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Prepared for:
Haywood County
Department of Solid Waste
278 Recycle Road
Clyde, NC 28721

WHITE OAK LANDFILL
PHASE 3 CONSTRUCTION
NC DENR PERMIT # 44-07

CONSTRUCTION QUALITY ASSURANCE CERTIFICATION REPORT

May 2010
Revised June 2010

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NORTH CAROLINA PROFESSIONAL SEAL 27446 ENGINEER EVAN E ANDREWS
6/15/10

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1.0 INTRODUCTION

This report, prepared by Joyce Engineering, Inc. (JEI) on behalf of Haywood County, NC addresses the quality assurance procedures and activities performed during construction of the Phase 3 lateral expansion at the White Oak Landfill, in Clyde, North Carolina. The documents comprising this report were compiled in accordance with North Carolina Solid Waste Management Regulations, 15A NCAC 13B and the General Permit Conditions of Permit 44-07.

Thalle Construction Co., Inc. of Hillsborough, North Carolina was selected as the General Contractor and performed earthwork in the summer and fall 2009 for the proposed Phase 3 lateral expansion. Earthwork included excavation and general fill placement to prepare subgrade for construction of a composite Sub-title D liner system, stormwater management features, modifications to the leachate lagoon, and site restoration. Other site work associated with the expansion project included installation of a synthetic liner system contiguous with the existing landfill liner system, installation of leachate collection piping, a leachate force main, a leachate gravity drain, and an aggregate/drainage layer/protective cover. Hallaton, Inc. a subcontractor to Thalle installed geosynthetic clay liner (GCL), 60-mil HDPE geomembrane, and geotextile cushion layer on the approximately 9 acres prepared by Thalle. The existing leachate lagoon was rehabilitated by raising the pond berm and relining the entire pond with HDPE membrane liner. General fill, soil liner and protective stone cover field and laboratory testing data are included in Appendix I. Geosynthetic materials manufacturer, conformance and installation data are included in Appendix II: Geosynthetic Clay Liner; Appendix III: Geomembrane; and Appendix IV: Geotextile and Geocomposite

A construction daily log, minutes of construction progress meetings, and a chronological photographic record to depict the sequence and details of the construction are included in Appendix V.

The constructed subgrade, low-permeability soil liner and top of completed protective cover/drainage layer were surveyed on a 50-foot grid system; the survey data and record drawings are presented in Appendix VIII. Record Drawing #5 in Appendix VIII shows all other site work associated with the Phase 3 construction.

2.0 CONSTRUCTION QUALITY ASSURANCE ACTIVITIES

2.1 General

Geotechnics, Inc. provided the onsite Construction Quality Assurance (CQA) activities during the construction project. The following sections describe the specific areas of CQA.

2.2 Soil Subgrade Foundation

The Contractor excavated and filled the proposed Phase 3 area floor and the sump in accordance with the design and the permit conditions. Undercut quantities, a drawing depicting the subgrade preparation, and underdrain pipe testing report are found in Appendix I. The perimeter road on the west side was cut and the north berm filled to achieve the design grades.

Subgrade preconstruction and construction field and laboratory soil testing data are presented in Appendix I. Table 1 at the end of this narrative section presents a summary of preconstruction test results for all soils used in the construction. Underdrain pipe and other Phase 3 construction related work are shown on Drawing #5. Resistant rock was encountered on the west slope of the Phase 3 during excavation. McGill Associates on behalf of the County prepared a request for a drilling and blasting to remove the rock. The Solid Waste Section approved the Rock Delineation and Blasting Plan on September 15, 2009. The Revised Blasting Plan, Blasting Plan Guide, and the Section approval letter are included in Appendix VII – NCDENR Correspondence. Upon completion, a survey verified that the specified design grade elevations had been achieved. Subgrade certification letter was issued on November 19, 2009. The certification letter is included in Appendix VII. The survey data and subgrade drawing are included Appendix VIII.

2.3 Low-permeability Soil Liner

Following the completed subgrade construction, the Contractor proceeded with the low-permeability soil liner construction. A Test pad was constructed in the SW corner of the Phase 3 within the sloped cell floor and was approximately 100 by 150 feet in size. Four lifts of the low-permeability soil from the on-site borrow source were placed to construct the test pad. Each lift, approximately six to eight inches thick were spread with a dozer and compacted with sheep's-foot roller- compactor. After repeated efforts to work the soil with varying moisture levels and efforts of compaction a decision was made that the on-site soils will not meet the permeability requirement 1x10E-07 cm/sec. As a result, McGill Associates negotiated a permit modification for an alternate liner design with the Solid Waste Section. Subsequently, the constructed test pad met the 1x10E-05 cm/sec permeability requirement for the alternate liner system. Table 2 at the end of this narrative section is a summary of the remolded and test pad permeability results. With the changed permit requirement, Thalle continued the soil liner construction with successful laboratory test results of the in-situ permeability testing. The alternate soil liner was constructed with three eight-inch lifts resulting in total liner thickness of 24 inches. The Phase 3 expansion area was divided into nine approximately one-acre size sections on the site plan to track the work progress and CQA testing. The Contractor placed the low-permeability soil one lift at the time over an acre, worked the soil, and the CQA field representative tested the completed work. Thalle worked some areas twice until acceptable permeability test results were achieved. A total of 27 acre-lifts were constructed for the Phase 3 soil liner. The north end, designated as Acre 9, was constructed in two parts to accommodate stormwater drainage, thus the field and laboratory testing resulted in additional set of soil testing data. The low-permeability soil material pre-construction, test pad and the soil liner construction final results are included in Appendix I. Table 3 at the end of this narrative section is a summary of all laboratory testing of the low-permeability soil liner test results. The leachate lagoon berm was constructed with the soil from the same borrow source used for the Phase 3 soil liner. The field and laboratory testing final results are included in Appendix I. The survey data and top of clay liner drawing are included Appendix VIII.

2.4 Geosynthetic Clay Liner (GCL)

Bentomat ST, manufactured by CETCO with Winning Edge Super Grove™ was placed on the entire cell floor in accordance with the approved permit modification for the alternate

liner design. Thalle Construction utilized the GCL matting on the leachate lagoon berm construction for the same reason as in the Phase 3 cell construction to compensate for the soil liner material not meeting the 1.0 x 10E-07 cm/sec permeability requirement.

Cetco manufacturer's quality certifications (MQC) and the Interface Friction Angle test results are included in Appendix II. The conformance samples were shipped on a pallet to the owner for archives. The GCL material arrived to the site in good condition without any damage to the rolls. The Contractor stacked the rolls in the construction materials staging area where the rolls were stored dry on high ground and covered with plastic to prevent the rolls from premature hydration. Installation of adjacent GCL panels overlapped a minimum of six (6) inches, and end-of-rolls were overlapped and shingled by a minimum of twenty-four (24) inches. Hallaton, Inc. applied accessory bentonite between the two-foot end-of-panel overlap as required in the specifications.

2.5 High Density Polyethylene Geomembrane (HDPE)

The primary HDPE geomembrane and GCL liner were installed simultaneously. Each day the GCL was covered with the HDPE membrane panels. The QA/QC data for the geomembrane liner include: quality certificates from the manufacturer (MQC) and laboratory conformance test results (CQA); installation records: the geomembrane panel placement log; field trial seam log; seaming record and non-destructive air pressure test log; seam destructive test log; laboratory peel and shear test results of the seam weld, and repair log. The geomembrane installation records and subgrade acceptance forms are included in Appendix III. The geomembrane rolls arrived to the site in good condition without any damage to the rolls. The Contractor stacked the rolls on a staging area that provided drainage during storage and covered them with plastic sheeting to prevent dust, rain, and sunlight exposure to the rolls.

2.6 Geotextile Cushion

Following geomembrane seaming, field testing, repairs and laboratory peel and shear test results were completed, Hallaton, Inc. deployed geotextile to cover the primary membrane. The geotextile edges were overlapped six inches, smoothed out and heat bonded together. The geotextile rolls arrived to the site in good condition without damage to the rolls. The Contractor stacked the rolls over an area that provided drainage during storage. The rolls were covered with plastic sheeting to prevent dust and rain, and sunlight exposure to the rolls. Manufacturer certificates and material conformance test results are included in Appendix IV.

With the Phase 3 expansion the leachate storage lagoon improvement was included in the project. Geocomposite was placed between the existing HDPE pond liner and a new HDPE liner. Geocomposite conformance test results and manufacturer certificate for the material are included in Appendix IV.

2.7 Aggregate Drainage Layer

A two-foot thick aggregate layer was placed over the completed geomembrane-geotextile composite liner. The drainage layer material was placed starting from the south end of Phase 3

and worked toward the sump and up toward higher elevation on the side slopes. A dozer equipped with GPS guiding system continuously pushed the stone uphill to avoid stress on the soil/synthetic liner interface and potential liner failure. Material pre-construction and construction testing results are in Appendix I.C. The survey data and top of drainage layer drawing are included Appendix VIII.

3.0 SUMMARY OF CQA FIELD DATA

3.1 Earthwork

Thalle excavated, hauled and placed all the soil materials for the Phase 3 lateral expansion subgrade and soil liner construction entirely from the on-site borrow source. Heavy earth moving equipment used for the earthwork included track excavators, dozers, articulated dump trucks, water trucks, sheep's foot compactor and smooth drum compactor. Soil was spread and graded with the dozers, compacted with a roller compactor, and sealed to smooth surface with rubber-tired drum roller. Water was added when soil moisture content was found below the moisture content required for the material to meet the specified compaction for the general fill and 1.0x10E-05 cm/sec permeability for the soil liner. A small track excavator was used to expose existing liner edge and excavate anchor trenches. A front loader was used for the stockpiled drainage layer stone loading the off-road trucks.

Site soil used for the Phase 3 construction ranged from was silty sand (SM) to elastic silt (MH) and fat clay (CH). A summary, Table 1, of the laboratory testing of materials used for the project is included in the end of this narrative.

Soil construction CQA field testing included in-place wet density, moisture content, calculated dry density and percent compaction with a Troxler model 3440 portable nuclear gauge. A density drive sampler with 4-inch thin-walled tube was used to verify the nuclear gauge test results for each acre lift. If the nuclear gauge moisture readings were found to deviate significantly from the moisture percentage by direct heating method, the dry density and in-place compaction percentage were re-calculated to verify compaction of the soil. If the placed soils were found not to meet the specification in a given area, the Contractor was informed of the test results and asked to re-work the soil. Following the soil re-work, the area was subjected to CQA testing verification. The test pad and soil liner CQA testing data are presented in tabular format at the end of this narrative section; Table 2 - Remolded and Test Pad Permeability Results, and Table - 3 Soil Liner Construction Testing Results. Complete set of all soil testing data for general fill, test pad, soil liner construction and leachate lagoon rehabilitation field and laboratory test results are included in Appendix I.

3.2 Geosynthetics Installation

Geosynthetic materials CQA documentation included friction angle testing, conformance testing for the proposed materials, and their installation. The CQA documents for the installation include (Appendix II and III) roll counts, geomembrane panel deployment, field trial weld log, geomembrane seaming and non-destructive testing log, geomembrane seam destructive test log, and repair log. A Record Drawing #4 of the membrane liner installation is included with Record

Documents in Appendix VIII. The membrane liner record drawing shows the entire Phase 3 area panel placement and their numbering, all welded seams, locations of destructive test and repairs. The west and north side perimeter line corresponds with the constructed anchor trench. The leachate lagoon membrane liner drawing is included on the Record Drawing #4.

Prior to deployment of the GCL the liner Contractor inspected the subsurface condition. The liner installer's Certificates for Subgrade Acceptance are included in Appendix III.

Hallaton, Inc. deployed 200 rolls of Bentomat ST equaling 450,000 SF, or 10.3 acres. The 60-mil textured HDPE synthetic membrane construction utilized 48 rolls of material equaling 452,640 SF, or 10.4 acres. The Phase 3 panel placement log records 113 panels and equals 417,302 SF, or a total of 9.6 acres. The difference of the total amount liner material ordered for the cell construction and the installed lined area results from material placement in the anchor trench, cutting and fitting the panels and material for repairs. Seven rolls of HDPE were ordered for the leachate lagoon improvements. The lagoon liner was constructed in radial pattern with most seams running down slope. Hallaton placed 19 panels totaling 26,255 sf or 0.6 acres.

Field seam testing was conducted on each day the Contractor welded panels and repairs. Each welder and his welding machine must qualify before proceeding with seam welding. The trial weld testing was conducted twice a day, each morning and after lunch-break, as required in the specifications. Samples were cut from a trial test seam and subjected to peel and shear tests. The minimum acceptable peel and shear strength values of fusion welded seams for the 60-mil textured HDPE in accordance with GRI GM19 are 91 ppi and 120 ppi respectively, and for extrusion welded seams were 78 ppi and 120 ppi respectively. The field conducted seam strength test results are included in Appendix III.

The Geomembrane seaming and non-destructive test logs were recorded for each day's progress. A total of 21,308 feet of seam welding was conducted to weld all 113 panels to a one contiguous membrane liner. Destructive samples of the welded seams were cut at an average frequency of 507 feet for a total of 42 destructive samples. The destructive seam samples were shipped to Geotechnics Laboratories in Pittsburg, Pennsylvania for peel and shear testing. DT-11, DT-12, DT-22, and DT-25 had partial seam failures (adhesion break of either inside or outside track). The destructive sample pass/fail criteria in the project specifications states that the peel criteria apply to both tracks of double track seams. Four out of five specimens from a destructive seam sample must meet the peel requirements and five out of five specimens must meet the shear requirements to be acceptable. The adhesion failures were traced both directions from the failed sample locations until acceptable quality weld was found. New samples were cut from the seam and shipped to laboratory peel/shear testing. Each of the four samples re-tested had satisfactory results from the laboratory testing. The in-field destructive seam test log and laboratory test results are included in Appendix III.

The Phase 3 repair log tallies a total of 220 repair locations. The geomembrane repairs consist of non-destructive seam air-test locations, destructive seam tests locations, panel junctions, welder burnouts, or blemishes found in the membrane panels. All repairs were extrusion welded. Prior to beginning repair work, the welding technician welded a sample seam

that was subjected to in-field peel and shear testing that monitors the weld quality. Vacuum-box testing provided quality control of the extrusion welded seam quality. The repair log is included in the Appendix III.

Leachate lagoon rehabilitation included a new liner over the raised berm, repair of any problems within the existing pond liner, double-sided geocomposite and a new 60-mil liner across the entire basin. Three destructive seam test samples were obtained and submitted to laboratory testing from the lagoon construction. The laboratory test results were satisfactory and they are included among the other destructive test results in Appendix III. The lagoon liner construction logs are included at the end of the Hallaton's installation submittal.

Geotextile and geocomposite Manufacturer's certifications and laboratory conformance sampling test results are included in Appendix IV.

The daily installation records track how many rolls of material were deployed each day and the installed quantity in square feet. Geomembrane panel numbers describe the work progress each day. Liner detail work, welding, testing and repairing are performed every day and these activities are recorded in their respective logs. Hallaton, Inc. began deploying GCL and 60-mil HDPE on November 7, 2009 on the south end of the Phase 3 by placing the materials from the Phase 1 tie-in across cell floor to the anchor trench on the west side. The installation progressed north toward the Phase 3 sump, alternating from one side to another and tying in the middle. By November 25, 2009, Hallaton had covered the entire Phase 3 with the geomembrane taking 18 days to construct the synthetic liner. Secondary geomembrane was installed in the sump area in accordance with the design. Repairs were all completed by December 7, 2009. The general construction daily log describing daily construction activities is in Appendix V.A. Photographic log of construction activities in included in Appendix V.B. Construction progress meetings were held once a month, and their minutes are included in Appendix V.C.

Written warranties from the geomembrane manufacturer, Agru, and installer, Hallaton, Inc. are included in Appendix VI.

3.3 Aggregate Drainage Layer

A two foot thick layer of #57 stone was placed over the entire lined area covering the geomembrane liner from anchor trenches to the Phase 1 and 2 tie-in. Preconstruction testing of the stone included a quarry certificate, grain size distribution, permeability, and Calcium Carbonate content. These tests were conducted one per source. Construction testing of the stone included grain size distribution at frequency of every 1,500 CY delivered, and permeability testing at frequency of every 6,000 CY delivered. The stone was delivered to the site and stockpiled and/or directly delivered to the working face. A total of 30,000 CY of stone was delivered for the Phase 3. Preconstruction quarry certificate and laboratory test results, and construction testing results and summary are included in Appendix I.C.

4.0 DEVIATIONS FROM THE CONTRACT DOCUMENTS

4.1 General

The purpose of this section is to identify any deviation from the contract documents, which occurred during construction. Correspondence with NCDENR regarding modifications to the Phase 3 design is included in Appendix VII.

4.2 Modified Permit Approval for the addition of a GCL alternative base-liner system

Pre-construction testing of the site soils for the construction of the base-liner did not yield acceptable laboratory test results for the undisturbed or remolded samples. As a result of the failing tests and the site soils not meeting the permitted soil liner permeability requirement, the County and Engineer agreed to approach the Solid Waste Section to apply for a modification to the Permit to Construct. On October 7, 2009 the Section approved a modification to the permit with the addition of a GCL alternative base-liner. The permit modification is included in Appendix VII – NCDENR Correspondence.

4.3 Anchor Trench and Liner Tie-in with Existing Phases

Thalle Construction suggested a change to the anchor trench and liner tie-in design in the interest to avoid excavating the existing anchor trench and placing low-permeability soil below the anchor trench as shown in the construction Drawing Detail Sheet 4 D. McGill Associates agreed to the suggested change and provided a revision to the anchor trench detail (Appendix III C). A condition to the design change called for subsoil permeability testing below the anchor trench at an interval not exceeding 250 feet. Permeability testing of the below anchor trench soil was conducted in four locations along the Phase 1 and 2 anchor trenches, labeled S-1 thru S-4. Test sample S-2 failed the permeability requirement. Re-sampling the Phase 2 anchor trench was retrieved 100 feet to the west which subsequently met the permeability requirement. The re-sampled S-2A laboratory Sample Number is PH2B. Anchor trench soil test results and location map are included in Appendix I.B - Construction Testing. As a result of the failing subsoil permeability test, McGill Associates required the Contractor to place additional GCL and HDPE membrane over the section of anchor trench that has soils not meeting the permeability requirement. A drawing depicting the geosynthetic installation along Phase 2 tie-in and the revised anchor trench detail are included in Appendix III C.

Rain during the winter months had washed soil from the Phase 2 slope and the fine material was deposited at the toe of the slope within the drainage layer stone. The Contractor removed the drainage layer stone to open the area along Phase 2 needing the additional GCL/HDPE. Hallaton placed one roll (150 feet) of Bentomat DN and covered it with textured 60-mil HDPE. The dimensions of the modified tie-in area were 203 feet long and 22 feet wide. A drawing is included in Appendix III.C – Installation to show the area along Phase 2 where the additional GCL and HDPE were installed and in relation to the anchor trench subsoil permeability test locations S-2 and S-2A. The geomembrane was covered with geotextile and

the stone was replaced. The soil contamination of the drainage layer stone was minimal and concentrated only along the tie-in section where the modification work was conducted.

4.4 HDPE Seam Destructive Testing

Membrane liner (HDPE) welded seam integrity testing is conducted by peel and shear testing of the weld. The seam strength testing is monitored in the field (CQC) and in the laboratory (CQA) testing. The CQA representative observes the liner installation and collects the installation data for each day's activities. As the work progresses, completed seams and the adjoining panel numbers are recorded. The seam lengths are measured in the field using a measuring wheel with accuracy to +/- 1.0 foot. Specification Section 02620 states that the laboratory destructive testing is defined as samples cut on 500 foot centers of the welded seam. At the completion of the project all field data has been collected and quantities verified. For the Phase 3 a total of 21,308 feet of seam welding was recorded to weld all 113 panels to one contiguous membrane liner. Destructive seam samples were marked approximately every 500 feet by measuring with the wheel. 42 seam samples were cut and shipped to the CQA laboratory for a destructive peel and shear testing. The slight variation between the field measured frequency and the mathematical frequency of 507 ft per destructive sample are a result of inaccuracies in field measurements due to human error crew judgment in marking and cutting destructive sample locations. The variation represents a 1.4% measurement error for the entire process which we feel is acceptable.

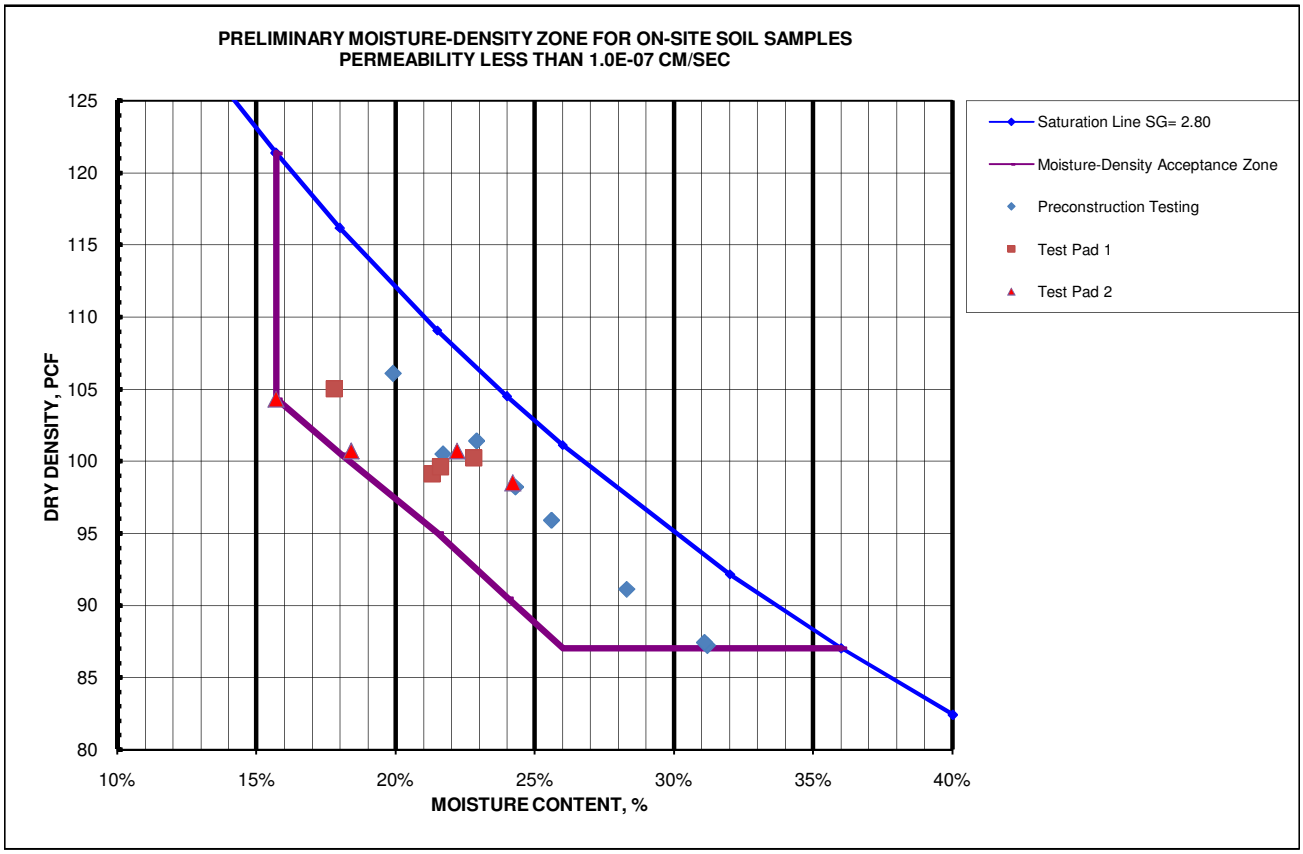
END

TABLE 1.
SUMMARY OF SOIL MATERIALS
White Oak Landfill - Phase 3
Haywood County, NC

Pre-Construction Testing Fill Material						Sieve	Atterberg Limits		
Sample ID	Soli Description	USCS	OMC	MDD	Water content %	%Fines	LL	PL	PI
SF-01	Brown Silt	ML	20.0	101.0	22.5				
SF-02	Red-brn fat Clay	CH	23.8	93.6	24.0				
SF-03	Red-brn fat Clay	CH	23.7	91.0	29.3				
SF-04	Red-brn elastic Silt	MH	27.0	91.0	29.1				
SF-05	Red-brn fat Clay	CH	23.4	87.8	30.5				
SF-06	Brown fat Clay	CH	16.4	104.8	14.0				
SF-07	Brown lean Clay	CL	16.2	107.0	15.2				
SF-08	Brown fat Clay	CH	19.4	102.7	17.2				
SF-09	Brown fat Clay	CH	18.0	103.3	16.8				
SF-10	Brown fat Clay	CH	17.8	102.5	16.1				
SF-11	Red-brn fat Clay	CH	23.9	96.9	5.4				

Pre-Construction Testing Low-Permeability Soil Liner						Sieve	Atterberg Limits		
Sample ID	Soli Description	USCS	OMC	MDD	K cm/sec	%Fines	LL	PL	PI
CCL1	Red-brn elastic Silt	MH	27.5%	89.7	3.4E-07	69.2%	50	30	20
CCL2	Brown fat Clay	CH	18.5%	103.5	6.3E-07	50.4%	51	27	24
CCL3	Brown Silt	ML	19.0%	104.1	5.0E-07	49.8%	39	31	8
CCL4	Brown lean Clay	CL	16.0%	109.8	3.8E-07	57.1%	40	21	19
CCL5	Brown fat Clay	CH	26.0%	94.2	2.6E-07	74.1%	56	29	27
CCL6	Red-brn fat Clay	CH	22.0%	98.8	7.4E-07	68.7%	50	27	23
CCL7	Red-brn Silt	ML	21.3%	100.5	2.9E-06	55.9%	44	36	8
CCL8	Red-brn elastic Silt	MH	28.6%	89.5	4.0E-07	79.7%	70	39	31
CCL9	Brn sandy elastic Silt	MH	18.8%	106.4					

TABLE 2
REMOLDED AND TEST PAD PERMEABILITY RESULTS



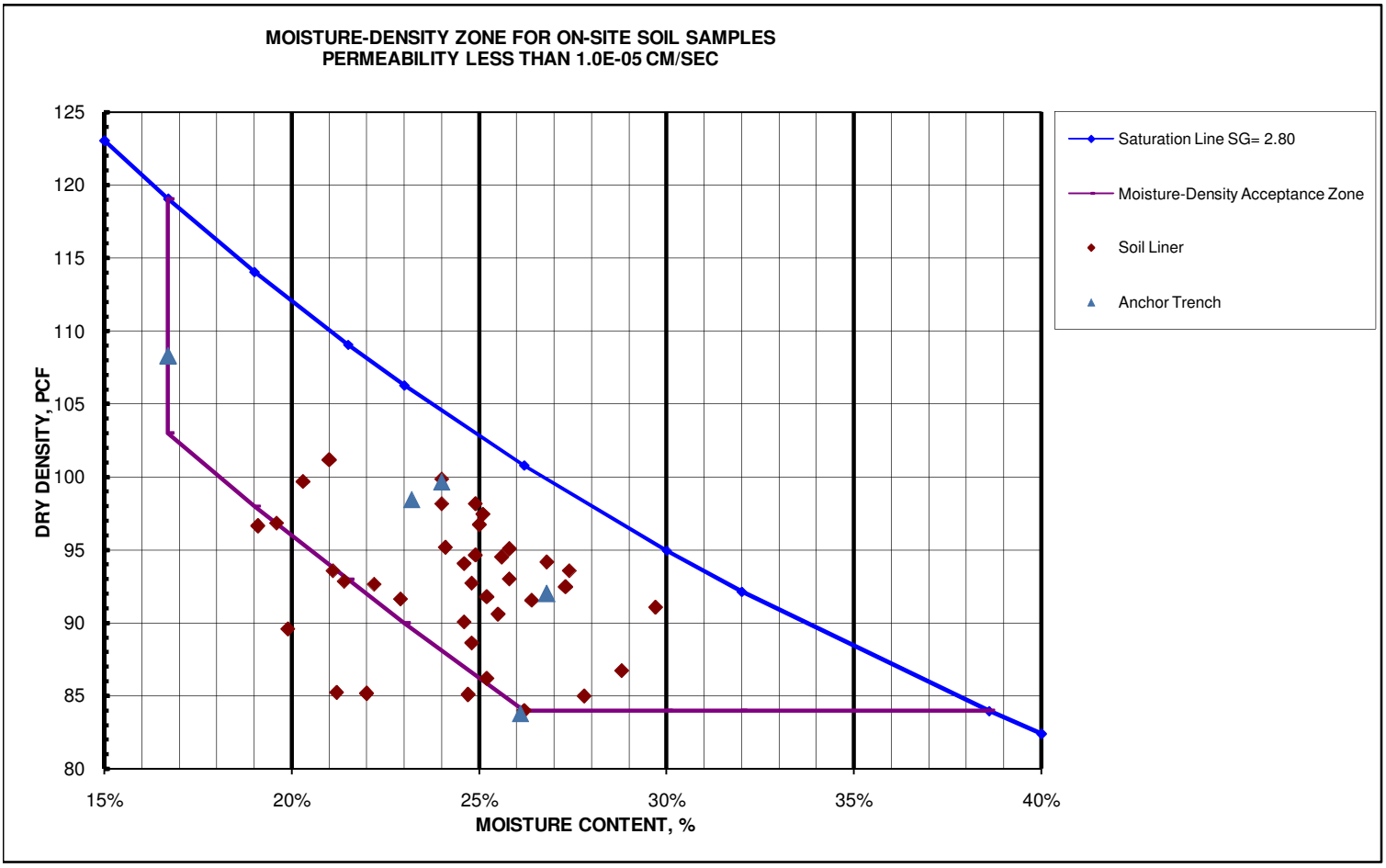
PRE-CONSTRUCTION REMOLDED CQA TESTING

Perm	Sample	Remold			Standard Proctor		Remolded Lab Samples				Perm
No.	I.D.		Sample Description	USCS	OMC	MDD	MC	OMC-MC	DD	DD/MDD	(cm/sec)
	CCL1	Remold	Red-brn elastic Silt	MH	27.5%	89.7	31.2%	3.7%	87.2	97.2%	3.4E-07
	CCL2	Remold	Brown fat Clay	CH	18.5%	103.5	21.7%	3.2%	100.5	97.1%	6.3E-07
	CCL3	Remold	Brown Silt	ML	19.0%	104.1	22.9%	3.9%	101.4	97.4%	5.0E-07
	CCL4	Remold	Brown lean Clay	CL	16.0%	109.8	19.9%	3.9%	106.1	96.6%	3.8E-07
	CCL5	Remold	Brown fat Clay	CH	26.0%	94.2	28.3%	2.3%	91.1	96.7%	2.6E-07
	CCL6	Remold	Red-brn fat Clay	CH	22.0%	98.8	25.6%	3.6%	95.9	97.1%	7.4E-07
	CCL7	Remold	Red-brn Silt	ML	21.3%	100.5	24.3%	3.0%	98.2	97.7%	2.9E-06
	CCL8	Remold	Red-brn elastic Silt	MH	28.6%	89.5	31.1%	2.5%	87.4	97.7%	4.0E-07
	CCL9	Remold	Brn sandy elastic Silt	MH	18.8%	106.4					

TEST PAD Constructed on September 1, 2009

Lab ID	Test Pad	LIFT	ST	Standard Proctor		Undisturbed Shelby Tube				Perm
2009-666-05-02	TP-1	LIFT 1	ST1	16.0%	109.8	17.8%	1.8%	105.0	95.6%	2.30E-07
2009-666-05-04	TP-1	LIFT 2	ST3	21.3%	100.5	21.3%	0.0%	99.1	98.6%	4.40E-07
2009-666-05-06	TP-1	LIFT 3	ST5	21.3%	100.5	22.8%	1.5%	100.2	99.7%	3.00E-07
2009-666-05-08	TP-1	LIFT 4	ST7	21.3%	100.5	21.6%	0.3%	99.6	99.1%	3.10E-07
2009-666-05-03	TP-2	LIFT 1	ST2	18.5%	103.5	18.4%	-0.1%	100.7	97.3%	3.40E-07
2009-666-05-05	TP-2	LIFT 2	ST4	22.0%	98.8	24.2%	2.2%	98.5	99.7%	2.30E-07
2009-666-05-07	TP-2	LIFT 3	ST6	18.5%	103.5	22.2%	3.7%	100.7	97.3%	5.20E-07
2009-666-05-09	TP-2	LIFT 4	ST8	16.0%	109.8	15.7%	-0.3%	104.3	95.0%	6.30E-07

TABLE 3
SOIL LINER CONSTRUCTION TESTING RESULTS



		SOIL LINER Construction started on September 11, 2009												
Lab ID	Tube	ACRE	LIFT	WD	MC	DD	K cm/sec	LL	PL	PI	USCS	Gravel	Sand	Silt/Clay
No.	No.	Ref.		pcf	%	pcf						%	%	%
666-06-01	ST-9	A1	L1	119.9	20.3%	99.7	1.7E-07	45	31	14	ML	5.15	33.21	61.64
666-06-02	ST-10	A1	L2	122.4	21.0%	101.2	4.5E-07	47	34	13	ML	2.93	41.66	55.41
666-07-05	ST-15	A1	L3	118.1	24.1%	95.2	5.7E-07	40	35	5	ML	3.49	47.20	49.31
666-07-01	ST-11	A2	L1	115.8	19.6%	96.8	1.4E-06	43	35	8	ML	3.54	46.65	49.81
666-07-03	ST-13	A2	L2	118.1	29.7%	91.1	1.7E-07	49	38	11	ML	1.01	36.45	62.54
666-07-06	ST-16	A2	L3	118.7	25.6%	94.5	3.4E-07	46	34	12	ML	0.92	47.58	51.50
666-08-01	ST-18	A3	L1	121.9	25.1%	97.4	3.4E-07	50	41	9	MH	3.37	41.10	55.53
666-08-02	ST-19	A3	L2	120.9	25.0%	96.7	1.8E-07	48	35	13	ML	4.78	39.32	55.90
666-09-01	ST-20	A3	L3	123.8	24.0%	99.8	3.0E-07	45	37	8	ML	5.46	43.97	50.57
666-10-06	ST-32	A4	L1	112.2	24.6%	90.0	4.2E-06	48	38	10	ML	0.58	34.32	65.10
666-09-07	ST-33	A4	L2	113.2	22.2%	92.6	7.2E-06	47	39	8	ML	0.08	40.02	59.90
666-12-03	ST-34	A4	L3	117.2	24.6%	94.1	4.7E-06	45	39	6	ML	0.27	41.94	57.79
666-09-05	ST-24	A5	L1	119.2	27.4%	93.6	4.3E-07	45	35	10	ML	0.53	36.36	63.11
666-09-10	ST-29	A5	L2	110.6	24.8%	88.6	2.7E-06	48	42	6	ML	1.03	35.81	63.16
666-10-05	ST-30	A5	L3	113.3	21.1%	93.6	9.5E-06	44	39	5	ML	0.24	38.41	61.35

Lab ID No.	Tube No.	ACRE Ref.	LIFT	WD pcf	MC %	DD pcf	K cm/sec	LL	PL	PI	USCS	Gravel %	Sand %	Silt/Clay %
666-09-02	ST-21	A6	L1	121.7	24.0%	98.1	1.8E-07	55	33	22	MH	0.45	37.06	62.49
666-09-03	ST-22	A6	L2	112.7	21.4%	92.8	2.4E-05	37	32	5	ML	3.38	42.02	54.60
666-09-03	ST-22B	A6	L2B	115.1	19.1%	96.6	3.9E-05	37	32	5	ML	3.38	42.02	54.60
666-10-03	ST-22A	A6	L2R	115.7	24.8%	92.7	2.3E-06	49	41	8	ML	0.45	38.94	60.61
666-09-04	ST-23	A6	L3	111.7	28.8%	86.72	5.7E-06	45	38	7	ML	0.50	38.85	60.65
666-11-01	ST-23A	A6	L3R	108.6	27.8%	85.0	2.8E-06	45	38	7	ML	0.15	36.03	63.82
666-09-06	ST-25	A7	L1	115.7	26.4%	91.5	1.4E-06	47	39	8	ML	2.16	43.03	54.81
666-09-08	ST-27	A7	L2	103.9	22.0%	85.2	1.5E-05	47	43	4	ML	0.22	38.28	61.50
666-10-04	ST-27A	A7	L2	119.4	26.8%	94.2	1.3E-06	44	38	6	ML	0.79	53.63	45.58
666-12-04	ST-35	A7	L3	106.1	24.7%	85.1	3.2E-05	47	39	8	ML	3.87	40.50	55.63
666-14-01	ST-35A	A7	L3R	107.4	19.9%	89.6	5.6E-06	49	41	8	ML	6.3	34.36	59.34
666-09-07	ST-26	A8	L1	117.7	27.3%	92.5	1.4E-06	43	34	9	ML	1.65	36.33	62.02
666-09-09	ST-28	A8	L2	103.3	21.2%	85.2	8.8E-05	45	40	5	ML	0.56	44.67	54.77
666-12-02	ST-28A	A8	L2R	117.0	25.8%	93.0	4.9E-06	47	37	10	ML	1.58	36.19	62.23
666-12-01	ST-31	A8	L3	106.0	26.2%	84.0	3.7E-06	47	39	8	ML	0.13	41.27	58.60
666-07-02	ST-12	A9A	L1	119.6	25.8%	95.1	8.0E-07	47	36	11	ML	5.26	44.17	50.57
666-07-04	ST-14	A9A	L2	113.7	25.5%	90.6	2.1E-06	46	36	10	ML	3.12	44.41	52.47
666-07-07	ST-17	A9A	L3	122.6	24.9%	98.2	1.1E-07	49	33	16	ML	1.67	39.61	58.72
666-13-01	ST-36	A9B	L1	114.9	25.2%	91.8	3.3E-05	46	36	10	ML	0.17	43.19	56.64
666-13-01	ST-36A	A9BR	L1	112.6	22.9%	91.6	8.0E-06	50	36	14	MH	4.21	43.69	52.10
666-13-02	ST-37	A9B	L2	107.9	25.2%	86.2	9.9E-06	51	43	8	MH	0.53	43.87	55.60
666-13-03	ST-38	A9B	L3	118.2	24.9%	94.6	2.8E-06	51	43	8	MH	0.99	38.1	60.91
PERIMETER ANCHOR TRENCH														
666-10-01	ST-1	PH1 CCH3		121.3	23.2%	98.5	5.3E-07	45	33	12	ML	0.39	42.53	57.08
666-10-02	ST-2	PH2		105.7	26.1%	83.8	1.0E-04	37	35	2	ML	0	46.81	53.19
666-10-02	ST-2R	PH2 B		116.7	26.8%	92.0	9.3E-05	37	35	2	ML	0	46.81	53.19
666-13-04	ST-3	PH1		126.4	16.7%	108.3	4.0E-07	49	31	18	ML	5.78	57.89	36.33
666-13-05	ST-4	PH1		123.6	24.0%	99.7	1.0E-05	43	32	11	ML	8.22	68.68	23.10

Notes:
ST = Shelby Tube
A = Acre designation
L = Lift designation
L2B = Lift 2 backup sample
L2R = Lift 2 reworked and resampled
9A = Acre 9 berm construction
9B = Acre 9 sump and floor constrcution
Moisture-Density Acceptance Zone defined to include most passing results.

Appendix I

Appendix I - Earthwork

Appendix I A – General Fill

TABLE 1.
SUMMARY OF SOIL MATERIALS
White Oak Landfill - Phase 3
Haywood County, NC

Pre-Construction Testing Fill Material						Sieve	Atterberg Limits		
Sample ID	Soli Description	USCS	OMC	MDD	Water content %	%Fines	LL	PL	PI
SF-01	Brown Silt	ML	20.0	101.0	22.5				
SF-02	Red-brn fat Clay	CH	23.8	93.6	24.0				
SF-03	Red-brn fat Clay	CH	23.7	91.0	29.3				
SF-04	Red-brn elastic Silt	MH	27.0	91.0	29.1				
SF-05	Red-brn fat Clay	CH	23.4	87.8	30.5				
SF-06	Brown fat Clay	CH	16.4	104.8	14.0				
SF-07	Brown lean Clay	CL	16.2	107.0	15.2				
SF-08	Brown fat Clay	CH	19.4	102.7	17.2				
SF-09	Brown fat Clay	CH	18.0	103.3	16.8				
SF-10	Brown fat Clay	CH	17.8	102.5	16.1				
SF-11	Red-brn fat Clay	CH	23.9	96.9	5.4				

Pre-Construction Testing Low-Permeability Soil Liner						Sieve	Atterberg Limits		
Sample ID	Soli Description	USCS	OMC	MDD	K cm/sec	%Fines	LL	PL	PI
CCL1	Red-brn elastic Silt	MH	27.5%	89.7	3.4E-07	69.2%	50	30	20
CCL2	Brown fat Clay	CH	18.5%	103.5	6.3E-07	50.4%	51	27	24
CCL3	Brown Silt	ML	19.0%	104.1	5.0E-07	49.8%	39	31	8
CCL4	Brown lean Clay	CL	16.0%	109.8	3.8E-07	57.1%	40	21	19
CCL5	Brown fat Clay	CH	26.0%	94.2	2.6E-07	74.1%	56	29	27
CCL6	Red-brn fat Clay	CH	22.0%	98.8	7.4E-07	68.7%	50	27	23
CCL7	Red-brn Silt	ML	21.3%	100.5	2.9E-06	55.9%	44	36	8
CCL8	Red-brn elastic Silt	MH	28.6%	89.5	4.0E-07	79.7%	70	39	31
CCL9	Brn sandy elastic Silt	MH	18.8%	106.4					

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MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client	JOYCE ENGINEERING, INC.
Client Reference	WHITE OAK MSW LF PH III
Project No.	2009-666-01

	SF	SF	SF	SF	SF
Lab ID	.001	.002	.003	.004	.005
Boring No.	NA	NA	NA	NA	NA
Depth (ft)	SURFACE	0-6	6-13	12-18	-18
Sample No.	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	SAMPLE 5
Tare Number	210	202	250	211	212
Wt. of Tare & WS (gm)	1941.17	1785.54	1750.36	1523.06	1738.91
Wt. of Tare & DS (gm)	1616.15	1478.21	1391.87	1218.59	1372.86
Wt. of Tare (gm)	172.91	197.48	169.29	171.16	171.59
Wt. of Water (gm)	325.02	307.33	358.49	304.47	366.05
Wt. of DS (gm)	1443.24	1280.73	1222.58	1047.43	1201.27
Water Content (%)	**22.5**	**24.0**	**29.3**	**29.1**	**30.5**

Notes : *NA*

Tested By *AB* *Date* *6/19/2009* *Checked By* GEM *Date* 6-24-09

DCN: CT-S1 DATE 6-30-98 REVISION: 2

\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-01 WATCONT.XLS]Sheet1

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MOISTURE CONTENT

ASTM D 2216 (SOP-S1)

Client	JOYCE ENGINEERING, INC.
Client Reference	WHITE OAK MSW LF PH III
Project No.	2009-666-03

Lab ID	.001	.002	.003	.004	.005
Boring No.	NA	NA	NA	NA	NA
Depth (ft)	NA	NA	NA	NA	NA
Sample No.	SF-6	SF-7	SF-8	SF-9	SF-10
Tare Number	210	316	316	209	209
Wt. of Tare & WS (gm)	1012.24	1265.67	1177.31	842.51	1138.03
Wt. of Tare & DS (gm)	909.33	1126.07	1035.27	746.11	1003.84
Wt. of Tare (gm)	172.99	208.25	208.21	171.73	171.8
Wt. of Water (gm)	102.91	139.6	142.04	96.4	134.19
Wt. of DS (gm)	736.34	917.82	827.06	574.38	832.04
Water Content (%)	**14.0**	**15.2**	**17.2**	**16.8**	**16.1**

Lab ID	.006
Boring No.	NA
Depth (ft)	NA
Sample No.	SF-11
Tare Number	201
Wt. of Tare & WS (gm)	742.39
Wt. of Tare & DS (gm)	712.98
Wt. of Tare (gm)	170
Wt. of Water (gm)	29.41
Wt. of DS (gm)	542.98
Water Content (%)	**5.4**

Notes : *NA*

Tested By *SD* *Date* *7/20/2009* *Checked By* GBM *Date* 7-30-09

DCN: CT-S1 DATE 6-30-98 REVISION: 2

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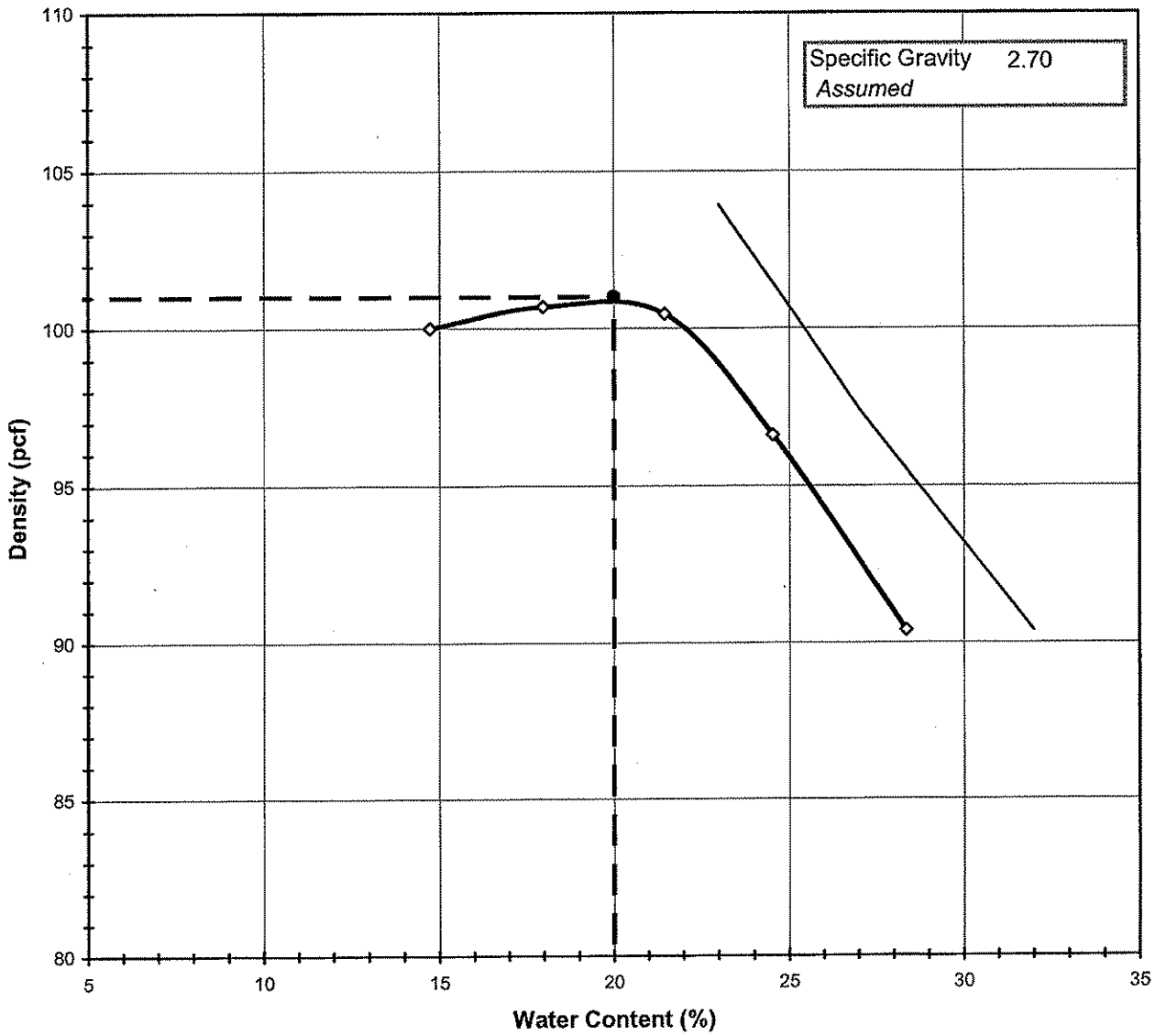
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	SURFACE
Project No.	2009-666-01	Sample No.	SAMPLE 1 SF-01
Lab ID	2009-666-01-01	Test Method	**STANDARD**

Visual Description PINK BROWN SANDY SILT

Optimum Water Content **20.0**
Maximum Dry Density **101.0**



Tested By SD *Date* 6/23/2009 *Checked By* GM *Date* 6-26-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-01-01 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	SURFACE
Project No.	2009-666-01	Sample No.	SAMPLE 1 SF-01
Lab ID	2009-666-01-01		

Visual Description PINK BROWN SANDY SILT

Total Weight of the Sample (gm)	17264
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4317
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6040	6101	6150	6124	6060
Wt.of Mold (gm)	4317	4317	4317	4317	4317
Wt. of WS	1723	1784	1833	1807	1743
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	303	300	315	318	398
Wt. of Tare & WS (gm)	565.00	496.70	618.70	514.90	494.60
Wt. of Tare & DS (gm)	506.71	437.91	528.90	430.58	403.89
Wt. of Tare (gm)	111.00	110.90	110.50	86.90	84.10
Wt. of Water (gm)	58.29	58.79	89.80	84.32	90.71
Wt. of DS (gm)	395.71	327.01	418.40	343.68	319.79

Wet Density (gm/cc)	1.84	1.90	1.96	1.93	1.86
Wet Density (pcf)	114.7	118.8	122.0	120.3	116.0
Moisture Content (%)	**14.7**	**18.0**	**21.5**	**24.5**	**28.4**
Dry Density (pcf)	**100.0**	**100.7**	**100.5**	**96.6**	**90.4**

Zero Air Voids

Moisture Content (%)	23.0	27.0	32.0
Dry Unit Weight (pcf)	103.9	97.4	90.4

Tested By SD *Date* 6/23/2009 *Checked By* GEM *Date* 6-26-09

DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-01-01 Proctor.XLS]Sheet1*

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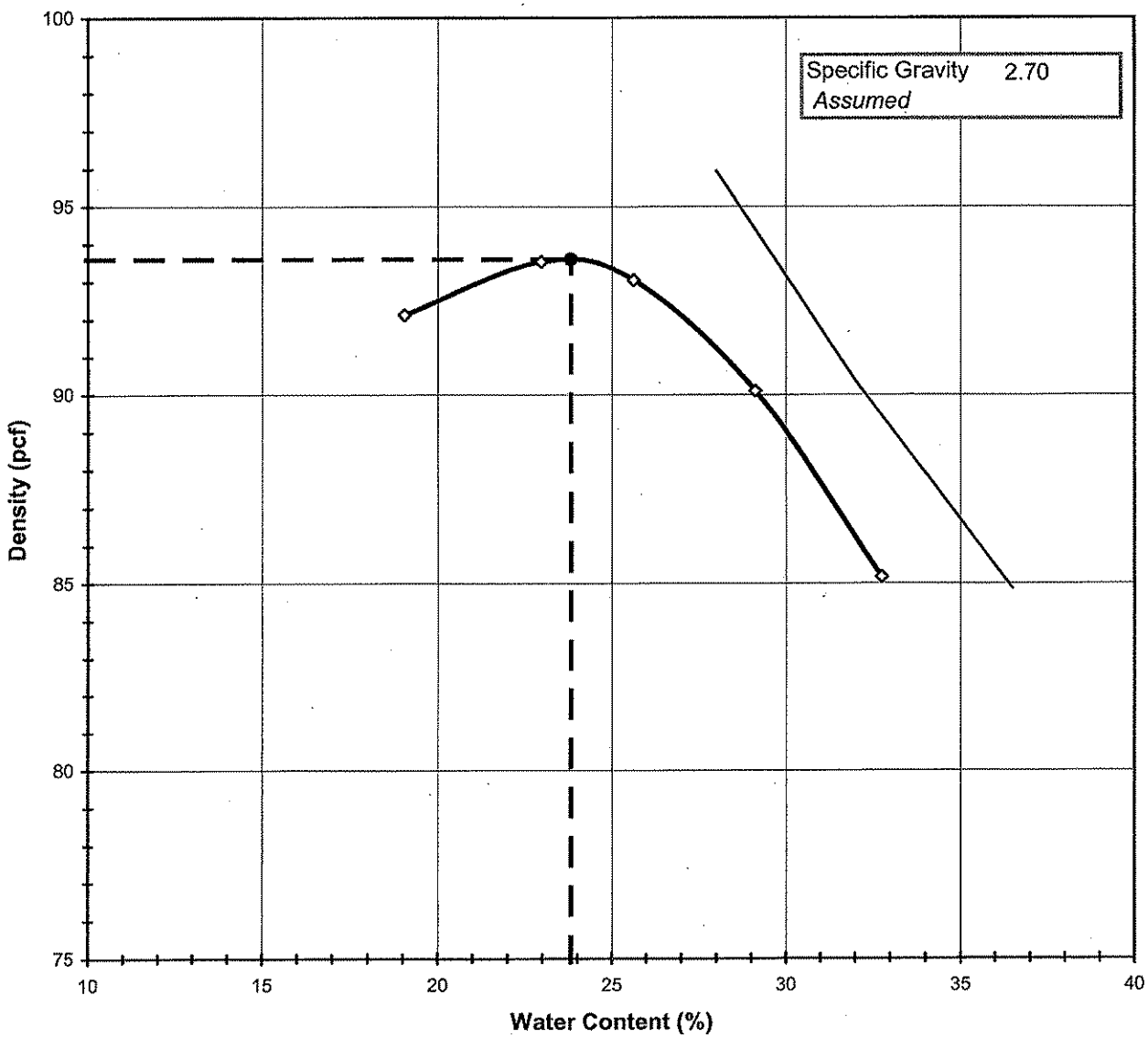
ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	0-6
Project No.	2009-666-01	Sample No.	SAMPLE 2 SP-02
Lab ID	2009-666-01-02	Test Method	**STANDARD**

Visual Description PINK BROWN SANDY SILT

Optimum Water Content **23.8**
Maximum Dry Density **93.6**



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 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-01-02 Proctor.XLS]Sheet1*

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ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	0-6
Project No.	2009-666-01	Sample No.	SAMPLE 2 SF-02
Lab ID	2009-666-01-02		

Visual Description PINK BROWN SANDY SILT

Total Weight of the Sample (gm)	20424
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4317
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5965	6045	6073	6064	6015
Wt.of Mold (gm)	4317	4317	4317	4317	4317
Wt. of WS	1648	1728	1756	1747	1698
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	317	301	K-7	306	309
Wt. of Tare & WS (gm)	514.30	496.50	548.00	600.00	576.40
Wt. of Tare & DS (gm)	445.44	419.48	458.63	484.62	461.20
Wt. of Tare (gm)	84.00	84.20	110.00	88.40	109.60
Wt. of Water (gm)	68.86	77.02	89.37	115.38	115.20
Wt. of DS (gm)	361.44	335.28	348.63	396.22	351.60

Wet Density (gm/cc)	1.76	1.84	1.87	1.86	1.81
Wet Density (pcf)	109.7	115.0	116.9	116.3	113.1
Moisture Content (%)	**19.1**	**23.0**	**25.6**	**29.1**	**32.8**
Dry Density (pcf)	**92.1**	**93.5**	**93.0**	**90.1**	**85.2**

Zero Air Voids

Moisture Content (%)	28.0	32.0	36.5
Dry Unit Weight (pcf)	95.9	90.4	84.9

Tested By SD *Date* 6/23/2009 *Checked By* GEM *Date* 6-24-09

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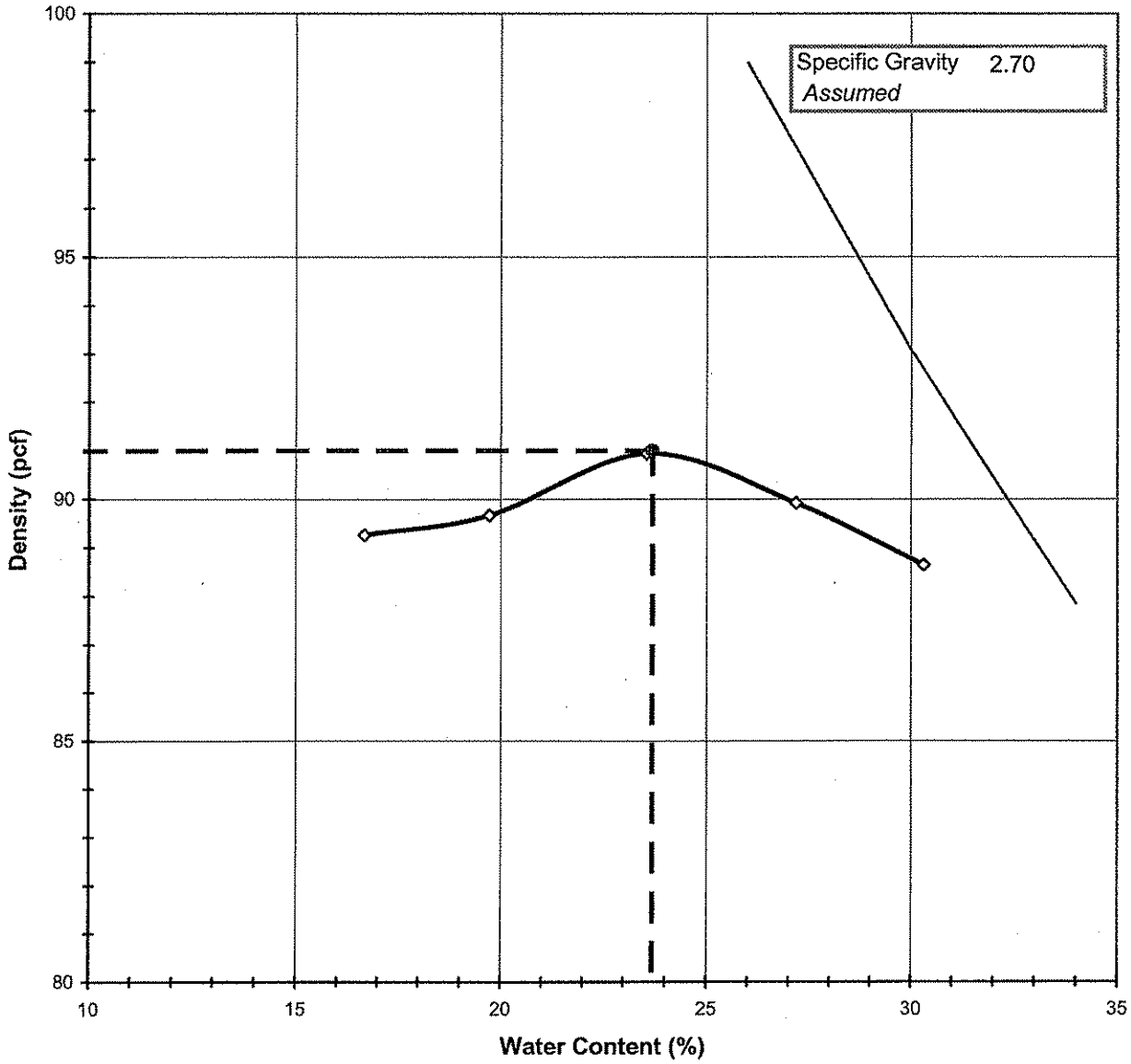
ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	6-13
Project No.	2009-666-01	Sample No.	SAMPLE 3 SP-03
Lab ID	2009-666-01-03	Test Method	**STANDARD**

Visual Description PINK BROWN SANDY SILT

Optimum Water Content **23.7**
Maximum Dry Density **91.0**



Tested By SD *Date* 6/24/2009 *Checked By* CBM *Date* 6-29-09

DCN:CT-S12 DATE:12/11/00 REVISION:9 USER:Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[Copy of 2009-666-01-03 Proctor1.XLS]Sheet1

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	6-13
Project No.	2009-666-01	Sample No.	SAMPLE 3 SP-03
Lab ID	2009-666-01-03		

Visual Description PINK BROWN SANDY SILT

Total Weight of the Sample (gm)	22776
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4317
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5881	5930	6005	6035	6052
Wt.of Mold (gm)	4317	4317	4317	4317	4317
Wt. of WS	1564	1613	1688	1718	1735
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	304	311	307	312	305
Wt. of Tare & WS (gm)	620.30	588.30	426.00	427.20	547.60
Wt. of Tare & DS (gm)	547.47	505.30	365.96	353.87	439.99
Wt. of Tare (gm)	110.70	84.40	111.10	84.10	84.90
Wt. of Water (gm)	72.83	83.00	60.04	73.33	107.61
Wt. of DS (gm)	436.77	420.90	254.86	269.77	355.09

Wet Density (gm/cc)	1.67	1.72	1.80	1.83	1.85
Wet Density (pcf)	104.1	107.4	112.4	114.4	115.5
Moisture Content (%)	**16.7**	**19.7**	**23.6**	**27.2**	**30.3**
Dry Density (pcf)	**89.3**	**89.7**	**90.9**	**89.9**	**88.6**

Zero Air Voids

Moisture Content (%)	26.0	30.0	34.0
Dry Unit Weight (pcf)	99.0	93.1	87.8

Tested By SD *Date* 6/24/2009 *Checked By* GEM *Date* 6-29-09

DCN:CT-S12 DATE:12/11/00 REVISION:0 S:\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[Copy of 2009-666-01-03 Proctor1.XLS]Sheet1

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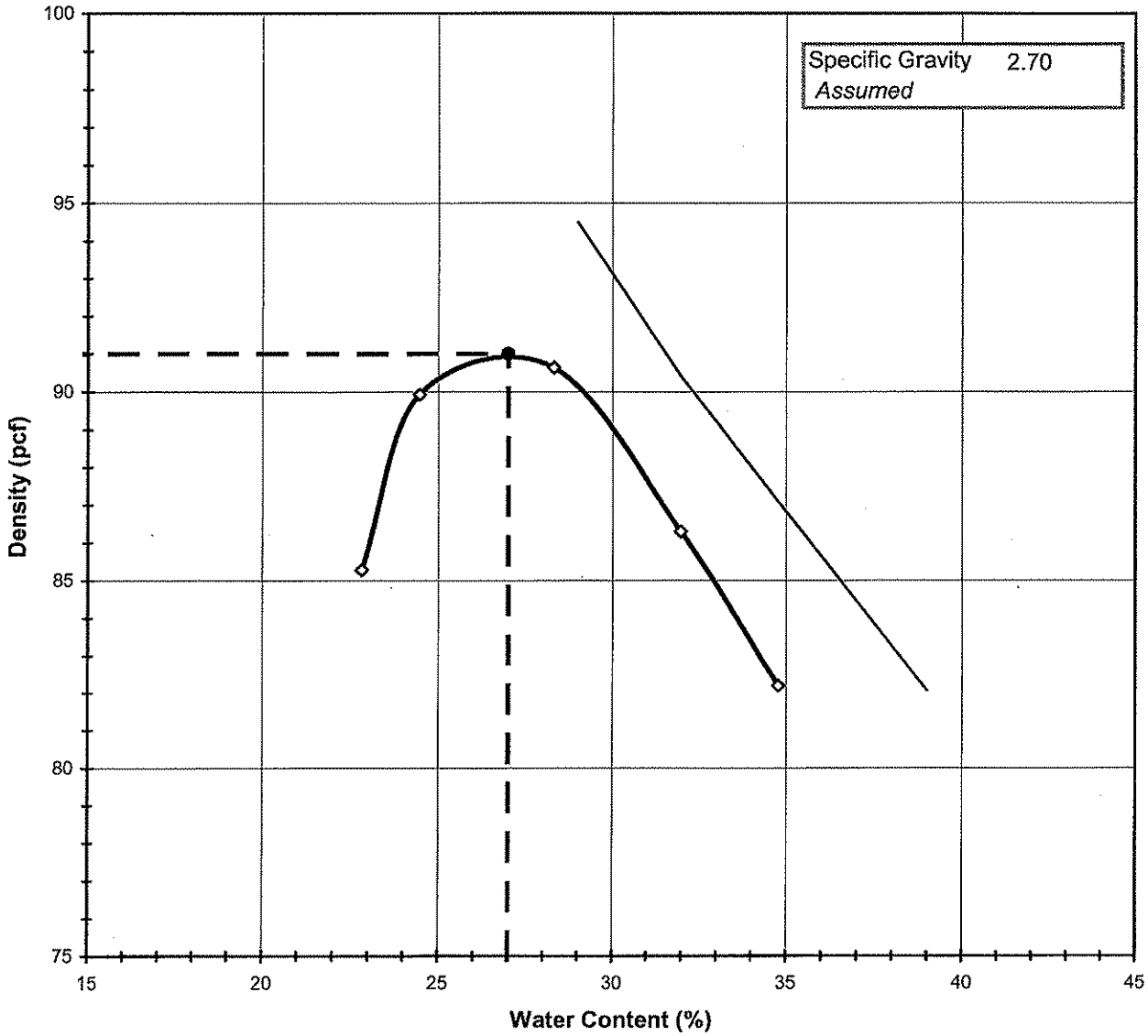
ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	6-13
Project No.	2009-666-01	Sample No.	SAMPLE 3 SP-04
Lab ID	2009-666-01-04	Test Method	**STANDARD**

Visual Description PINK BROWN SANDY SILT

Optimum Water Content	**27.0**
Maximum Dry Density	**91.0**



Tested By SD *Date* 6/24/2009 *Checked By* GEM *Date* 6-26-09

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ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	6-13
Project No.	2009-666-01	Sample No.	SAMPLE 3 ST-04
Lab ID	2009-666-01-04		

Visual Description PINK BROWN SANDY SILT

Total Weight of the Sample (gm)	20812
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4317
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5890	5998	6064	6028	5981
Wt.of Mold (gm)	4317	4317	4317	4317	4317
Wt. of WS	1573	1681	1747	1711	1664
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	317	318	300	303	398
Wt. of Tare & WS (gm)	530.70	557.70	582.00	520.10	490.40
Wt. of Tare & DS (gm)	447.80	469.78	478.06	420.99	385.61
Wt. of Tare (gm)	84.50	110.50	111.00	111.10	84.30
Wt. of Water (gm)	82.90	87.92	103.94	99.11	104.79
Wt. of DS (gm)	363.30	359.28	367.06	309.89	301.31

Wet Density (gm/cc)	1.68	1.79	1.86	1.83	1.78
Wet Density (pcf)	104.7	111.9	116.3	113.9	110.8
Moisture Content (%)	**22.8**	**24.5**	**28.3**	**32.0**	**34.8**
Dry Density (pcf)	**85.3**	**89.9**	**90.6**	**86.3**	**82.2**

Zero Air Voids

Moisture Content (%)	29.0	32.0	39.0
Dry Unit Weight (pcf)	94.5	90.4	82.1

Tested By SD *Date* 6/24/2009 *Checked By* GEM *Date* 6-26-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-01-04 Proctor.XLS]Sheet1*

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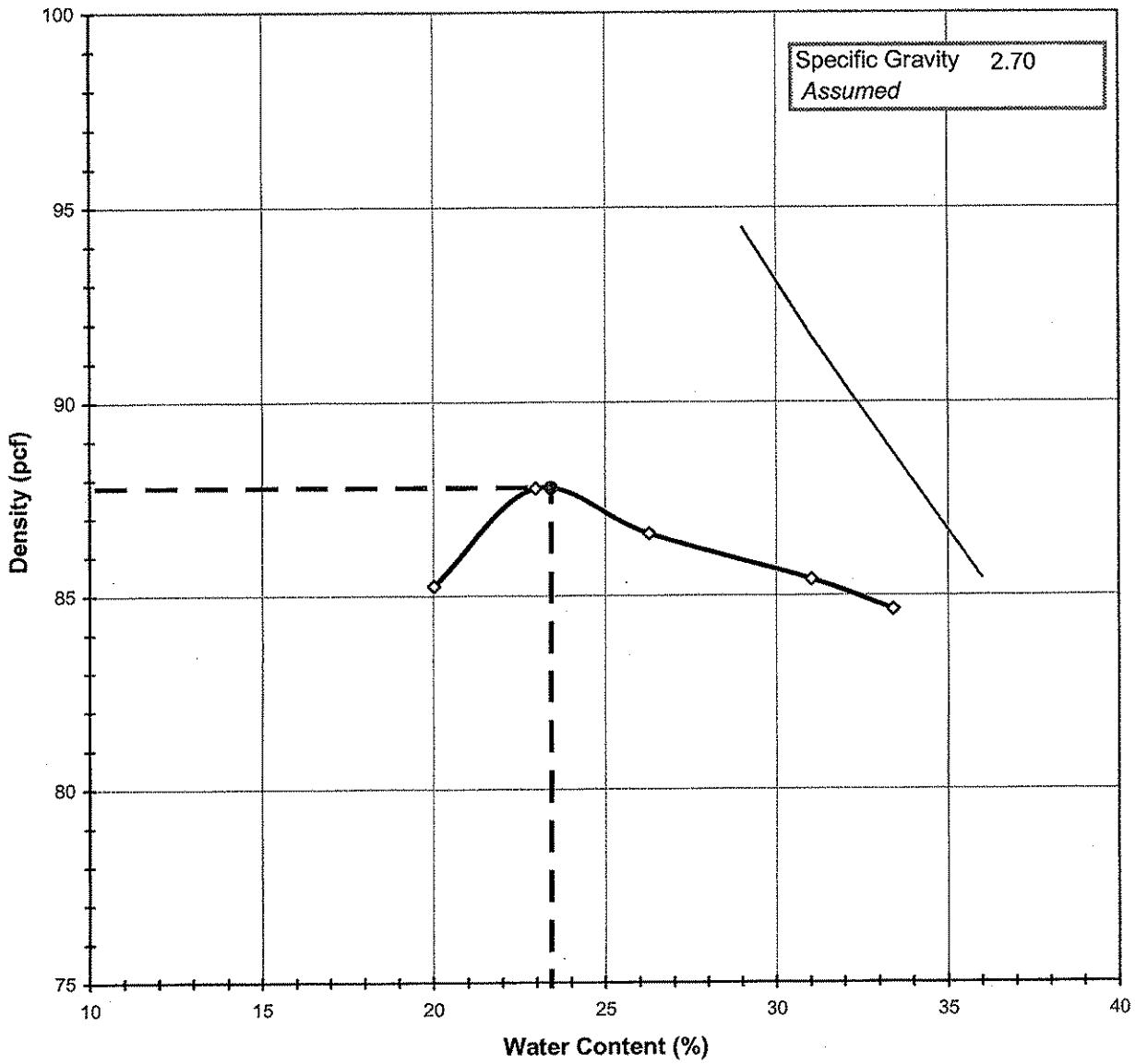
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-18
Project No.	2009-666-01	Sample No.	SAMPLE 5 ST-05
Lab ID	2009-666-01-05	Test Method	**STANDARD**

Visual Description PINK BROWN SANDY SILT

Optimum Water Content	**23.4**
Maximum Dry Density	**87.8**



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 DCN:CT-S12 DATE:12/11/00 REVISION 5 \\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-01-05 Proctor.XLS]Sheet1

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ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-18
Project No.	2009-666-01	Sample No.	SAMPLE 5 SP-05
Lab ID	2009-666-01-05		

Visual Description PINK BROWN SANDY SILT

Total Weight of the Sample (gm)	21617
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4317
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5854	5938	5960	5998	6013
Wt.of Mold (gm)	4317	4317	4317	4317	4317
Wt. of WS	1537	1621	1643	1681	1696
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	398	303	314	301	k-7
Wt. of Tare & WS (gm)	490.40	550.70	496.20	496.00	612.00
Wt. of Tare & DS (gm)	422.65	468.55	410.60	398.48	486.34
Wt. of Tare (gm)	84.30	111.00	84.80	84.20	110.30
Wt. of Water (gm)	67.75	82.15	85.60	97.52	125.66
Wt. of DS (gm)	338.35	357.55	325.80	314.28	376.04

Wet Density (gm/cc)	1.64	1.73	1.75	1.79	1.81
Wet Density (pcf)	102.3	107.9	109.4	111.9	112.9
Moisture Content (%)	**20.0**	**23.0**	**26.3**	**31.0**	**33.4**
Dry Density (pcf)	**85.2**	**87.8**	**86.6**	**85.4**	**84.6**

Zero Air Voids

Moisture Content (%)	29.0	31.0	36.0
Dry Unit Weight (pcf)	94.5	91.7	85.4

Tested By SD *Date* 6/24/2009 *Checked By* GEM *Date* 6-29-09

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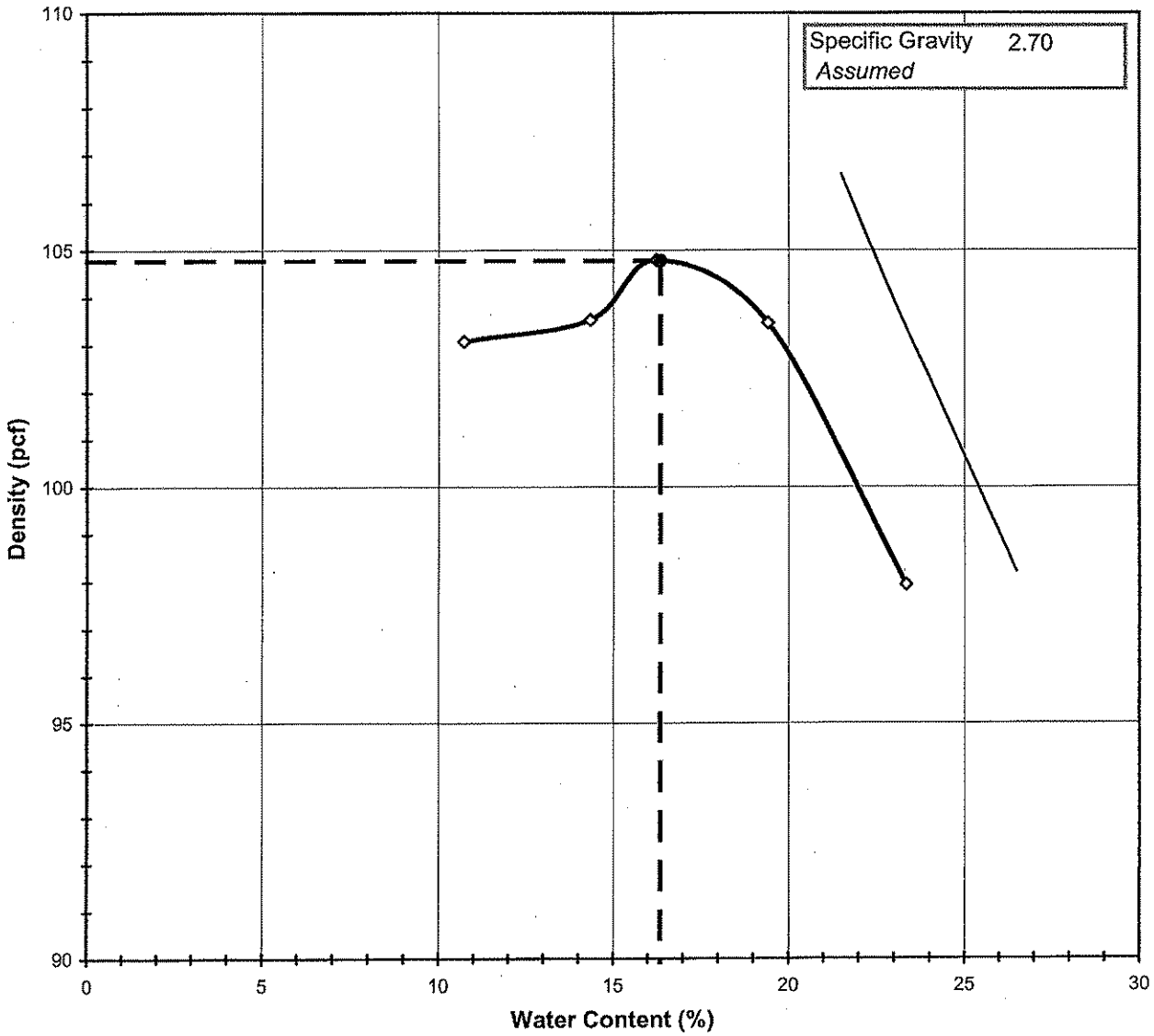
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-06
Lab ID	2009-666-03-01	Test Method	**STANDARD**

Visual Description BROWN MICAEOUS SILT

Optimum Water Content	**16.4**
Maximum Dry Density	**104.8**



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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-06
Lab ID	2009-666-03-01		

Visual Description BROWN MICAEOUS SILT

Total Weight of the Sample (gm)	21470
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	2
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6030	6094	6146	6172	6131
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1714	1778	1830	1856	1815
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	K-7	307	308	318	300
Wt. of Tare & WS (gm)	431.00	444.10	466.60	627.40	439.20
Wt. of Tare & DS (gm)	399.91	402.29	416.90	539.40	377.04
Wt. of Tare (gm)	110.20	111.00	110.80	86.20	110.90
Wt. of Water (gm)	31.09	41.81	49.70	88.00	62.16
Wt. of DS (gm)	289.71	291.29	306.10	453.20	266.14

Wet Density (gm/cc)	1.83	1.90	1.95	1.98	1.94
Wet Density (pcf)	114.1	118.4	121.8	123.6	120.8
Moisture Content (%)	**10.7**	**14.4**	**16.2**	**19.4**	**23.4**
Dry Density (pcf)	**103.1**	**103.5**	**104.8**	**103.5**	**97.9**

Zero Air Voids

Moisture Content (%)	21.5	23.0	26.5
Dry Unit Weight (pcf)	106.6	103.9	98.2

Tested By SD *Date* 7/28/2009 *Checked By* GEM *Date* 7-30-09

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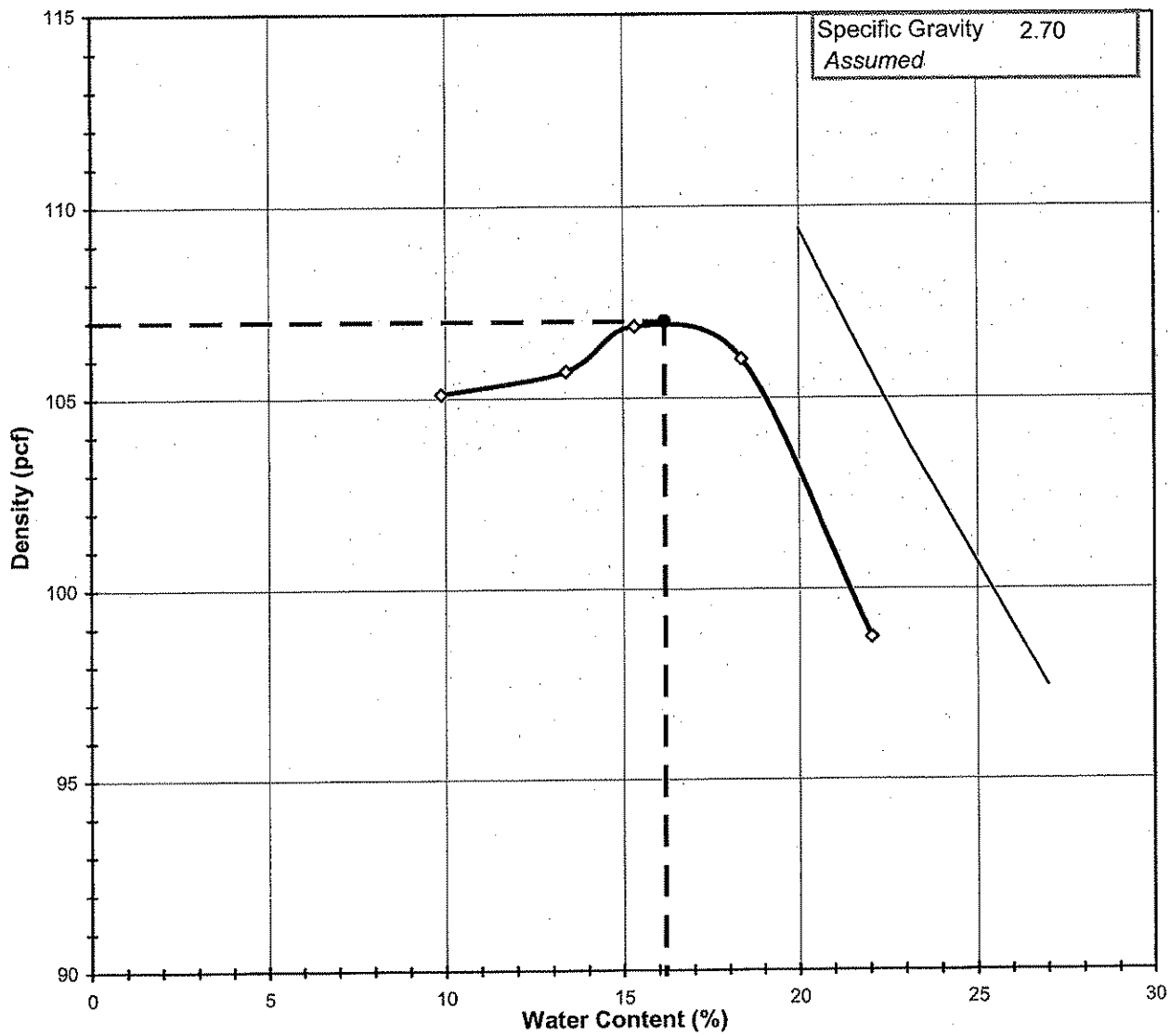
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-07
Lab ID	2009-666-03-02	Test Method	**STANDARD**

Visual Description BROWN SILT

Optimum Water Content **16.2**
Maximum Dry Density **107.0**



Tested By *SD* *Date* *7/28/2009* *Checked By* GEM *Date* 7-30-09

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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-07
Lab ID	2009-666-03-02		

Visual Description BROWN SILT

Total Weight of the Sample (gm)	17385
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	1
Percent Retained on 3/8"	2
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4315
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6050	6115	6167	6200	6125
Wt.of Mold (gm)	4315	4315	4315	4315	4315
Wt. of WS	1735	1800	1852	1885	1810
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	825	821	818	823	828
Wt. of Tare & WS (gm)	408.10	502.50	433.20	466.60	444.90
Wt. of Tare & DS (gm)	383.74	459.23	393.91	415.52	389.07
Wt. of Tare (gm)	137.40	136.00	137.70	137.50	136.00
Wt. of Water (gm)	24.36	43.27	39.29	51.08	55.83
Wt. of DS (gm)	246.34	323.23	256.21	278.02	253.07

Wet Density (gm/cc)	1.85	1.92	1.98	2.01	1.93
Wet Density (pcf)	115.5	119.8	123.3	125.5	120.5
Moisture Content (%)	**9.9**	**13.4**	**15.3**	**18.4**	**22.1**
Dry Density (pcf)	**105.1**	**105.7**	**106.9**	**106.0**	**98.7**

Zero Air Voids

Moisture Content (%)	20.0	23.0	27.0
Dry Unit Weight (pcf)	109.4	103.9	97.4

Tested By SD *Date* 7/28/2009 *Checked By* GEM *Date* 7-30-09

DCN:CT-S12 DATE:12/11/00 REVISION 5

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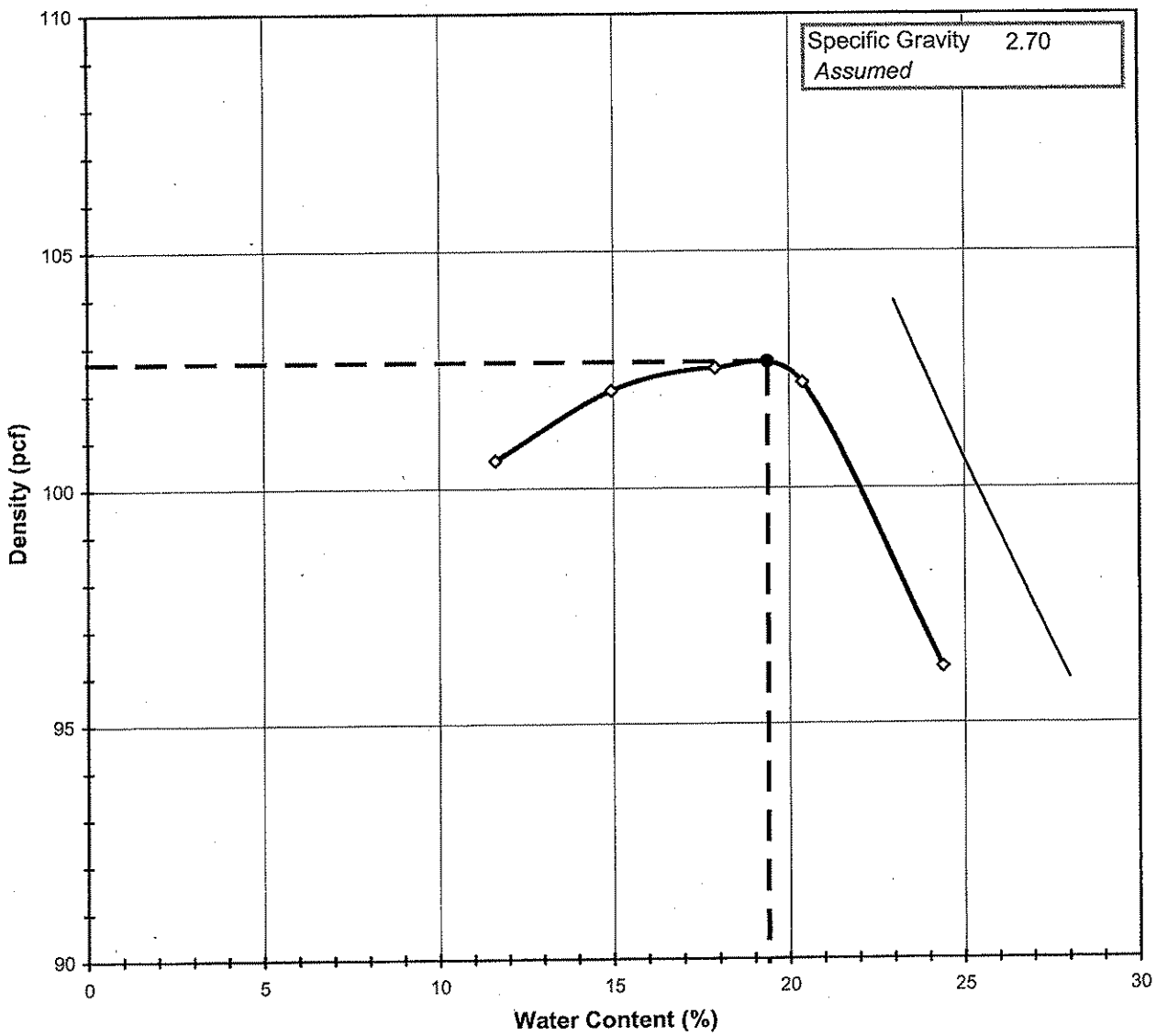
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-08
Lab ID	2009-666-03-03	Test Method	**STANDARD**

Visual Description BROWN MICAEOUS SILT

Optimum Water Content	**19.4**
Maximum Dry Density	**102.7**



Tested By SD *Date* 7/28/2009 *Checked By* GEM *Date* 7-30-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-03-03 Proctor.XLS]Sheet1*

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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-08
Lab ID	2009-666-03-03		

Visual Description BROWN MICAEOUS SILT

Total Weight of the Sample (gm)	19694
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	2
Percent Retained on #4	3
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6003	6078	6132	6165	6113
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1687	1762	1816	1849	1797
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	306	398	303	311	304
Wt. of Tare & WS (gm)	442.00	410.40	487.00	456.30	502.80
Wt. of Tare & DS (gm)	405.14	367.93	429.88	393.31	425.87
Wt. of Tare (gm)	88.00	84.00	110.70	84.40	110.40
Wt. of Water (gm)	36.86	42.47	57.12	62.99	76.93
Wt. of DS (gm)	317.14	283.93	319.18	308.91	315.47

Wet Density (gm/cc)	1.80	1.88	1.94	1.97	1.92
Wet Density (pcf)	112.3	117.3	120.9	123.1	119.7
Moisture Content (%)	**11.6**	**15.0**	**17.9**	**20.4**	**24.4**
Dry Density (pcf)	**100.6**	**102.1**	**102.5**	**102.2**	**96.2**

Zero Air Voids

Moisture Content (%)	23.0	25.0	28.0
Dry Unit Weight (pcf)	103.9	100.6	95.9

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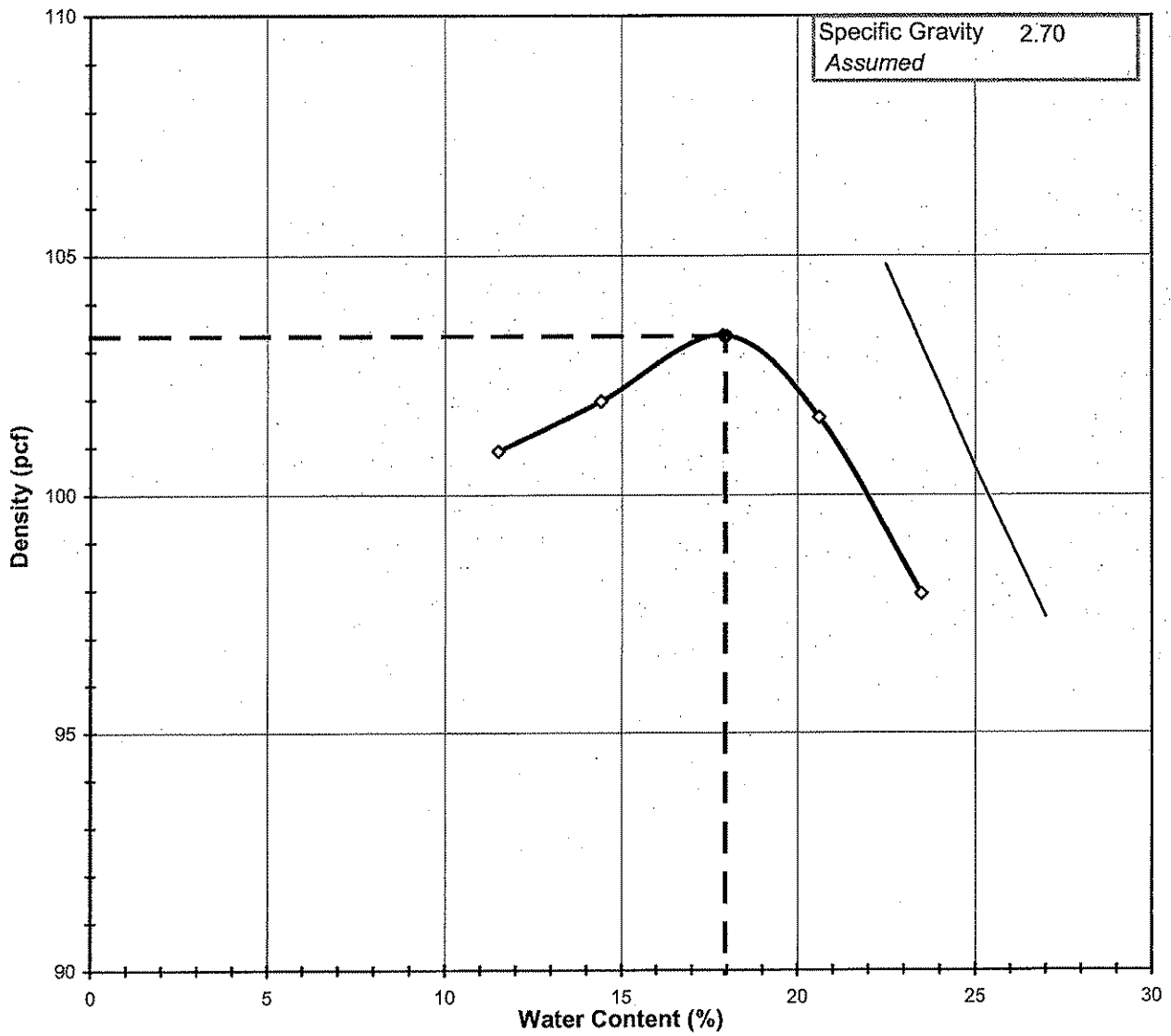
ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-09
Lab ID	2009-666-03-04	Test Method	**STANDARD**

Visual Description BROWN SILT

Optimum Water Content	**18.0**
Maximum Dry Density	**103.3**



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ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-09
Lab ID	2009-666-03-04		

Visual Description BROWN SILT

Total Weight of the Sample (gm)	20283
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	9
Percent Retained on 3/8"	0
Percent Retained on #4	11
Oversize Material	Not included
Procedure Used	B

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6006	6068	6146	6157	6132
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1690	1752	1830	1841	1816
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	309	398	311	306	300
Wt. of Tare & WS (gm)	494.20	484.80	524.90	470.20	546.70
Wt. of Tare & DS (gm)	454.52	434.37	458.22	405.02	463.85
Wt. of Tare (gm)	109.80	84.60	85.20	88.80	111.20
Wt. of Water (gm)	39.68	50.43	66.68	65.18	82.85
Wt. of DS (gm)	344.72	349.77	373.02	316.22	352.65

Wet Density (gm/cc)	1.80	1.87	1.95	1.96	1.94
Wet Density (pcf)	112.5	116.7	121.8	122.6	120.9
Moisture Content (%)	**11.5**	**14.4**	**17.9**	**20.6**	**23.5**
Dry Density (pcf)	**100.9**	**102.0**	**103.3**	**101.6**	**97.9**

Zero Air Voids

Moisture Content (%)	22.5	25.0	27.0
Dry Unit Weight (pcf)	104.8	100.6	97.4

Tested By SD *Date* 7/29/2009 *Checked By* GEM *Date* 7-30-09

DCN:CT-S12 DATE:12/11/00 REVISION 5 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-03-04 Proctor.XLS]Sheet1

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INTEGRITY IN TESTING

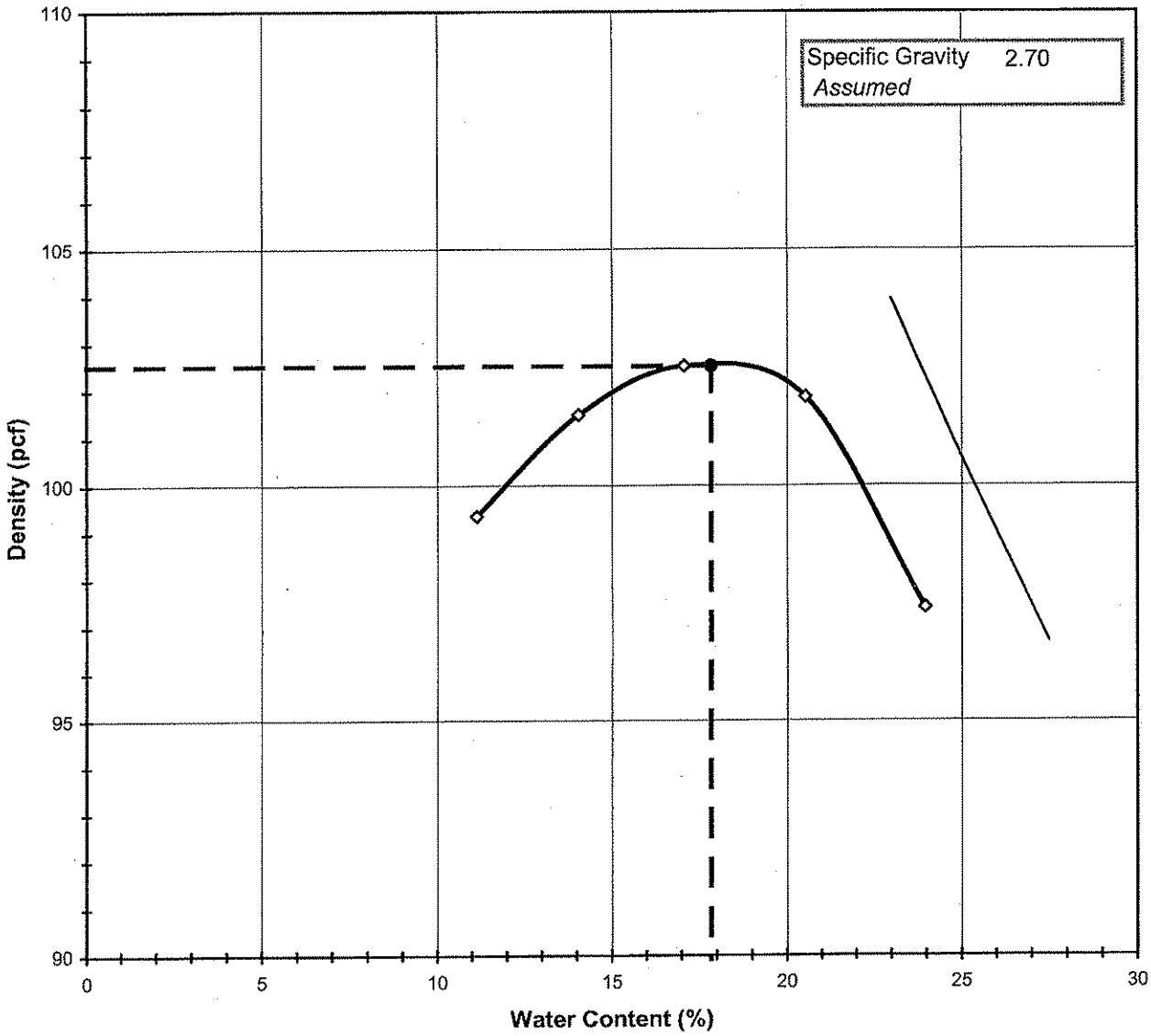
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-10
Lab ID	2009-666-03-05	Test Method	**STANDARD**

Visual Description BROWN SILT

Optimum Water Content **17.8**
Maximum Dry Density **102.5**



Tested By SD *Date* 7/28/2009 *Checked By* GEM *Date* 7-30-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-03-05 Proctor.XLS]Sheet1*

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INTEGRITY IN TESTING

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-10
Lab ID	2009-666-03-05		

Visual Description BROWN SILT

Total Weight of the Sample (gm)	21596
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	1
Percent Retained on 3/8"	1
Percent Retained on #4	3
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5975	6055	6119	6160	6130
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1659	1739	1803	1844	1814
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	301	312	314	310	317
Wt. of Tare & WS (gm)	421.10	424.00	502.50	637.50	468.00
Wt. of Tare & DS (gm)	387.32	382.13	441.56	547.61	393.72
Wt. of Tare (gm)	84.00	84.30	84.50	109.80	83.80
Wt. of Water (gm)	33.78	41.87	60.94	89.89	74.28
Wt. of DS (gm)	303.32	297.83	357.06	437.81	309.92

Wet Density (gm/cc)	1.77	1.86	1.92	1.97	1.94
Wet Density (pcf)	110.4	115.8	120.0	122.8	120.8
Moisture Content (%)	**11.1**	**14.1**	**17.1**	**20.5**	**24.0**
Dry Density (pcf)	**99.4**	**101.5**	**102.5**	**101.9**	**97.4**

Zero Air Voids

Moisture Content (%)	23.0	25.0	27.5
Dry Unit Weight (pcf)	103.9	100.6	96.7

Tested By SD *Date* 7/28/2009 *Checked By* GBM *Date* 7-30-09

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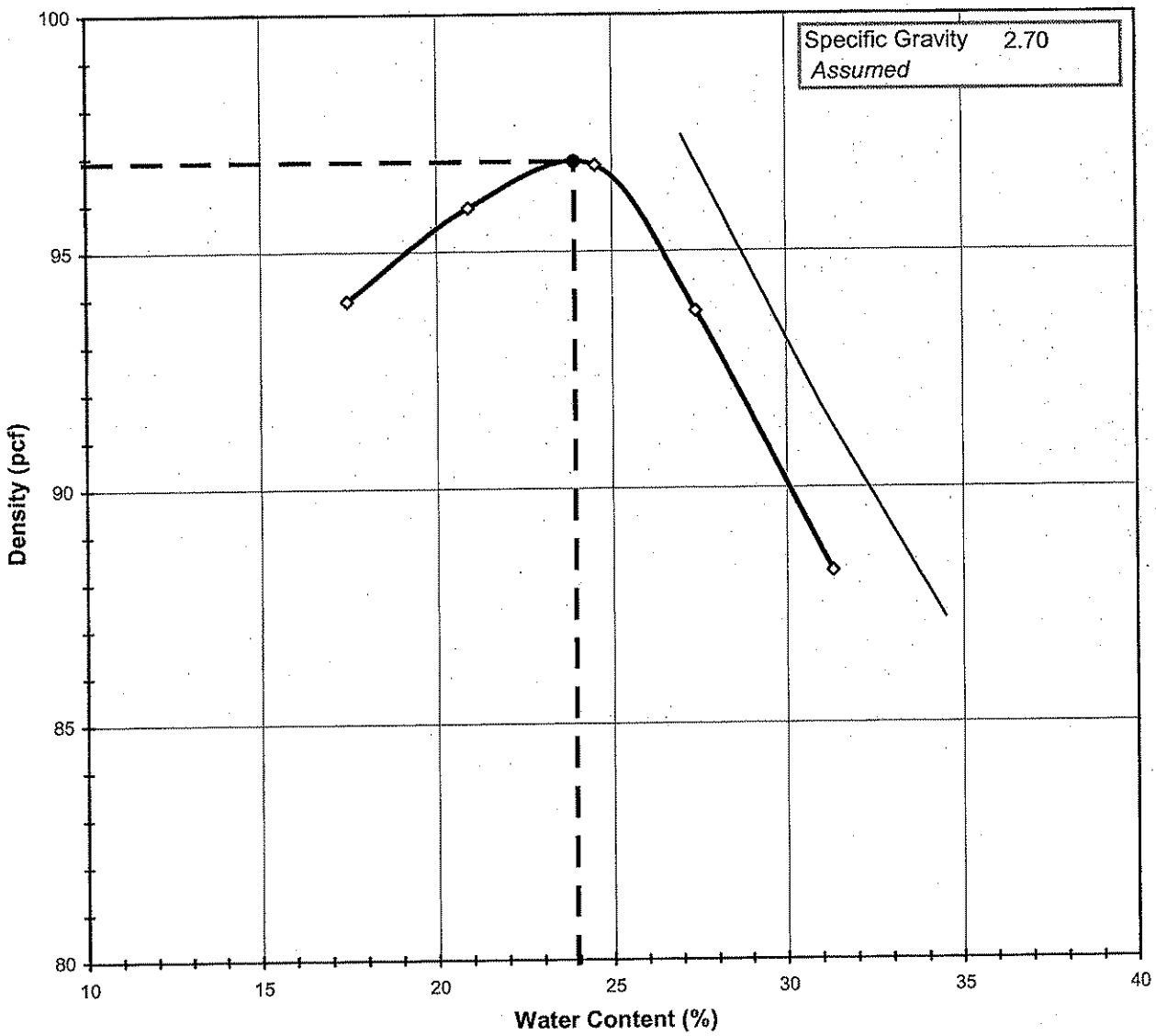
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-11
Lab ID	2009-666-03-06	Test Method	**STANDARD**

Visual Description BROWN SILT

Optimum Water Content	**23.9**
Maximum Dry Density	**96.9**



Tested By SD *Date* 7/28/2009 *Checked By* GEM *Date* 7-30-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-03-06 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-03	Sample No.	SF-11
Lab ID	2009-666-03-06		

Visual Description BROWN SILT

Total Weight of the Sample (gm)	22670
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	0
Percent Retained on #4	3
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5974	6058	6127	6110	6057
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1658	1742	1811	1794	1741
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	315	309	399	305	G-5
Wt. of Tare & WS (gm)	523.70	507.90	441.90	586.00	521.60
Wt. of Tare & DS (gm)	462.28	439.04	371.90	478.13	432.36
Wt. of Tare (gm)	110.30	109.70	86.60	84.30	147.50
Wt. of Water (gm)	61.42	68.86	70.00	107.87	89.24
Wt. of DS (gm)	351.98	329.34	285.30	393.83	284.86

Wet Density (gm/cc)	1.77	1.86	1.93	1.91	1.86
Wet Density (pcf)	110.3	116.0	120.6	119.4	115.9
Moisture Content (%)	**17.4**	**20.9**	**24.5**	**27.4**	**31.3**
Dry Density (pcf)	**94.0**	**95.9**	**96.8**	**93.7**	**88.2**

Zero Air Voids

Moisture Content (%)	27.0	31.0	34.5
Dry Unit Weight (pcf)	97.4	91.7	87.2

Tested By SD *Date* 7/28/2009 *Checked By* GEM *Date* 7-30-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **EMBK-01**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **07.08.09,07.24.09,07.27.09**	Reviewed By : MM	Date : 1-4-10
Contractor : Thalle	Borrow Source : On-site	
Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller		

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 1	ACRE 9	-4'	6"	666-01-01	101.0	20.0	**117.9**	**14.5**	**103.0**	**101.9%**	**95.0%**	The elevation shown is -4' below SG
NDSF 2	ACRE 7	-4'	6"	666-01-01	101.0	20.0	**118.7**	**15.9**	**102.4**	**101.4%**	**95.0%**	The elevation shown is -4' below SG
NDSF 3	Access Rd.	-16.5'	6"	666-01-02	93.6	23.8	**114.2**	**22.0**	**93.6**	**100.0%**	**95.0%**	N. End Cell
NDSF 4	Access Rd.	-12.5'	6"	666-02-03	104.1	19.0	**124.3**	**18.8**	**104.6**	**100.5%**	**95.0%**	N. End Cell

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Hayw
Project Number :	2009-666

Report Number :	**EMBK-01**
Date (s) :	07.08.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-01
Nuclear Test Number :	NDSF-01
Location:	ACRE 1
Depth (ft):	4'
Date :	07.08.09

Mold

Cylinder ID	1
Weight of Cylinder (lbs.)	1.33
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.24
Wt. of Cylinder (lbs.)	1.33
Wt. of WS	3.91
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB10
Wt. of Tare & WS (gm)	230.60
Wt. of Tare & DS (gm)	202.40
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	28.20
Wt. of DS (gm)	195.60
Wet Density (pcf):	118.5
Moisture Content (%):	**14.4**
Dry Density (pcf):	**103.6**

Geotechnics Representative : Al Lambeth

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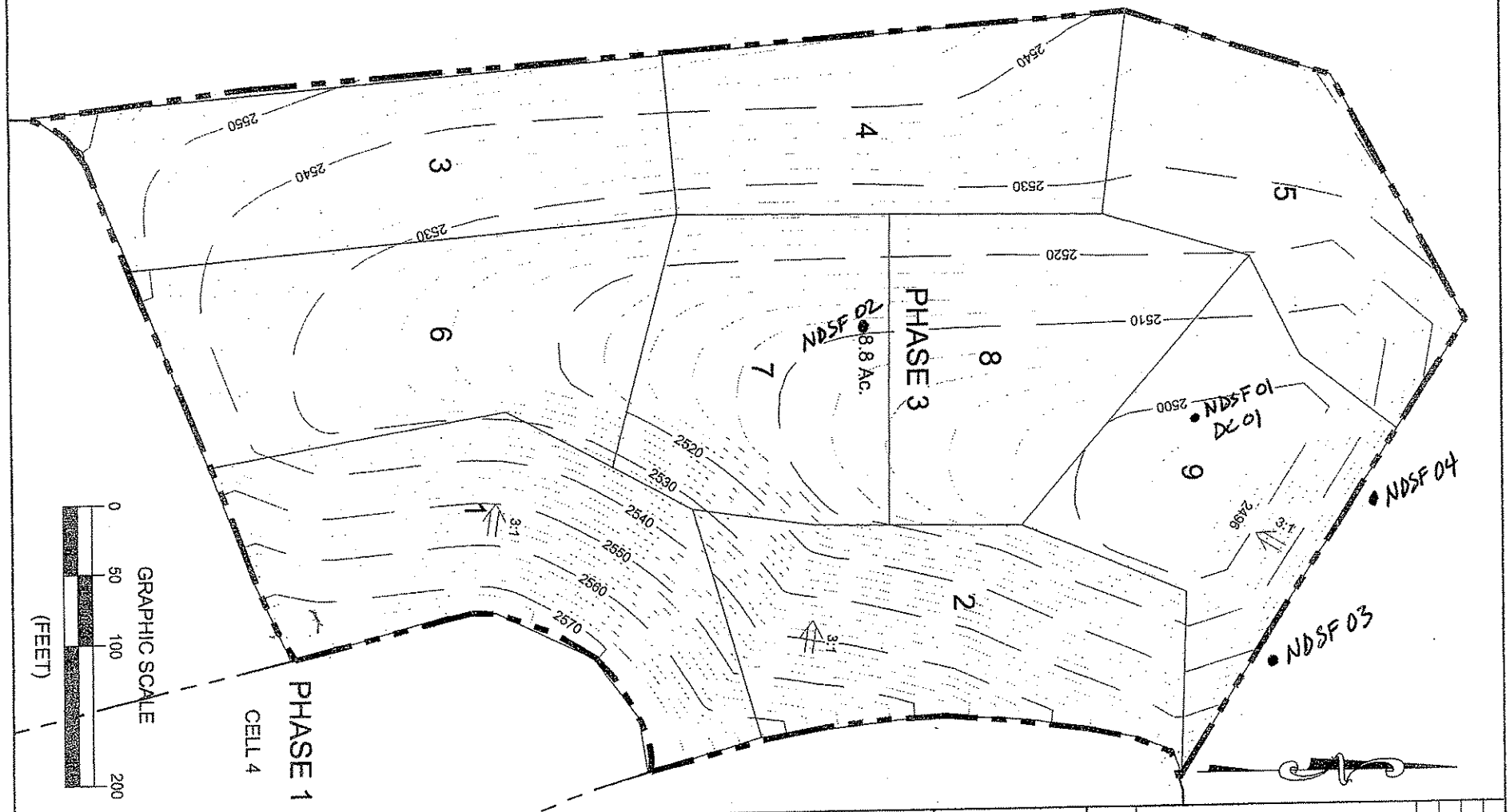
EMBK-01



DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP

JOYCE ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE: (336) 323-0092

DESIGNED
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DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **EMBK-02**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.14.09**	Reviewed By : MMS	Date : 1-4-10

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 5	A3	SG	6"	666-02-03	104.1	19.0	**121.9**	**17.1**	**104.1**	**100.0%**	**95.0%**	
NDSF 6	A4	SG	6"	666-02-03	104.1	19.0	**122.6**	**16.2**	**105.5**	**101.4%**	**95.0%**	
NDSF 7	A-7/A-8	SG	6"	666-02-03	104.1	19.0	**126.4**	**18.4**	**106.8**	**102.6%**	**95.0%**	Corner of Acre7/Acre8
NDSF 8	A-7/A-4	SG	6"	666-02-03	104.1	19.0	**125.7**	**17.9**	**106.6**	**102.4%**	**95.0%**	Corner of Acre7/Acre4
NDSF 9	A-4	SG	6"	666-02-03	104.1	19.0	**127.5**	**16.0**	**109.9**	**105.6%**	**95.0%**	Acre 4

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Hayw(
Project Number :	2009-666

Report Number :	**EMBK-02**
Date (s) :	11.14.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-02
Nuclear Test Number :	NDSF-07
Location:	ACRE 7/8
Depth (ft):	SG
Date :	11.14.09

Mold

Cylinder ID	4
Weight of Cylinder (lbs.)	1.32
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.43
Wt. of Cylinder (lbs.)	1.32
Wt. of WS	4.11
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	A-1
Wt. of Tare & WS (gm)	431.80
Wt. of Tare & DS (gm)	362.80
Wt. of Tare (gm)	9.00
Wt. of Water (gm)	69.00
Wt. of DS (gm)	353.80
Wet Density (pcf):	124.5
Moisture Content (%):	**19.5**
Dry Density (pcf):	**104.2**

Geotechnics Representative : Al Lambeth

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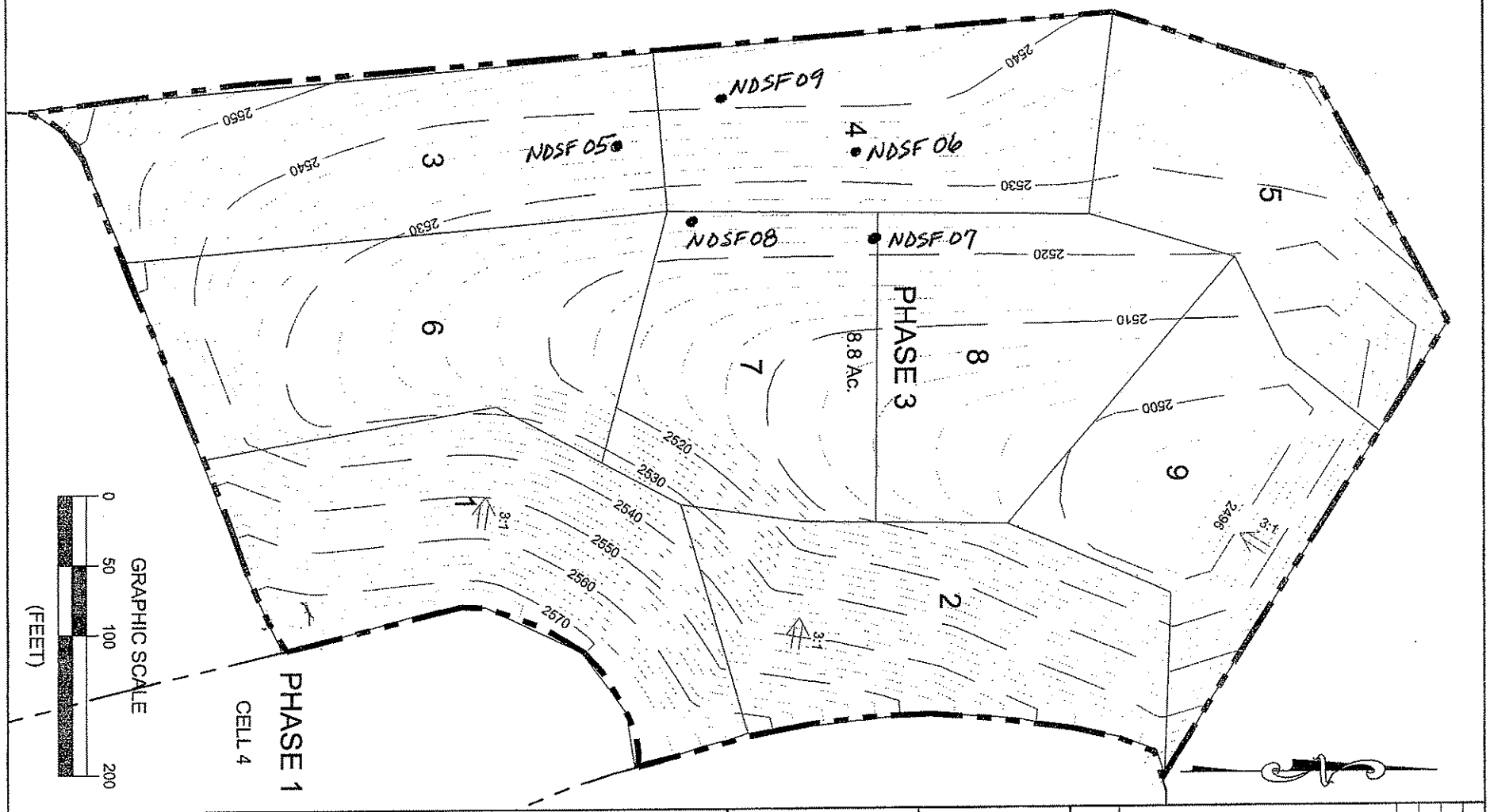
EMBK-02



WHITE OAK LANDFILL CLYDE, NORTH CAROLINA	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	
PHASE 3-ACRE MAP		© 2003 Joyce Engineering, Inc. All rights reserved.	

PROJECT NO.	SCALE	DRAWING NO.
	AS NOTED	AM-1

DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **EMBK-03**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.24.09**	Reviewed By : RMS	Date : 1-4-10

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 10	A9B	SG	6"	666-02-03	104.1	19.0	**123.6**	**18.6**	**104.2**	**100.1%**	**95.0%**	DC-03
NDSF 11	A9B	SG	6"	666-02-03	104.1	19.0	**125.0**	**19.2**	**104.9**	**100.7%**	**95.0%**	DC-04

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

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INTEGRITY IN TESTING

Report Number :	**EMBK-03**
Date (s) :	11.24.09

Drive Cylinder - ASTM D 2937

Test Information		
Test Number :	DC-03	DC-04
Nuclear Test Number :	NDSF-10	NDSF-11
Location:	ACRE 9B	ACRE 9B
Depth (ft):	SG	SG
Date :	11.24.09	11.24.09
Mold		
Cylinder ID	1	1
Weight of Cylinder (lbs.)	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033
Specimen		
Wt. of Cylinder & WS (lbs.)	5.47	5.41
Wt. of Cylinder (lbs.)	1.33	1.33
Wt. of WS	4.14	4.08
Cylinder Volume (ft^3)	0.033	0.033
Moisture / Density		
Tare Number	A-2	A-2
Wt. of Tare & WS (gm)	376.00	411.80
Wt. of Tare & DS (gm)	326.80	350.90
Wt. of Tare (gm)	9.00	9.00
Wt. of Water (gm)	49.20	60.90
Wt. of DS (gm)	317.80	341.90
Wet Density (pcf):	125.5	123.6
Moisture Content (%):	**15.5**	**17.8**
Dry Density (pcf):	**108.6**	**104.9**

Geotechnics Representative : Al Lambeth

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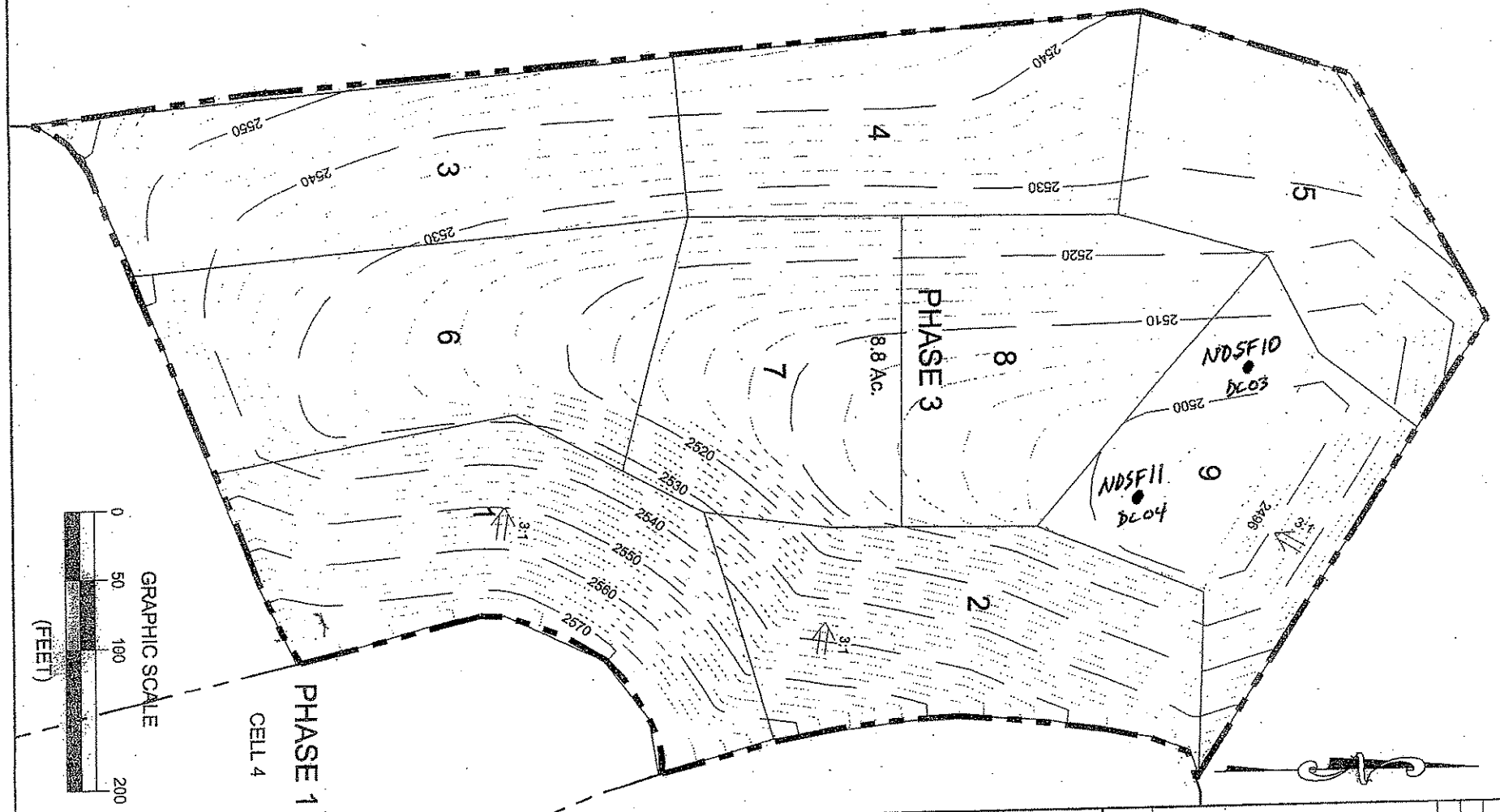
EMBK-03



DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA
			PHASE 3-ACRE MAP

ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE: (336) 323-0092

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DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Field Density Test Report

Report Number : **EMBK-04**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **12.16.09**	Reviewed By : MPS	Date : 1-5-10

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 12	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**125.9**	**19.0**	**105.8**	**101.6%**	**100.0%**	N721-039.7 E811-231.95 DC-05
NDSF 13	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**125.6**	**18.6**	**105.9**	**101.7%**	**100.0%**	N721-285.6 E811-233.9
NDSF 14	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**124.7**	**18.9**	**104.9**	**100.7%**	**100.0%**	N721-626.15 E811-215.4
NDSF 15	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**125.3**	**19.2**	**105.1**	**100.9%**	**100.0%**	N721-808.1 E811-264.1
NDSF 16	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**127.2**	**19.5**	**106.4**	**102.3%**	**100.0%**	N721-897.1 E811-454.1
NDSF 17	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**125.3**	**19.1**	**105.2**	**101.1%**	**100.0%**	N721-794.14 E811-703.4
NDSF 18	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**125.2**	**18.8**	**105.4**	**101.2%**	**100.0%**	N721-759.3 E811-865.4
NDSF 19	Per.Acc.Rd.	SG	6"	666-02-03	104.1	19.0	**126.3**	**19.0**	**106.1**	**102.0%**	**100.0%**	N721-694.9 E811-036.8

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Hayw(
Project Number :	2009-666

Report Number :	**EMBK-04**
Date (s) :	12.16.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-05
Nuclear Test Number :	NDSF-12
Location:	Per.Acc.Rd.
Depth (ft):	SG
Date :	12.16.09

Mold

Cylinder ID	1
Weight of Cylinder (lbs.)	1.33
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.37
Wt. of Cylinder (lbs.)	1.33
Wt. of WS	4.04
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	A-1
Wt. of Tare & WS (gm)	500.40
Wt. of Tare & DS (gm)	429.20
Wt. of Tare (gm)	9.00
Wt. of Water (gm)	71.20
Wt. of DS (gm)	420.20
Wet Density (pcf):	122.4
Moisture Content (%):	**16.9**
Dry Density (pcf):	**104.7**

Geotechnics Representative : Al Lambeth

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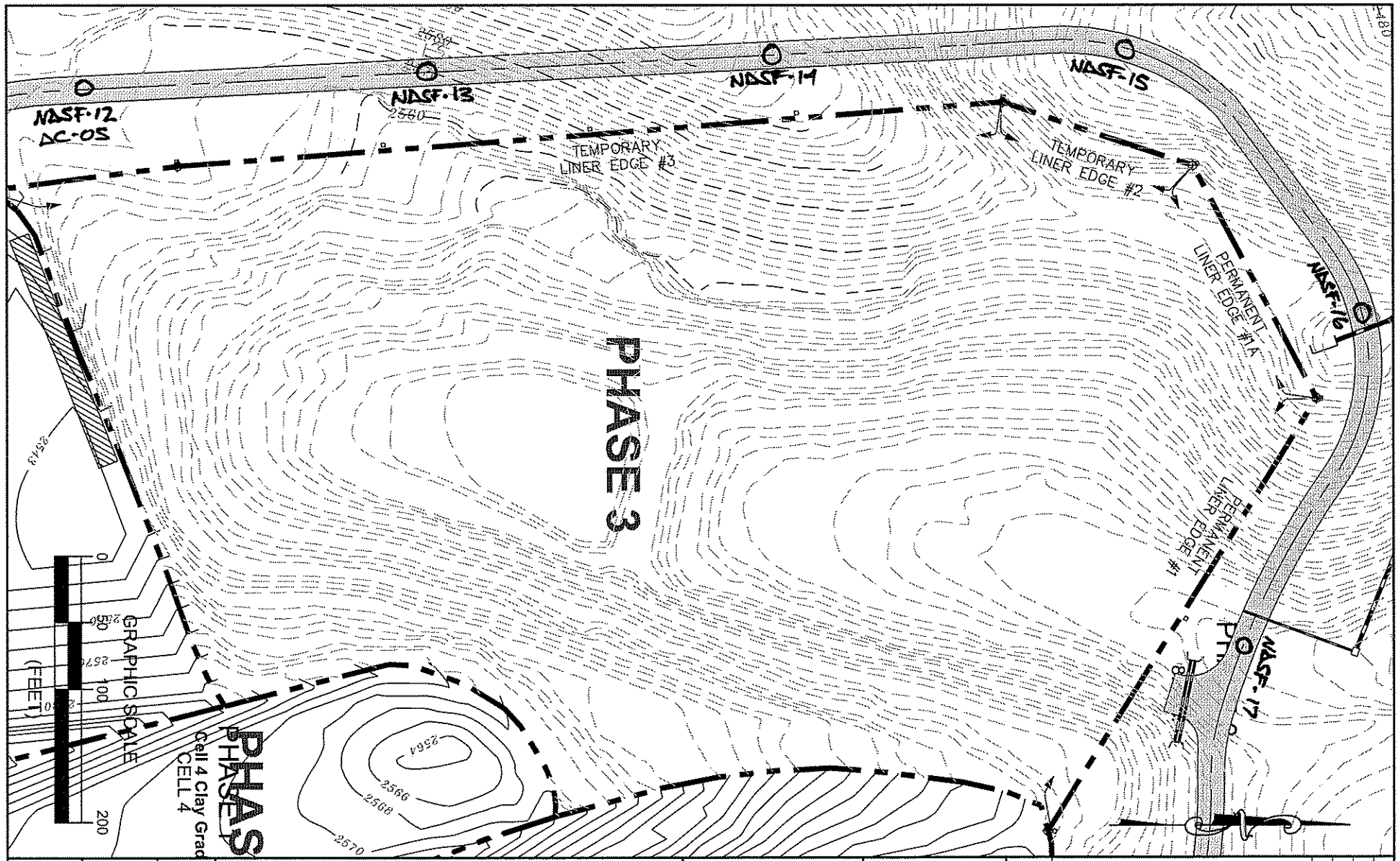

WHITE OAK LANDFILL
CLYDE, NORTH CAROLINA

ACCESS ROAD

JOYCE ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE: (336) 323-0092

DESIGNED
DRAWN CADD/
CHECKED
APPROVED
DATE

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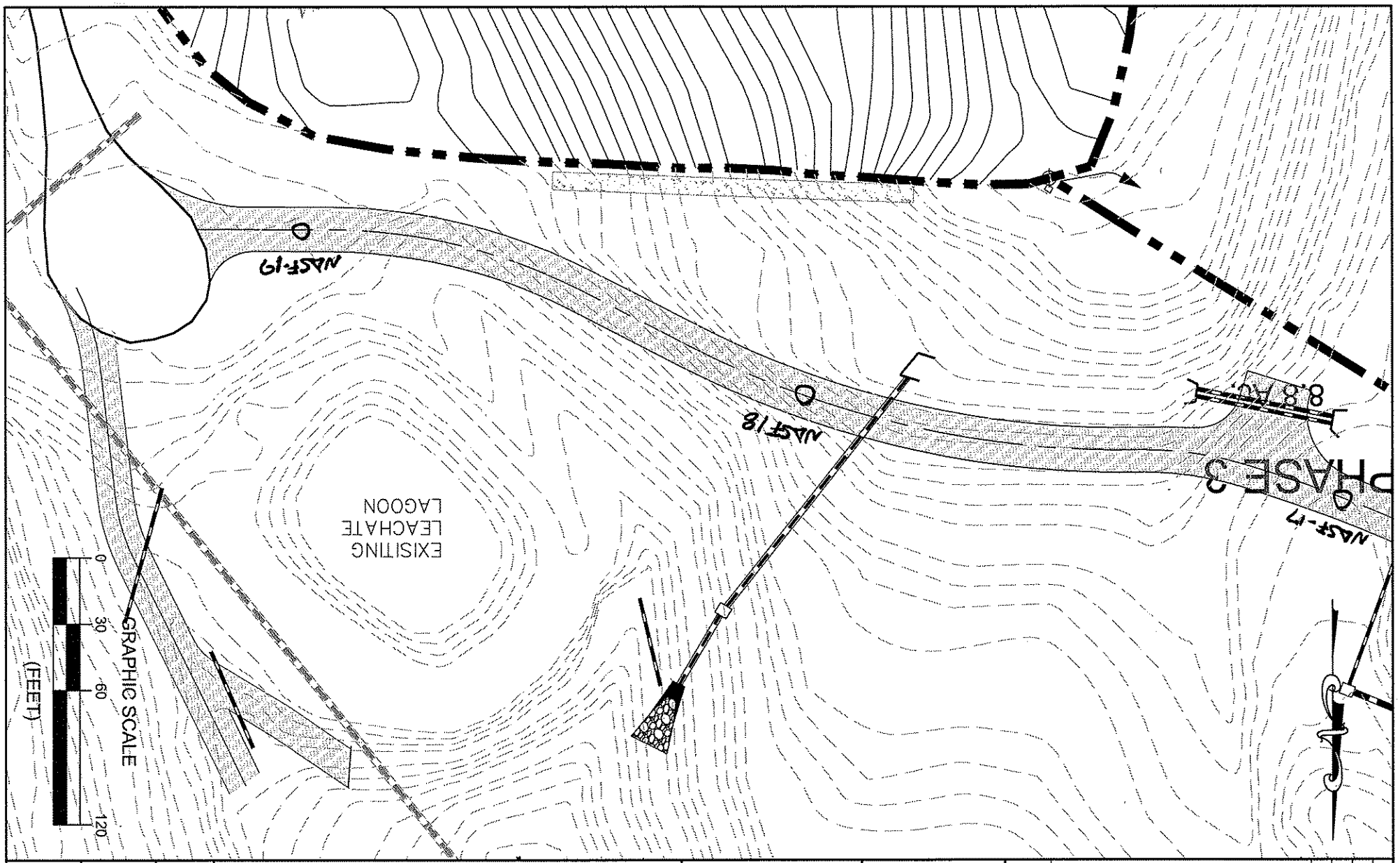
DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

PROJECT NO.

SCALE
AS NOTED

DRAWING NO.
1

L:_CIVIL PROJECTS\HAYWOOD\PERIMETER ROAD AND LEACHATE LAGOON.dwgROAD



DRAWING NO. 2	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA LEACHATE LAGOON

JOYCE ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE: (336) 323-0092

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DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

L:_CIVIL PROJECTS\HAYWOOD\PERIMETER ROAD AND LEACHATE LAGOON.dwgLAGOON

Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **LL-01**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **12.07.09**	Reviewed By : MDS	Date : 1-5-10

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
LL ND- 1	LL	-2.00	6"	666-02-01	89.7	27.5	**110.0**	**26.4**	**87.0**	**97.0%**	**95.0%**	DC-01
LL ND- 2	LL	-2.00	6"	666-02-01	89.7	27.5	**109.5**	**25.9**	**87.0**	**97.0%**	**95.0%**	
LL ND- 3	LL	-2.00	6"	666-02-01	89.7	27.5	**111.4**	**29.2**	**86.2**	**96.1%**	**95.0%**	
LL ND- 4	LL	-2.00	6"	666-02-01	89.7	27.5	**110.4**	**27.2**	**86.8**	**96.8%**	**95.0%**	
LL ND- 5	LL	-1.00	6"	666-02-06	98.8	22.0	**122.1**	**25.1**	**97.6**	**98.8%**	**95.0%**	DC-02
LL ND- 6	LL	-1.00	6"	666-02-06	98.8	22.0	**121.7**	**26.1**	**96.5**	**97.7%**	**95.0%**	
LL ND- 7	LL	-1.00	6"	666-02-06	98.8	22.0	**120.4**	**25.9**	**95.6**	**96.8%**	**95.0%**	
LL ND- 8	LL	-1.00	6"	666-02-06	98.8	22.0	**119.7**	**25.2**	**95.6**	**96.8%**	**95.0%**	
LL ND- 9	LL	GDE	6"	666-02-06	98.8	22.0	**118.4**	**24.9**	**94.8**	**95.9%**	**95.0%**	
LL ND- 10	LL	GDE	6"	666-02-06	98.8	22.0	**121.4**	**25.2**	**97.0**	**98.1%**	**95.0%**	DC-03
LL ND- 11	LL	GDE	6"	666-02-06	98.8	22.0	**122.6**	**26.1**	**97.2**	**98.4%**	**95.0%**	
LL ND- 12	LL	GDE	6"	666-02-06	98.8	22.0	**120.4**	**25.5**	**95.9**	**97.1%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **LL-01**
Date (s) : 12.07.09

Drive Cylinder - ASTM D 2937

Test Information			
Test Number :	LLDC-01	LLDC-02	LLDC-03
Nuclear Test Number :	LLND-01	LLND-05	LLND-10
Location:	LL	LL	LL
Depth (ft):	-2	-1	GRD
Date :	12.07.09	12.07.09	12.08.09
Mold			
Cylinder ID	3	3	3
Weight of Cylinder (lbs.)	1.32	1.32	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033
Specimen			
Wt. of Cylinder & WS (lbs.)	4.89	5.21	5.25
Wt. of Cylinder (lbs.)	1.32	1.32	1.32
Wt. of WS	3.57	3.89	3.93
Cylinder Volume (ft^3)	0.033	0.033	0.033
Moisture / Density			
Tare Number	JB-06	A-3	A-2
Wt. of Tare & WS (gm)	301.40	432.00	399.80
Wt. of Tare & DS (gm)	243.20	341.80	317.80
Wt. of Tare (gm)	9.00	9.00	9.00
Wt. of Water (gm)	58.20	90.20	82.00
Wt. of DS (gm)	234.20	332.80	308.80
Wet Density (pcf):	108.2	117.9	119.1
Moisture Content (%):	**24.9**	**27.1**	**26.6**
Dry Density (pcf):	**86.6**	**92.7**	**94.1**

Geotechnics Representative : Al Lambeth MPS

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WHITE OAK LANDFILL
CLYDE, NORTH CAROLINA

LEACHATE LAGOON

PROJECT NO.

SCALE
AS NOTED

DRAWING NO.
2

L:_CIVIL PROJECTS\HAYWOOD\PERIMETER ROAD AND LEACHATE LAGOON.dwg\LAGOON

PERMEABILITY TEST

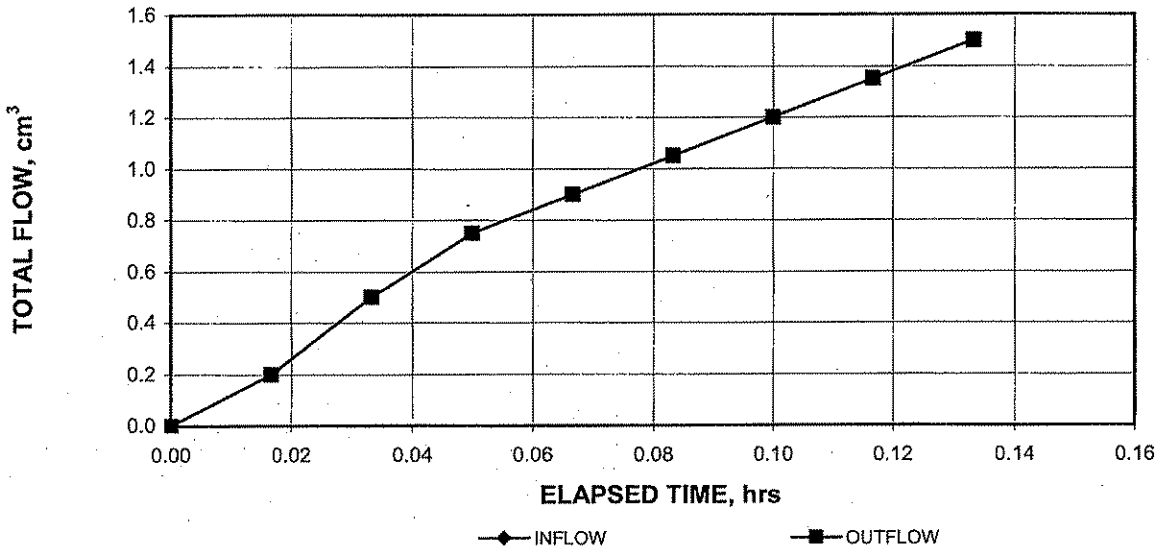
ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

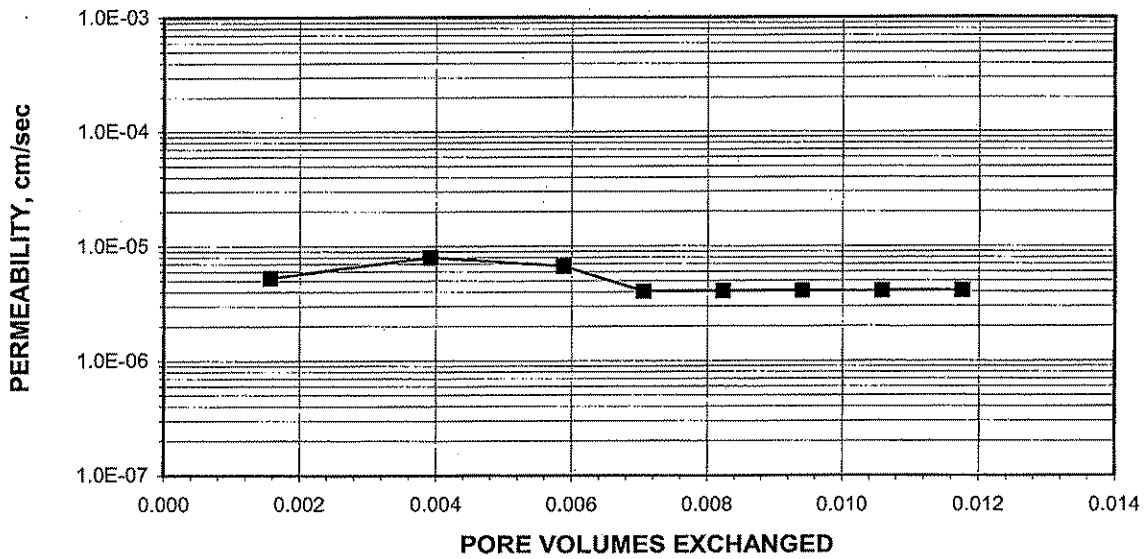
Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID No.	2009-666-15-01		

AVERAGE PERMEABILITY = 4.1E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.1E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/10/2009 Checked By: GEM Date: 12-11-09

DCN: CT-22C DATE: 12/10/2009 REVISION: 5 [Server\Data\Drive\Z\GEOTECH\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID No.	2009-666-15-01		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	212	801
Wt. of Tare & WS (gm.)	413.02	251.44
Wt. of Tare & DS (gm.)	366.94	213.68
Wt. of Tare (gm.)	171.45	107.33
Wt. of Water (gm.)	46.08	37.76
Wt. of DS (gm.)	195.49	106.35
Moisture Content (%)	**23.6**	**35.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	433.33	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	433.33	475.18
Length 1 (in.)	2.518	2.497
Length 2 (in.)	2.455	2.512
Length 3 (in.)	2.502	2.450
Top Diameter (in.)	2.840	2.853
Middle Diameter (in.)	2.844	2.839
Bottom Diameter (in.)	2.821	2.816
Average Length (in.)	2.49	2.49
Average Area (in.^{2})	6.31	6.32
Sample Volume (cm^3)	257.74	257.37
Unit Wet Wt. (gm./ cm^3)	1.68	1.85
Unit Wet Wt. (pcf)	104.9	115.2
Unit Dry Wt. (pcf)	84.9	85.1
Unit Dry Wt. (gm./ cm^3)	1.36	1.36
Void Ratio, e	0.98	0.98
Porosity, n	0.50	0.50
Pore Volume (cm^3)	127.9	127.5
Total Wgt. Of Sample After Test		475.63

Tested By: TMS Date: 12/10/2009 Checked By: Gem Date: 12-11-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID No.	2009-666-15-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.1	Sample Length (cm), L	6.32
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	75.0	Sample Area (cm^2), A	40.75
Total Pressure Head (cm)	63.3	Inflow Burette Area (cm^2), a-in	0.887
Hydraulic Gradient	10.02	Outflow Burette Area (cm^2), a-out	0.884
		B Parameter (%)	95

AVERAGE PERMEABILITY = 4.1E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.1E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/10/2009	9	44	0.00	0.0	0.0	90.3	0	23.3	NA
12/10/2009	9	45	0.02	0.2	0.2	89.8	0	23.3	5.3E-06
12/10/2009	9	46	0.03	0.5	0.5	89.1	0	23.3	8.0E-06
12/10/2009	9	47	0.05	0.8	0.8	88.6	0	23.3	6.7E-06
12/10/2009	9	48	0.07	0.9	0.9	88.2	0	23.3	4.0E-06
12/10/2009	9	49	0.08	1.1	1.1	87.9	0	23.3	4.1E-06
12/10/2009	9	50	0.10	1.2	1.2	87.6	0	23.3	4.1E-06
12/10/2009	9	51	0.12	1.4	1.4	87.2	0	23.3	4.1E-06
12/10/2009	9	52	0.13	1.5	1.5	86.9	1	23.3	4.1E-06

Tested By: TMS Date: 12/10/2009 Checked By: GZM Date: 12-11-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

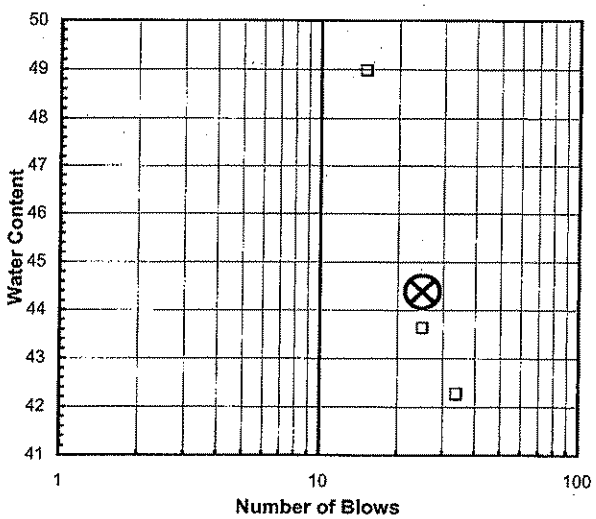
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	P	K	C	MULTIPOINT
Wt. of Tare & WS (gm)	28.97	28.30	26.16	
Wt. of Tare & DS (gm)	24.44	24.33	22.91	
Wt. of Tare (gm)	15.19	15.23	15.22	
Wt. of Water (gm)	4.5	4.0	3.3	
Wt. of DS (gm)	9.3	9.1	7.7	
Moisture Content (%)	**49.0**	**43.6**	**42.3**	
Number of Blows	**15**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	R	N	
Wt. of Tare & WS (gm)	21.63	21.41	
Wt. of Tare & DS (gm)	19.82	19.74	
Wt. of Tare (gm)	15.12	15.29	
Wt. of Water (gm)	1.8	1.7	
Wt. of DS (gm)	4.7	4.5	
Moisture Content (%)	**38.5**	**37.5**	**1.0**

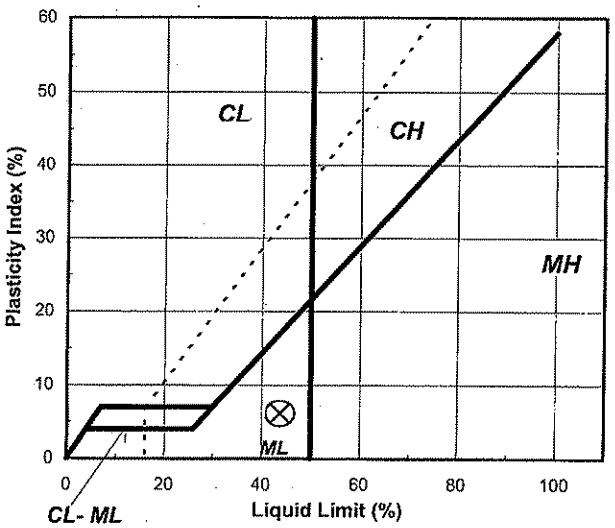
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**44**
Plastic Limit (%)	**38**
Plasticity Index (%)	**6**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/9/2009 *Checked By* GEM *Date* 12-10-09

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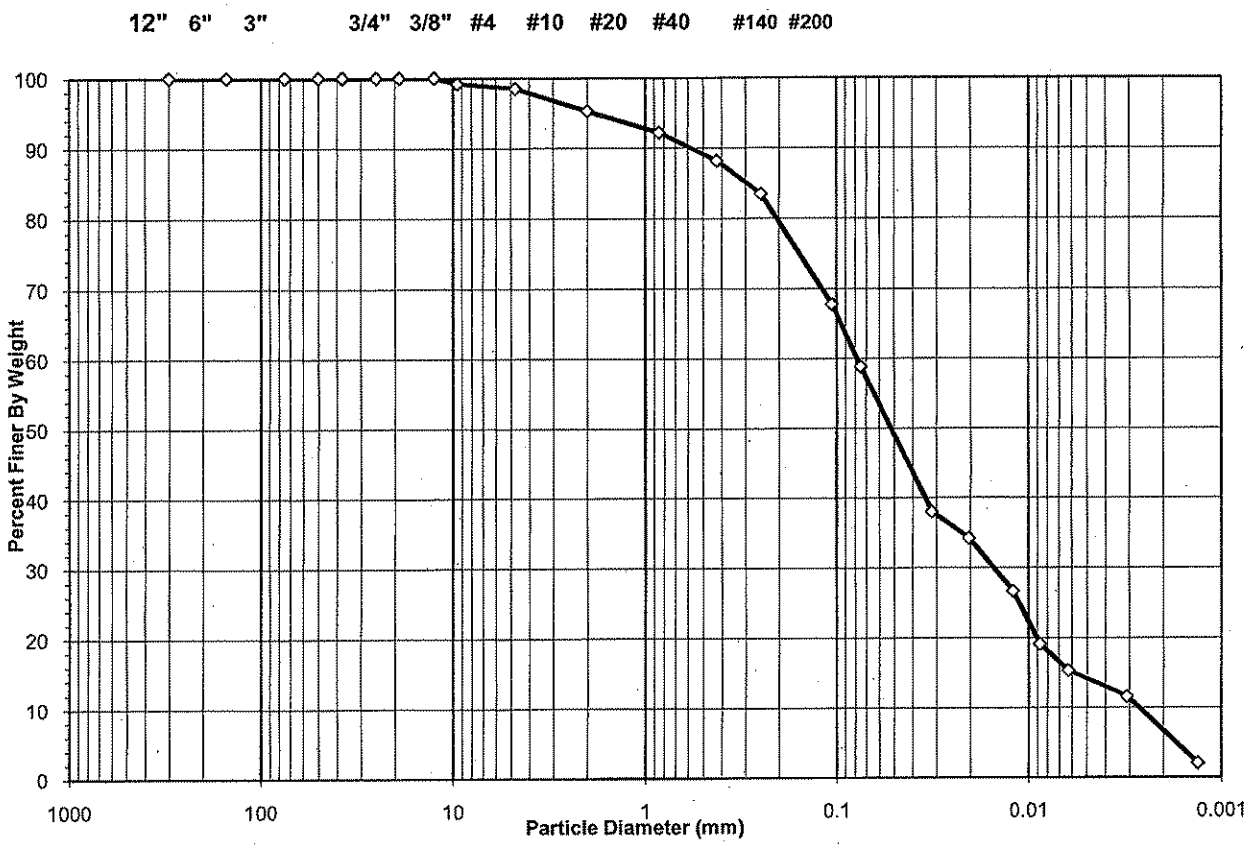
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	1.51
#4 To #200	*Sand*	39.65
Finer Than #200	*Silt & Clay*	58.84

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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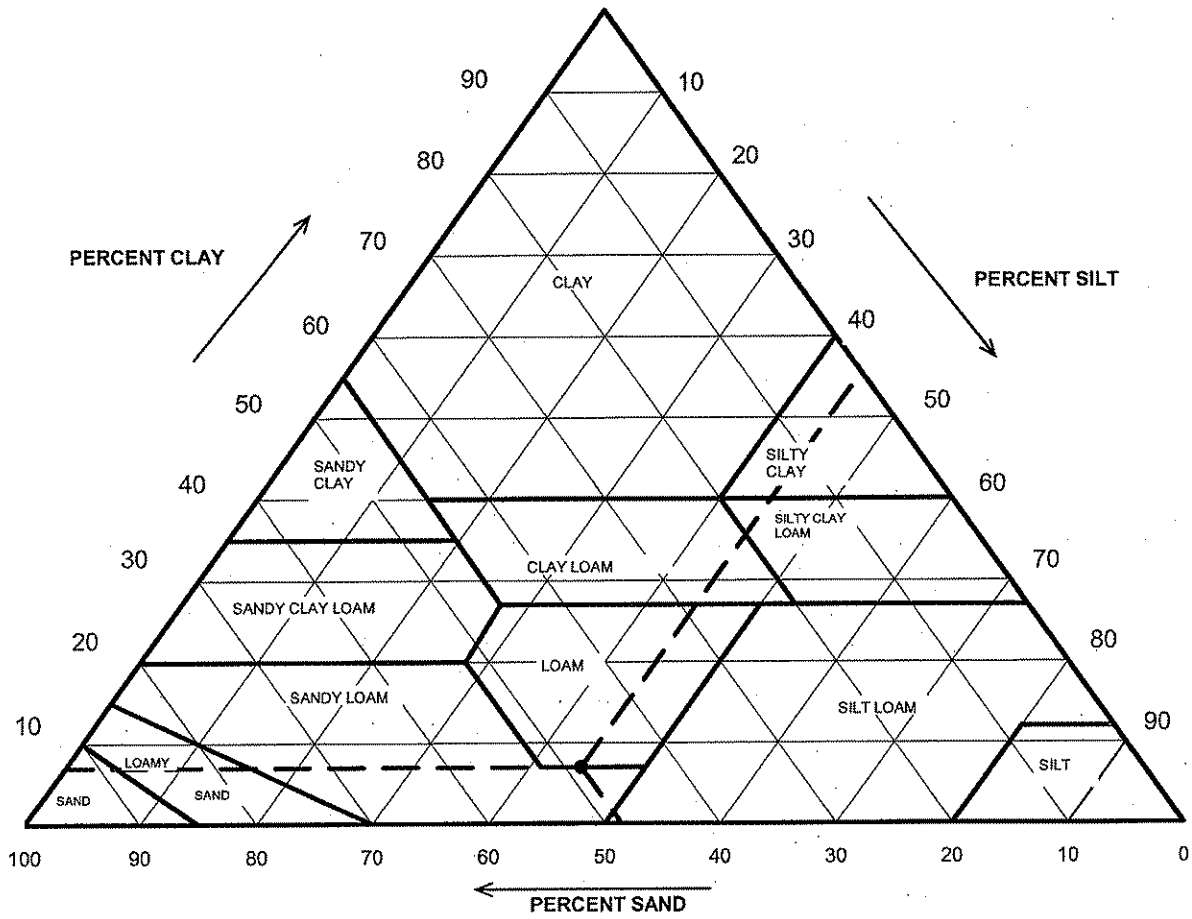
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	4.74	**0.00**
2	95.26	*Sand*	46.26	**48.56**
0.05	49.00	*Silt*	42.32	**44.42**
0.002	6.68	*Clay*	6.68	**7.01**

USDA Classification: ***LOAM***

 DCN: CT-53P DATE:08/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	212	Tare No.	B-1
Wgt.Tare + Wet Soil (gm)	413.02	Wgt.Tare + Wet Soil (gm)	48.28
Wgt.Tare + Dry Soil (gm)	366.94	Wgt.Tare + Dry Soil (gm)	48.10
Weight of Tare (gm)	171.45	Weight of Tare (gm)	15.85
Weight of Water (gm)	46.08	Weight of Water (gm)	0.18
Weight of Dry Soil (gm)	195.49	Weight of Dry Soil (gm)	32.25
Moisture Content (%)	**23.6**	**Moisture Content (%)**	**0.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	241.57	Weight of the Dry Sample (gm)	245.29
Dry Weight +#10 Material(gm)	195.5	Weight of minus #200 material (gm)	30.76
Wet Weight Hydro. Material.(gm)	50.08	Weight of plus #200 material (gm)	214.53
Dry Weight Hydro. Material (gm)	49.80		
Total Dry Weight Sample (gm)	245.29	**J-FACTOR (%FINER THAN #10)**	**0.9526**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.59	0.81	0.81	99.19	**99.19**
#4	4.75	1.36	0.70	1.51	98.49	**98.49**
#10	2.00	6.32	3.23	4.74	95.26	**95.26**
#20	0.85	1.60	3.21	3.21	96.79	**92.20**
#40	0.425	2.09	4.20	7.41	92.59	**88.20**
#60	0.250	2.46	4.94	12.35	87.65	**83.49**
#140	0.106	8.24	16.55	28.89	71.11	**67.73**
#200	0.075	4.65	9.34	38.23	61.77	**58.84**
Pan	-	30.76	61.77	100.00	-	-

Notes :

Tested By SD Date 12.17.09 Checked By JEB Date 12.17.09

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INTEGRITY IN TESTING

HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-2'
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	25.0	25.0	23.6	4.92	20.1	39.9	0.01288	0.0318	**38.0**
5		23.0	23.6	4.92	18.1	35.9	0.01288	0.0204	**34.2**
15		19.0	23.6	4.92	14.1	28.0	0.01288	0.0121	**26.7**
30		15.0	23.6	4.92	10.1	20.0	0.01288	0.0087	**19.1**
60		13.0	23.6	4.92	8.1	16.1	0.01288	0.0063	**15.3**
250		11.0	23.7	4.85	6.1	12.2	0.01287	0.0031	**11.6**
1440		6.0	23.6	4.92	1.1	2.1	0.01288	0.0013	**2.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.80	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	95.26
Weight of Dry Material (gm)	49.80		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12.15.09 Checked By JEB Date 12.17.09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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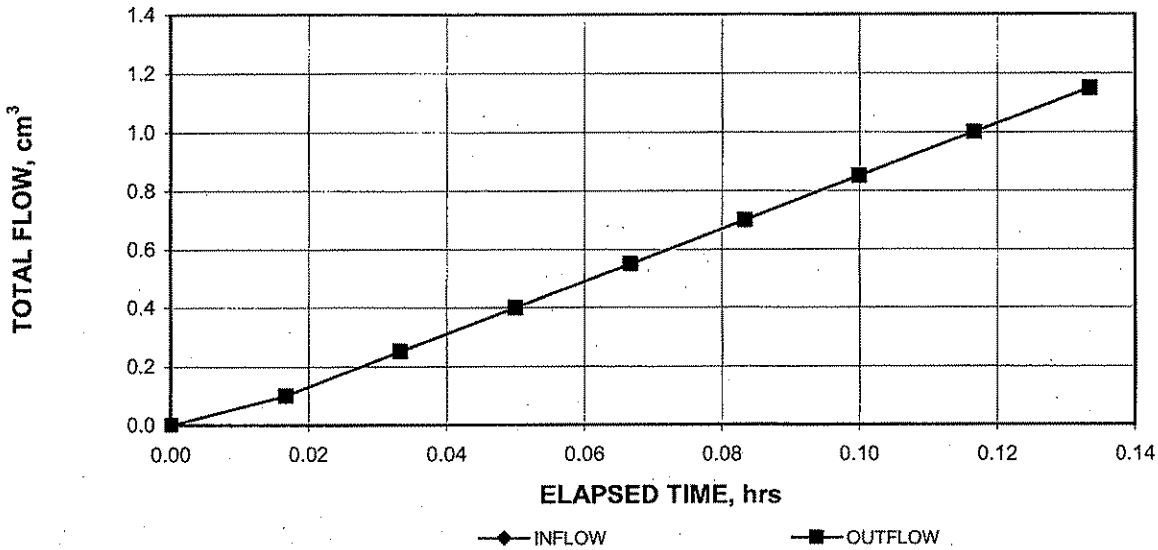
INTEGRITY IN TESTING

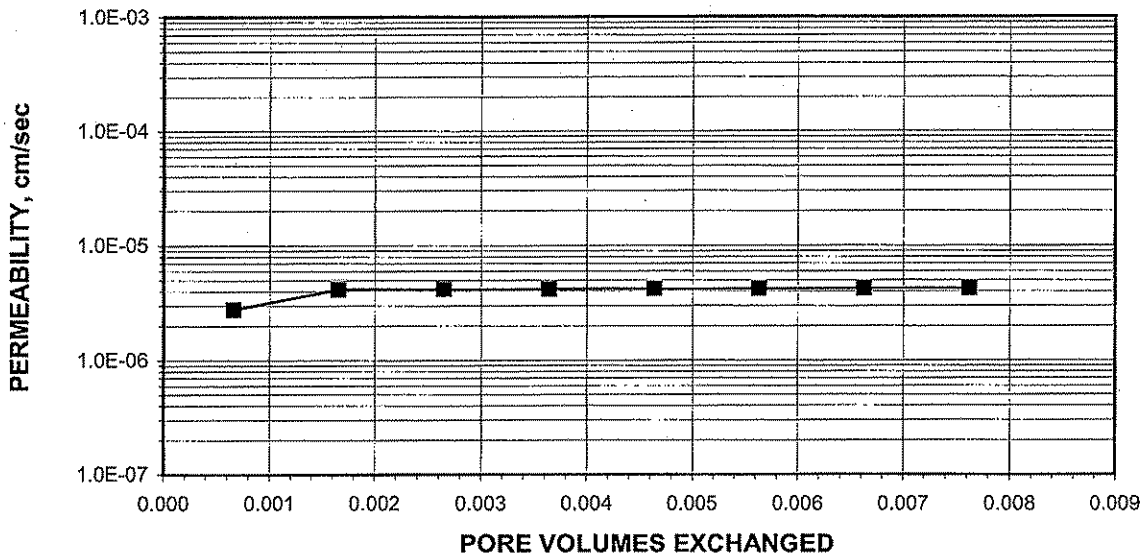
Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID No.	2009-666-15-02		

AVERAGE PERMEABILITY = 4.2E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.2E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/10/2009 Checked By: TMS Date: 12-17-09

DCN: CT-22C DATE: 12/10/2009 FILE: \\Server\data\DRIVE\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID No.	2009-666-15-02		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	211	802
Wt. of Tare & WS (gm.)	537.41	295.71
Wt. of Tare & DS (gm.)	462.44	257.19
Wt. of Tare (gm.)	171.13	103.78
Wt. of Water (gm.)	74.97	38.52
Wt. of DS (gm.)	291.31	153.41
Moisture Content (%)	**25.7**	**25.1**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	667.46	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	667.46	664.14
Length 1 (in.)	3.395	3.405
Length 2 (in.)	3.410	3.378
Length 3 (in.)	3.409	3.372
Top Diameter (in.)	2.855	2.839
Middle Diameter (in.)	2.849	2.876
Bottom Diameter (in.)	2.809	2.758
Average Length (in.)	3.40	3.39
Average Area (in.^{2})	6.32	6.27
Sample Volume (cm^3)	352.85	347.52
Unit Wet Wt. (gm./ cm^3)	1.89	1.91
Unit Wet Wt. (pcf)	118.1	119.3
Unit Dry Wt. (pcf)	93.9	95.4
Unit Dry Wt. (gm./ cm^3)	1.50	1.53
Void Ratio, e	0.79	0.77
Porosity, n	0.44	0.43
Pore Volume (cm^3)	156.2	150.9
Total Wgt. Of Sample After Test		681.23

Tested By: TMS Date: 12/10/2009 Checked By: MMS Date: 12-17-09

DCN: CT-22C DATE: 11-11-09 REVISION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID No.	2009-666-15-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.7	Sample Length (cm), L	8.60
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.17
Cell (psi)	75.0	Sample Area (cm^2), A	40.42
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.888
Hydraulic Gradient	10.63	Outflow Burette Area (cm^2), a-out	0.890
		B Parameter (%)	95

AVERAGE PERMEABILITY = 4.2E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.2E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/10/2009	9	44.5	0.00	0.0	0.0	118.3	0	23.3	NA
12/10/2009	9	45.5	0.02	0.1	0.1	118.0	0	23.3	2.8E-06
12/10/2009	9	46.5	0.03	0.3	0.3	117.7	0	23.3	4.2E-06
12/10/2009	9	47.5	0.05	0.4	0.4	117.4	0	23.3	4.2E-06
12/10/2009	9	48.5	0.07	0.6	0.5	117.0	0	23.3	4.2E-06
12/10/2009	9	49.5	0.08	0.7	0.7	116.7	0	23.3	4.2E-06
12/10/2009	9	50.5	0.10	0.9	0.8	116.4	0	23.3	4.2E-06
12/10/2009	9	51.5	0.12	1.0	1.0	116.0	0	23.3	4.2E-06
12/10/2009	9	52.5	0.13	1.2	1.2	115.7	1	23.3	4.2E-06

Tested By: TMS Date: 12/10/2009 Checked By: [illegible] Date: 12-17-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-02 PERM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID	2009-666-15-02	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

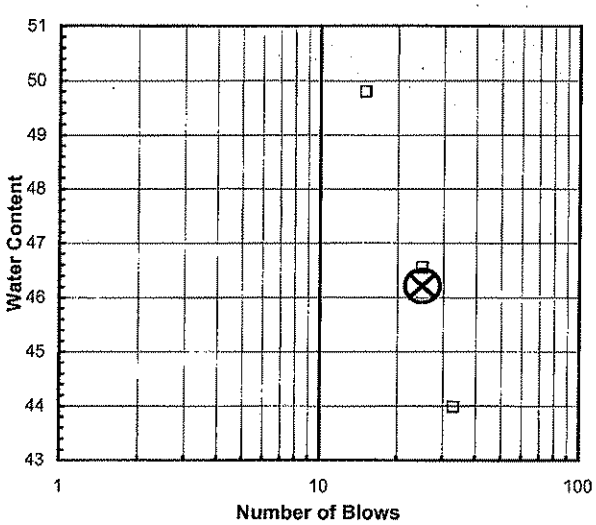
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	B	A-I	A-B	MULTIPOINT
Wt. of Tare & WS (gm)	29.43	29.87	29.42	
Wt. of Tare & DS (gm)	24.69	25.29	25.18	
Wt. of Tare (gm)	15.17	15.45	15.54	
Wt. of Water (gm)	4.7	4.6	4.2	
Wt. of DS (gm)	9.5	9.8	9.6	
Moisture Content (%)	**49.8**	**46.5**	**44.0**	
Number of Blows	**15**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	O	A-F	
Wt. of Tare & WS (gm)	21.67	22.36	
Wt. of Tare & DS (gm)	20.03	20.60	
Wt. of Tare (gm)	15.19	15.43	
Wt. of Water (gm)	1.6	1.8	
Wt. of DS (gm)	4.8	5.2	
Moisture Content (%)	**33.9**	**34.0**	**-0.2**

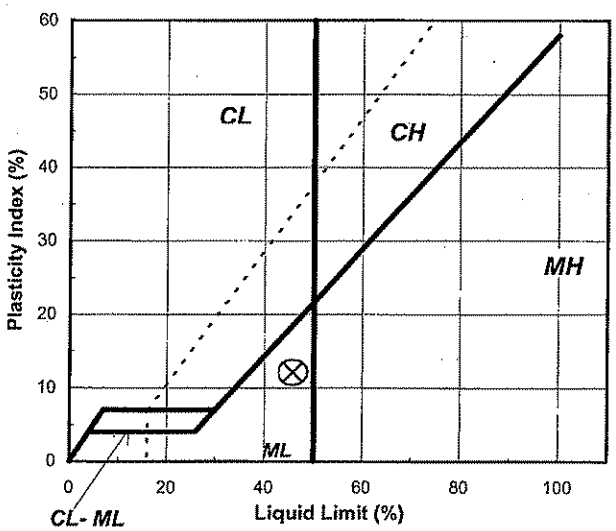
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**46**
Plastic Limit (%)	**34**
Plasticity Index (%)	**12**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/10/2009 *Checked By* GEM *Date* 12-11-09

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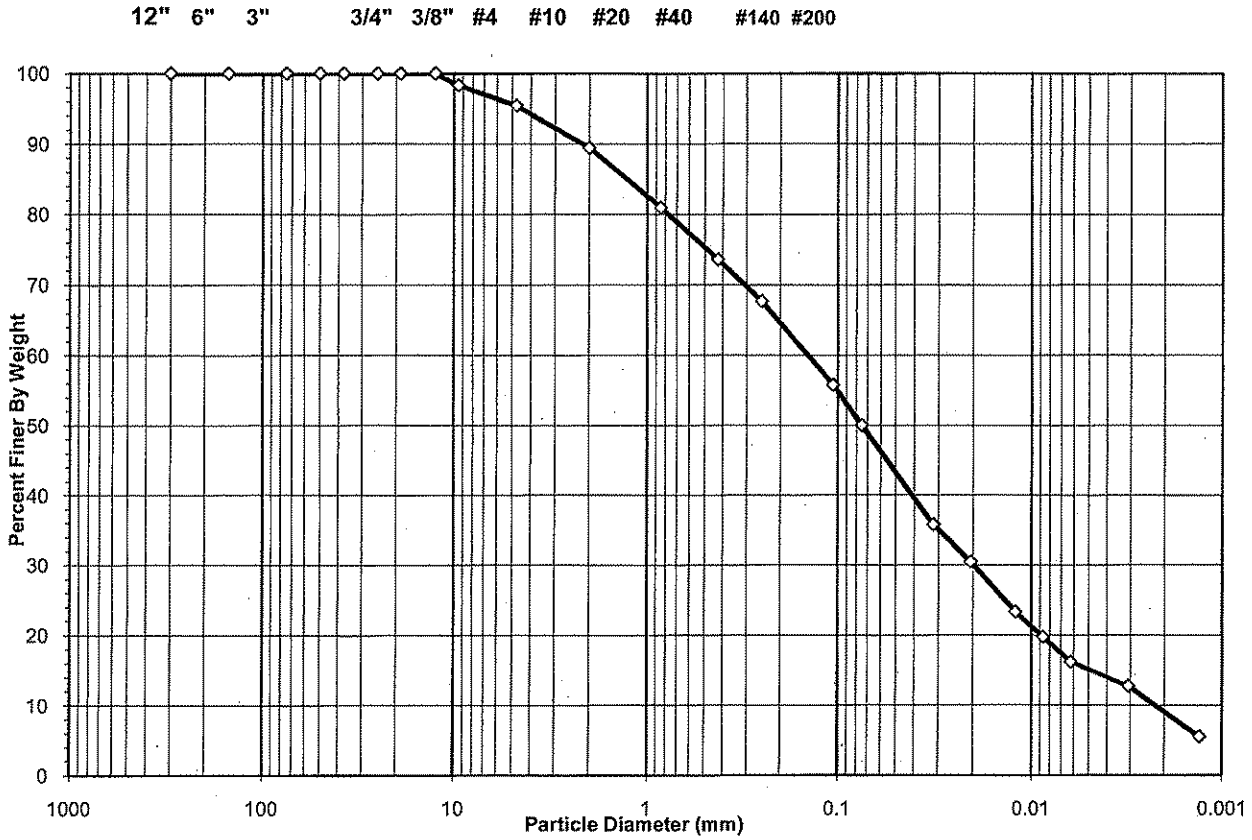
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID	2009-666-15-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel		sand	silt	clay



Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	4.57
#4 To #200	*Sand*	45.44
Finer Than #200	*Silt & Clay*	50.00

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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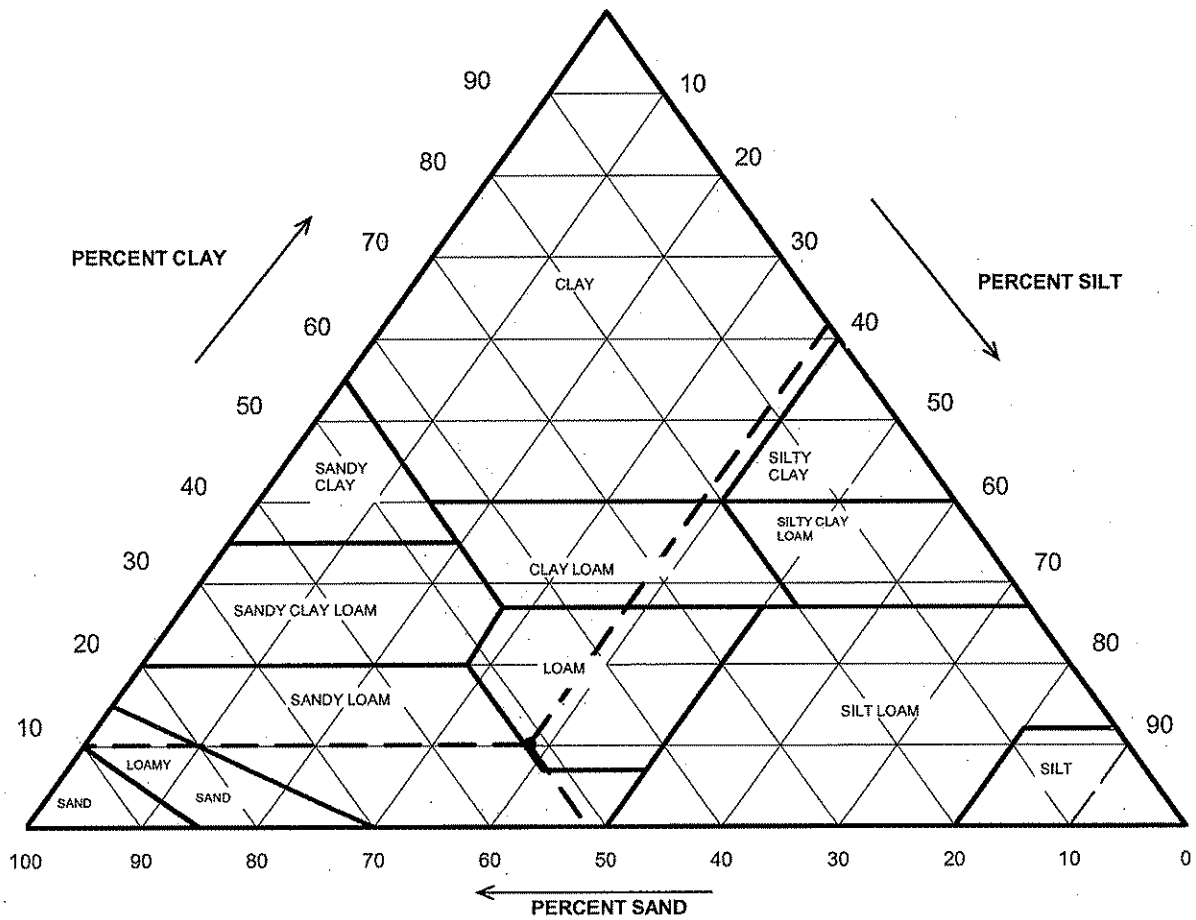
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID	2009-666-15-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	10.56	**0.00**
2	89.44	*Sand*	46.16	**51.60**
0.05	43.29	*Silt*	34.22	**38.26**
0.002	9.07	*Clay*	9.07	**10.14**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID	2009-666-15-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	211	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	537.41	Wgt.Tare + Wet Soil (gm)	52.26
Wgt.Tare + Dry Soil (gm)	462.44	Wgt.Tare + Dry Soil (gm)	51.95
Weight of Tare (gm)	171.13	Weight of Tare (gm)	15.74
Weight of Water (gm)	74.97	Weight of Water (gm)	0.31
Weight of Dry Soil (gm)	291.31	Weight of Dry Soil (gm)	36.21
Moisture Content (%)	**25.7**	**Moisture Content (%)**	**0.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	366.28	Weight of the Dry Sample (gm)	340.96
Dry Weight +#10 Material(gm)	291.3	Weight of minus #200 material (gm)	27.75
Wet Weight Hydro. Material.(gm)	50.08	Weight of plus #200 material (gm)	313.21
Dry Weight Hydro. Material (gm)	49.65		
Total Dry Weight Sample (gm)	340.96	**J-FACTOR (%FINER THAN #10)**	**0.8944**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	4.92	1.69	1.69	98.31	**98.31**
#4	4.75	8.38	2.88	4.57	95.43	**95.43**
#10	2.00	17.45	5.99	10.56	89.44	**89.44**
#20	0.85	4.71	9.49	9.49	90.51	**80.96**
#40	0.425	4.08	8.22	17.70	82.30	**73.61**
#60	0.250	3.30	6.65	24.35	75.65	**67.67**
#140	0.106	6.60	13.29	37.64	62.36	**55.78**
#200	0.075	3.21	6.46	44.10	55.90	**50.00**
Pan	-	27.75	55.90	100.00	-	-

Notes :

Tested By SD Date 12.17.09 Checked By JRB Date 12.17.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	-1'
Project No.	2009-666-15	Sample No.	NA
Lab ID	2009-666-15-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	25.0	25.0	23.6	4.92	20.1	40.0	0.01288	0.0318	**35.8**
5		22.0	23.6	4.92	17.1	34.1	0.01288	0.0205	**30.5**
15		18.0	23.6	4.92	13.1	26.1	0.01288	0.0122	**23.3**
30		16.0	23.6	4.92	11.1	22.1	0.01288	0.0087	**19.8**
60		14.0	23.6	4.92	9.1	18.1	0.01288	0.0062	**16.2**
250		12.0	23.7	4.85	7.1	14.2	0.01287	0.0031	**12.7**
1440		8.0	23.6	4.92	3.1	6.1	0.01288	0.0013	**5.5**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.65	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	89.44
Weight of Dry Material (gm)	49.65		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12.15.09 Checked By JRB Date 12.17.09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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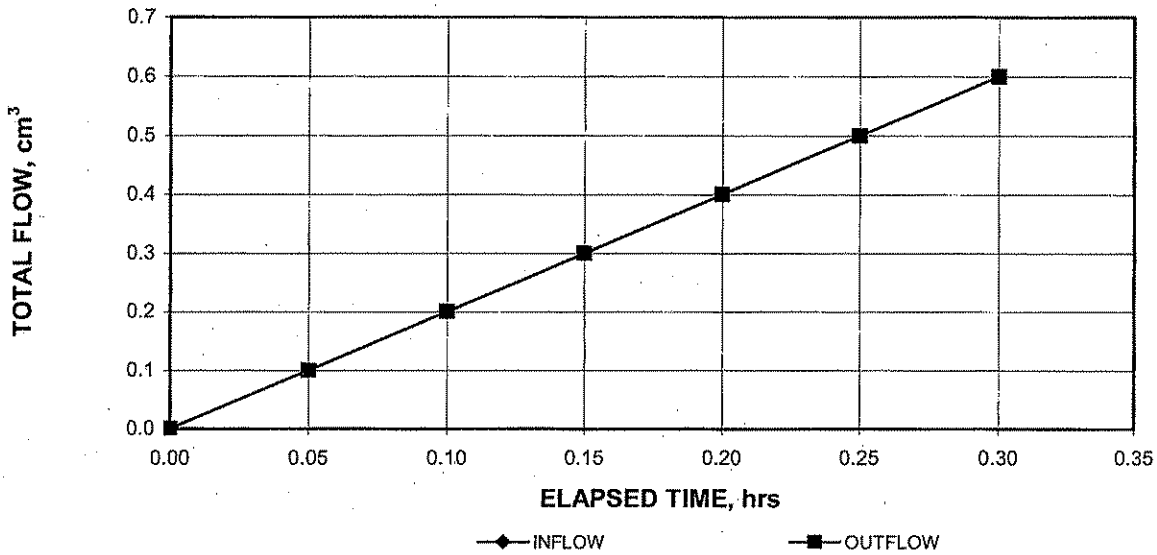
INTEGRITY IN TESTING

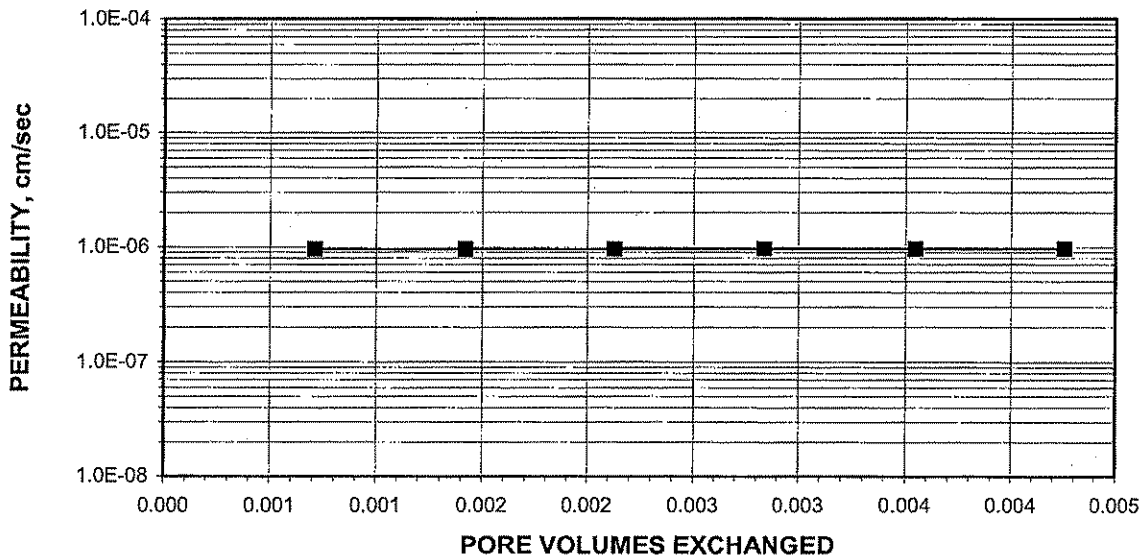
Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID No.	2009-666-15-03		

AVERAGE PERMEABILITY = 9.6E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.6E-09 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/10/2009 Checked By: GEM Date: 12-11-09

DCN: CT-22C DATE: 12/11/2009 FILE: I:\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID No.	2009-666-15-03		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	201	823
Wt. of Tare & WS (gm.)	457.71	335.77
Wt. of Tare & DS (gm.)	395.96	295.83
Wt. of Tare (gm.)	170.72	137.03
Wt. of Water (gm.)	61.75	39.94
Wt. of DS (gm.)	225.24	158.80
Moisture Content (%)	**27.4**	**25.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	605.76	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	605.76	595.00
Length 1 (in.)	3.208	3.169
Length 2 (in.)	3.209	3.178
Length 3 (in.)	3.174	3.113
Top Diameter (in.)	2.805	2.775
Middle Diameter (in.)	2.803	2.788
Bottom Diameter (in.)	2.823	2.822
Average Length (in.)	3.20	3.15
Average Area (in.^{2})	6.20	6.14
Sample Volume (cm^3)	324.97	317.05
Unit Wet Wt. (gm./ cm^3)	1.86	1.88
Unit Wet Wt. (pcf)	116.4	117.1
Unit Dry Wt. (pcf)	91.3	93.6
Unit Dry Wt. (gm./ cm^3)	1.46	1.50
Void Ratio, e	0.85	0.80
Porosity, n	0.46	0.44
Pore Volume (cm^3)	148.9	141.0
Total Wgt. Of Sample After Test		601.52

Tested By: TMS Date: 12/10/2009 Checked By: GEM Date: 12-11-09

DCN: CT-22C DATE: 11-11-09 ~~TEA/LSKOMA~~ drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID No.	2009-666-15-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.01
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.10
Cell (psi)	75.0	Sample Area (cm^2), A	39.58
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.959
Hydraulic Gradient	10.53	Outflow Burette Area (cm^2), a-out	0.983
		B Parameter (%)	95

AVERAGE PERMEABILITY = 9.6E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.6E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/10/2009	10	8.5	0.00	0.0	0.0	109.2	0	23.3	NA
12/10/2009	10	11.5	0.05	0.1	0.1	109.0	0	23.3	9.5E-07
12/10/2009	10	14.5	0.10	0.2	0.2	108.7	0	23.3	9.5E-07
12/10/2009	10	17.5	0.15	0.3	0.3	108.5	0	23.3	9.6E-07
12/10/2009	10	20.5	0.20	0.4	0.4	108.3	0	23.3	9.6E-07
12/10/2009	10	23.5	0.25	0.5	0.5	108.1	0	23.3	9.6E-07
12/10/2009	10	26.5	0.30	0.6	0.6	107.9	1	23.3	9.6E-07

Tested By: TMS Date: 12/10/2009 Checked By: GZM Date: 12-11-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	SST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-03	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

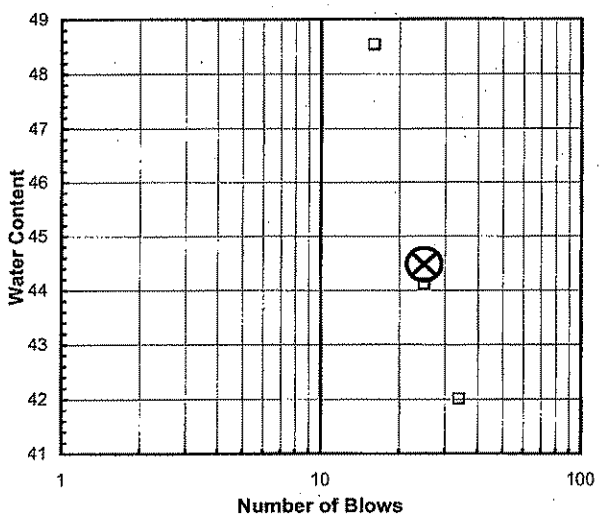
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	T	S	W	MULTIPOINT
Wt. of Tare & WS (gm)	28.34	28.15	27.46	
Wt. of Tare & DS (gm)	24.04	24.18	23.81	
Wt. of Tare (gm)	15.18	15.18	15.12	
Wt. of Water (gm)	4.3	4.0	3.7	
Wt. of DS (gm)	8.9	9.0	8.7	
Moisture Content (%)	**48.5**	**44.1**	**42.0**	
Number of Blows	**16**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	G	J	
Wt. of Tare & WS (gm)	21.87	21.44	
Wt. of Tare & DS (gm)	20.22	19.88	
Wt. of Tare (gm)	15.04	15.11	
Wt. of Water (gm)	1.7	1.6	
Wt. of DS (gm)	5.2	4.8	
Moisture Content (%)	**31.9**	**32.7**	**-0.9**

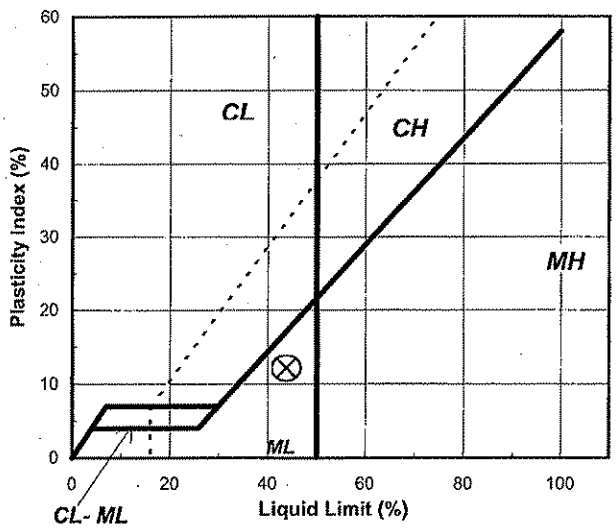
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**44**
Plastic Limit (%)	**32**
Plasticity Index (%)	**12**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/10/2009 *Checked By* GEM *Date* 12-11-09

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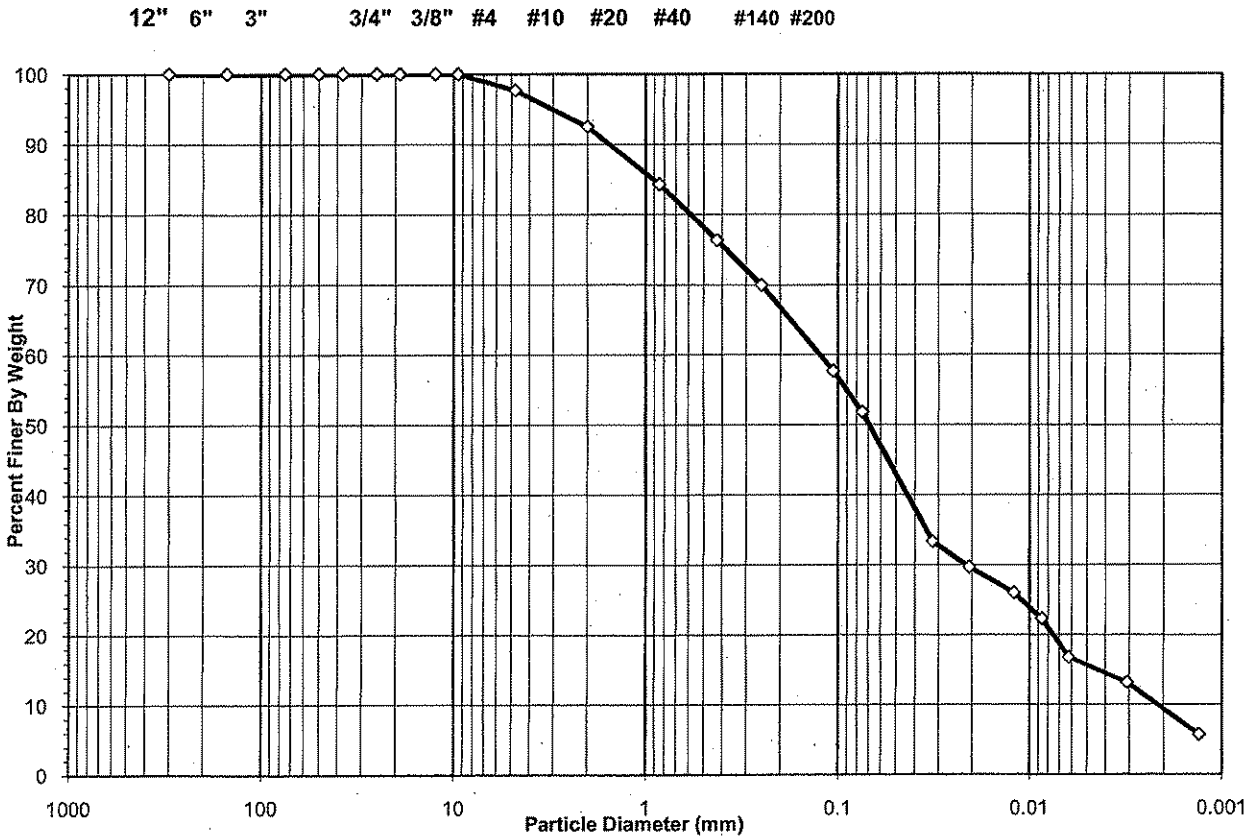
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-03	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	2.33
#4 To #200	*Sand*	45.84
Finer Than #200	*Silt & Clay*	51.83

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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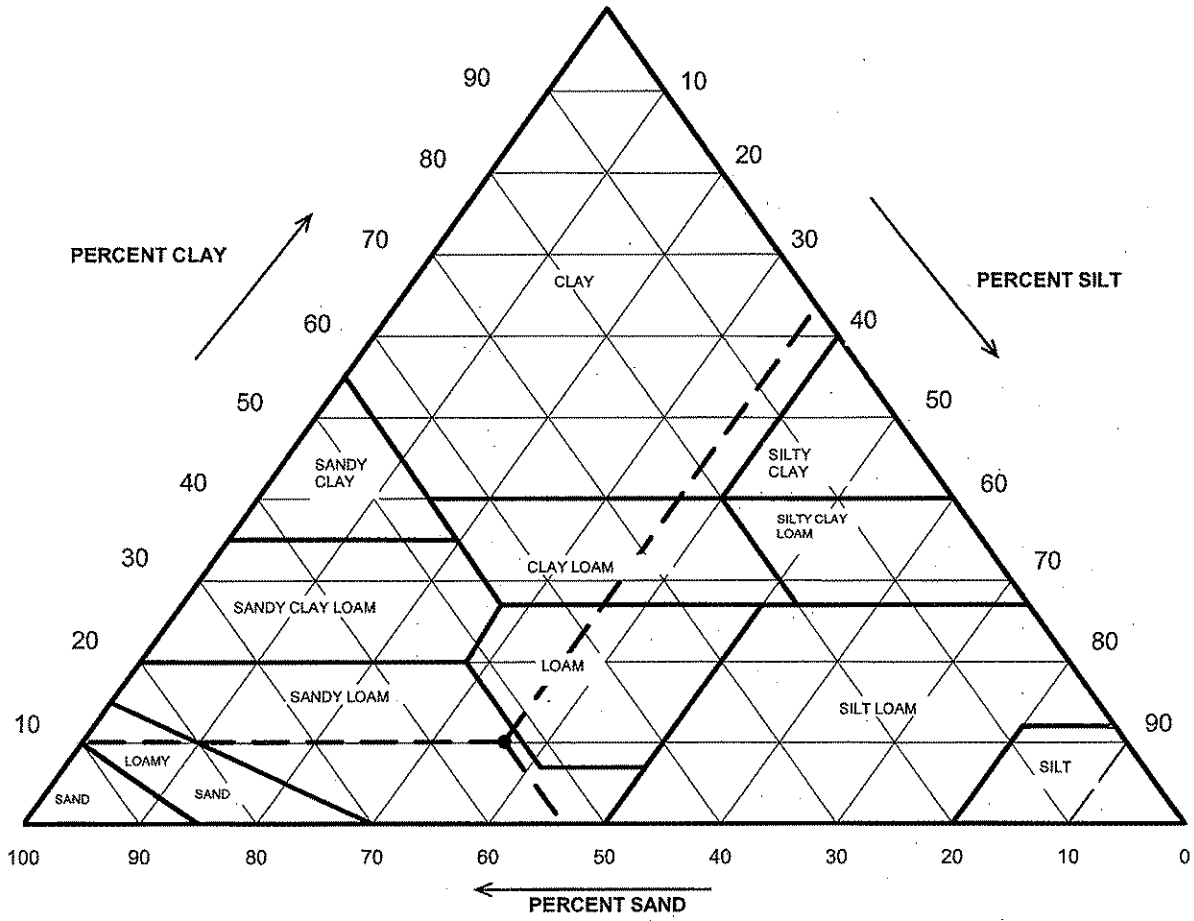
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-03	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	7.46	**0.00**
2	92.54	*Sand*	49.57	**53.57**
0.05	42.97	*Silt*	33.58	**36.29**
0.002	9.38	*Clay*	9.38	**10.14**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-03 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-03	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	201	Tare No.	M-1
Wgt.Tare + Wet Soil (gm)	457.41	Wgt.Tare + Wet Soil (gm)	39.21
Wgt.Tare + Dry Soil (gm)	395.96	Wgt.Tare + Dry Soil (gm)	39.01
Weight of Tare (gm)	170.72	Weight of Tare (gm)	15.89
Weight of Water (gm)	61.45	Weight of Water (gm)	0.20
Weight of Dry Soil (gm)	225.24	Weight of Dry Soil (gm)	23.12
Moisture Content (%)	**27.3**	**Moisture Content (%)**	**0.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	286.69	Weight of the Dry Sample (gm)	274.87
Dry Weight +#10 Material(gm)	225.2	Weight of minus #200 material (gm)	27.80
Wet Weight Hydro. Material.(gm)	50.06	Weight of plus #200 material (gm)	247.07
Dry Weight Hydro. Material (gm)	49.63		
Total Dry Weight Sample (gm)	274.87	**J-FACTOR (%FINER THAN #10)**	**0.9254**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	5.24	2.33	2.33	97.67	**97.67**
#10	2.00	11.57	5.14	7.46	92.54	**92.54**
#20	0.85	4.42	8.91	8.91	91.09	**84.30**
#40	0.425	4.26	8.58	17.49	82.51	**76.35**
#60	0.250	3.43	6.91	24.40	75.60	**69.96**
#140	0.106	6.58	13.26	37.66	62.34	**57.69**
#200	0.075	3.14	6.33	43.98	56.02	**51.83**
Pan	-	27.80	56.02	100.00	-	-

Notes :

Tested By SD Date 12.17.09 Checked By JRB Date 12.17.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	GDE
Project No.	2009-666-15	Sample No.	LEACHATE LAGOON
Lab ID	2009-666-15-03	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	23.6	4.92	18.1	36.1	0.01288	0.0322	**33.4**
5		21.0	23.6	4.92	16.1	32.1	0.01288	0.0207	**29.7**
15		19.0	23.6	4.92	14.1	28.1	0.01288	0.0121	**26.0**
30		17.0	23.6	4.92	12.1	24.1	0.01288	0.0086	**22.3**
60		14.0	23.6	4.92	9.1	18.1	0.01288	0.0062	**16.8**
250		12.0	23.7	4.85	7.1	14.3	0.01287	0.0031	**13.2**
1440		8.0	23.6	4.92	3.1	6.1	0.01288	0.0013	**5.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.63	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	92.54
Weight of Dry Material (gm)	49.63		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12.15.09 Checked By JRB Date 12.17.09

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Roy Alexander

From: David Pasko [dpasko@mcgillengineers.com]
Sent: Monday, October 19, 2009 3:31 PM
To: roy@mcgillengineers.com
Subject: FW: Testing of Dual-Contained Piping

From: David Pasko [mailto:dpasko@mcgillengineers.com]
Sent: Thursday, August 13, 2009 10:38 AM
To: 'chaverstrom@Thalle.com'; 'Sarah McKee'; 'kvess@thalle.com'
Cc: 'Stephen King'; 'Mark Shumpert'; 'Denese Ballew'
Subject: Testing of Dual-Contained Piping

Chris,

We appreciate you all coming to the site yesterday to talk about the project. We felt it was a very productive meeting.

In regards to testing of the dual-contained piping on the project, the County must be able to prove beyond the shadow of a doubt that Thalle installed the pipeline under MSW Phase 3 in such a manner that the pipe does not leak. Therefore, we included in our spec the requirement that both sections of the dual-contained piping be tested. Feel free to perform water testing on each section of pipe individually, or you can use an air and water testing procedure simultaneously. The attached spec is the typical testing procedure that we use for any gravity sewer that we install. See Section 3.02 A 2f of the spec for the air testing requirements if you wish to use this method. Shamrock Environmental recently completed testing of a dual-contained pipe on one of our projects, and the Project Superintendent said it was a relatively straightforward procedure of fusion welding an end plate to both ends, and then tapping the end plates to install the appropriate fittings to do the test. Please let Alan Mackey know when you all are going to do the testing.

Give us a call if you have any questions regarding this procedure.

Dave Pasko
McGill Associates
828/252-0575

McGill Associates P.A.
Post Office Box 2259
Asheville, North Carolina 28802
(828) 252-0575

PROJECT OBSERVATION REPORT

(ALL ENTRIES IN INK)

DATE 8/19/09	DAY OF WEEK S M T (W) T F S	TIME ARRIVED 7:00 AM PM	TIME DEPARTED 12:00 AM PM
WEATHER ☐ CLEAR ☑ OVERCAST ☐ RAIN ☐ SNOW ☐ OTHER	RAIN WITHIN PAST 24 HOURS IN.	HIGH TEMPERATURE 84	LOW TEMPERATURE 64

CONTRACTOR: THALLE CONSTRUCTION

PROJECT FOREMAN: KEITH VESS | OPERATOR(S): 16 | SKILLED: 3 | OTHER:

EQUIPMENT: TRACK EXCAVATOR: 3 | RUBBER TIRE EXCAVATOR: | RUBBER TIRE LOADER: 1 | DUMP TRUCK: 5 | OTHER: 2-DOZERS, 2-ROLLERS

SUBCONTRACTOR: | FOREMAN:

SUBCONTRACTOR: | FOREMAN:

SUBCONTRACTOR: | FOREMAN:

OWNER'S REP:

VISITORS:

☐ WATER LINE	☐ SEWER LINE INSTALLATION	Sta.		to Sta.	
☐ WATER LINE	☑ SEWER LINE TESTING	Sta.	± 13+42 ± 10+06	to Sta.	± 18+27 ± 18+08
☐ ROAD CONSTRUCTION		Sta.		to Sta.	

WORK AREA CLEAN-UP	☐ GOOD	☑ ACCEPTABLE	☐ INADEQUATE	☐ SEE COMMENTS BELOW
EROSION & SEDIMENTATION CONTROL MEASURES IN PLACE	☐ N/A	☑ YES	☐ NO	☐ SEE COMMENTS BELOW
EROSION & SEDIMENTATION CONTROL MEASURES	☑ CLEAN & FUNCTIONAL	☐ REPAIR/MAINTENANCE REQUIRED	☐ SEE COMMENTS BELOW	
TRAFFIC CONTROL	☑ SIGNS	☐ CONES	☐ FLAGMEN	☐ N/A
GRADED AREAS (SLOPES/FILLS)	☐ SEEDED	☐ PROTECTED	☐ OTHER	

LIST PICTURES TAKEN TODAY:		DOES CONTRACTOR HAVE SHOP DRAWINGS FOR THE MATERIALS INSTALLED TODAY?	☑ YES	☐ NO

CONSTRUCTION ISSUES:

Alan Mackey
CFR'S SIGNATURE

8/19/09
DATE

REV: 04/08

Sewer Line Test Report

PAGE: 1 OF: 1

PROJECT: WHITE OAK LANDFILL
OWNER: HAYWOOD CO.
PROJECT No.: 07518

CONTRACTOR: THALLE CONSTRUCTION
FOREMAN: KEITH VESS
McGILL CFR: ALLAN F. MARKEY

DATE	PIPE SIZE	PIPE TYPE	Stations From	Stations To	TEST LENGTH	TEST PRESSURE	TEST TIME	PASS/ FAIL	LAMP	95% MANDREL
8/19/09	12"	H.D.P.E	±13+42	±18+27	485'	3.5 lbs	8:54	PASS	—	—
8/19/09	8"	H.D.P.E	±13+42	±18+27	485'	3.5 lbs	5:56	PASS	—	—
8/19/09	12"	H.D.P.E	±10+00	±18+08	808'	3.5 lbs.	14:14	PASS	—	—
8/19/09	8"	H.D.P.E	±10+00	±18+08	808'	3.5 lbs.	9:30	PASS	—	—

Minimum Test Time for Pipe

LENGTH TESTED

Pipe Size	4"	6"	8"	10"	12"	15"	21"	24"
25	0:04	0:10	0:17	0:22	0:26	0:31	0:44	0:53
50	0:09	0:20	0:35	0:44	0:53	1:02	1:29	1:47
75	0:13	0:30	0:53	1:06	1:20	1:34	2:14	2:40
100	0:17	0:40	1:11	1:29	1:47	2:05	2:58	3:33
125	0:22	0:50	1:29	1:51	2:13	2:36	3:43	4:27
150	0:26	1:00	1:47	2:13	2:40	3:07	4:27	5:20
175	0:31	1:10	2:04	2:35	3:07	3:39	5:12	6:14
200	0:35	1:20	2:22	2:58	3:33	4:10	5:57	7:07
225	0:40	1:30	2:40	3:20	4:00	4:41	6:41	8:00
250	0:44	1:40	2:58	3:42	4:27	5:13	7:26	8:54
275	0:49	1:50	3:16	4:05	4:53	5:44	8:10	9:47
300	0:53	2:00	3:33	4:27	5:20	6:15	8:55	10:41
325	0:58	2:10	3:51	4:49	5:47	6:47	9:40	11:34
350	1:02	2:20	4:09	5:11	6:14	7:18	10:24	12:28
375	1:06	2:30	4:27	5:34	6:40	7:49	11:09	13:21
400	1:11	2:40	4:45	5:56	7:07	8:21	11:54	14:14
425	1:15	2:50	5:02	6:18	7:34	8:52	12:38	15:08
450	1:20	3:00	5:20	6:40	8:00	9:23	13:23	16:01
475	1:24	3:10	5:38	7:03	8:27	9:54	14:07	16:55
500	1:29	3:20	5:56	7:25	8:54	10:26	14:52	17:48
525	1:33	3:30	6:14	7:47	9:21	10:57	15:37	18:42
550	1:38	3:40	6:31	8:09	9:47	11:28	16:21	19:35
575	1:42	3:50	6:49	8:32	10:14	12:00	17:06	20:28
600	1:47	4:00	7:07	8:54	10:41	12:31	17:51	21:22

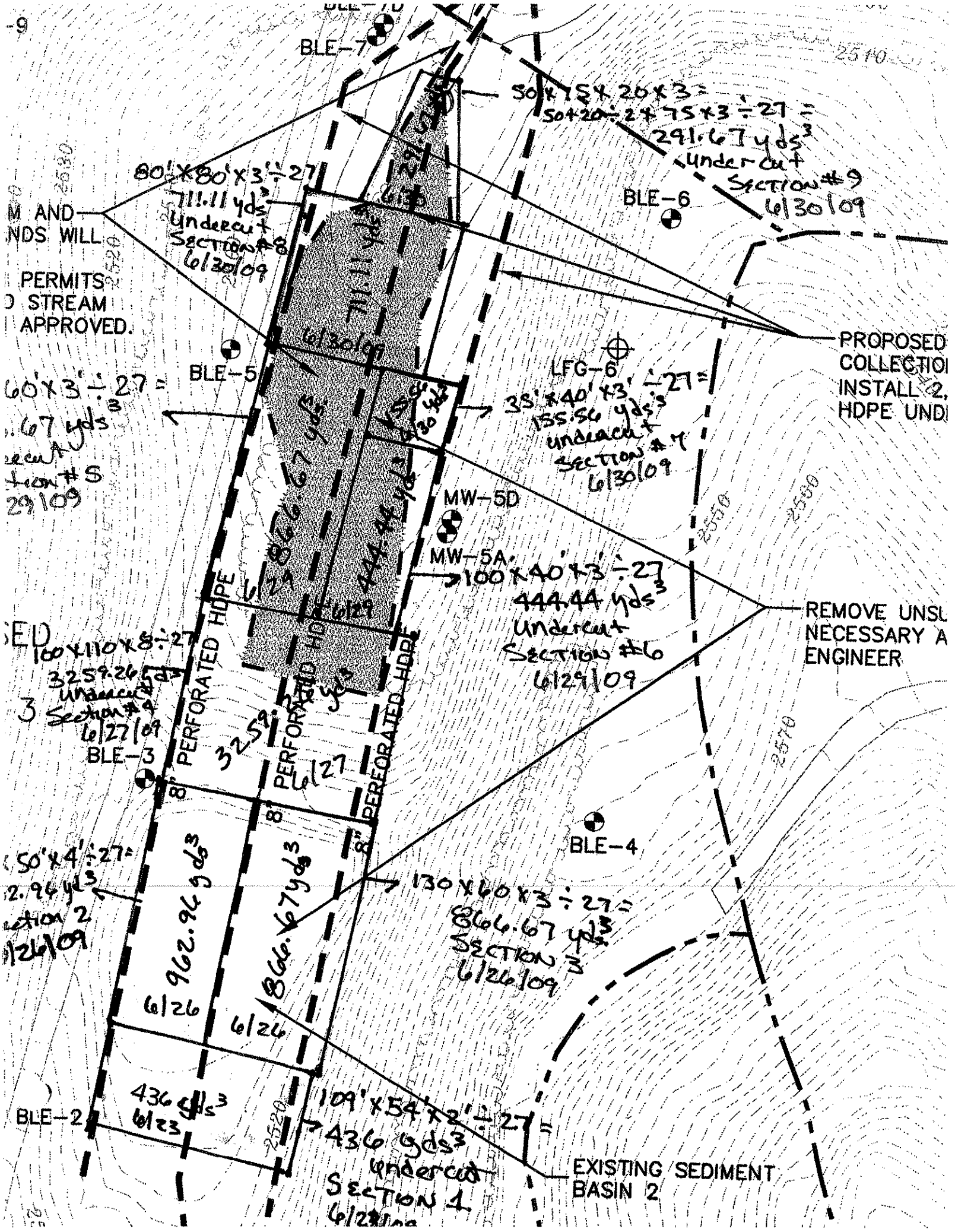
WHITE OAK LANDFILL - PHASE 3 CONSTRUCTION

HAYWOOD COUNTY, NORTH CAROLINA

UNDERCUT QUANTITIES FOR PHASE 3 CONSTRUCTION

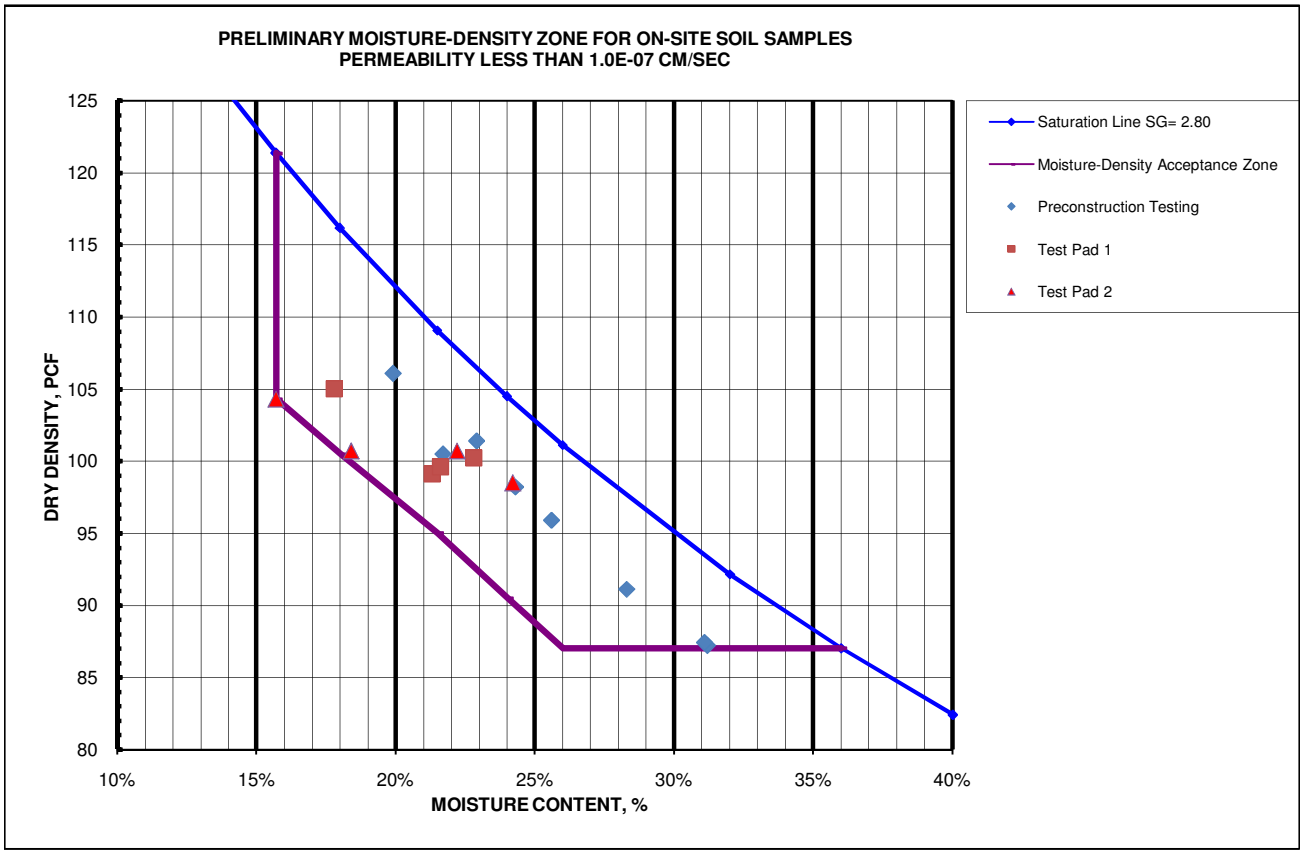
SECTION	DATE	QUANTITY	UNITS
1	6/23/2010	436.00	CY
2	6/26/2010	962.96	CY
3	6/26/2010	866.67	CY
4	6/27/2010	3,259.26	CY
5	6/27/2010	866.67	CY
6	6/29/2010	444.44	CY
7	6/30/2010	155.56	CY
8	6/30/2010	711.11	CY
9	6/30/2010	291.67	CY
UNDERCUT TOTAL		7,994.34	CY

UNSUITABLE MATERIAL REMOVED


-9
BLE-7
50+75x20x3=
50+20÷2+75x3÷27=
291.67 yds3
undercut
Section #9
6/30/09
BLE-6
80'x80'x3'÷27
711.11 yds3
Undercut
Section #8
6/30/09
M AND
NDS WILL
PERMITS
D STREAM
APPROVED.
PROPOSED
COLLECTIO
INSTALL 2,
HDPE UND
BLE-5
LFG-6
60'x3'÷27=
.67 yds3
ecut
tion #5
29/09
35'x40'x3'÷27=
155.56 yds3
undercut
Section #7
6/30/09
MW-5D
MW-5A
100x40x3÷27
444.44 yds3
Undercut
Section #6
6/29/09
REMOVE UNSU
NECESSARY A
ENGINEER
SED
100x110x8÷27
3259.26 yds3
undercut
3 Section #4
6/27/09
BLE-3
8" PERFORATED HDPE
8" PERFORATED HDPE
8" PERFORATED HDPE
BLE-4
50'x4'÷27=
2.96 yds3
ection 2
/26/09
130x60x3÷27=
866.67 yds3
SECTION 3
6/26/09
962.96 yds3
6/26
866.67 yds3
6/26
BLE-2
436 yds3
6/23
109'x54'x2'÷27=
436 yds3
undercut
SECTION 1
EXISTING SEDIMENT
BASIN 2

Appendix I B – Soil Liner

TABLE 2
REMOLDED AND TEST PAD PERMEABILITY RESULTS



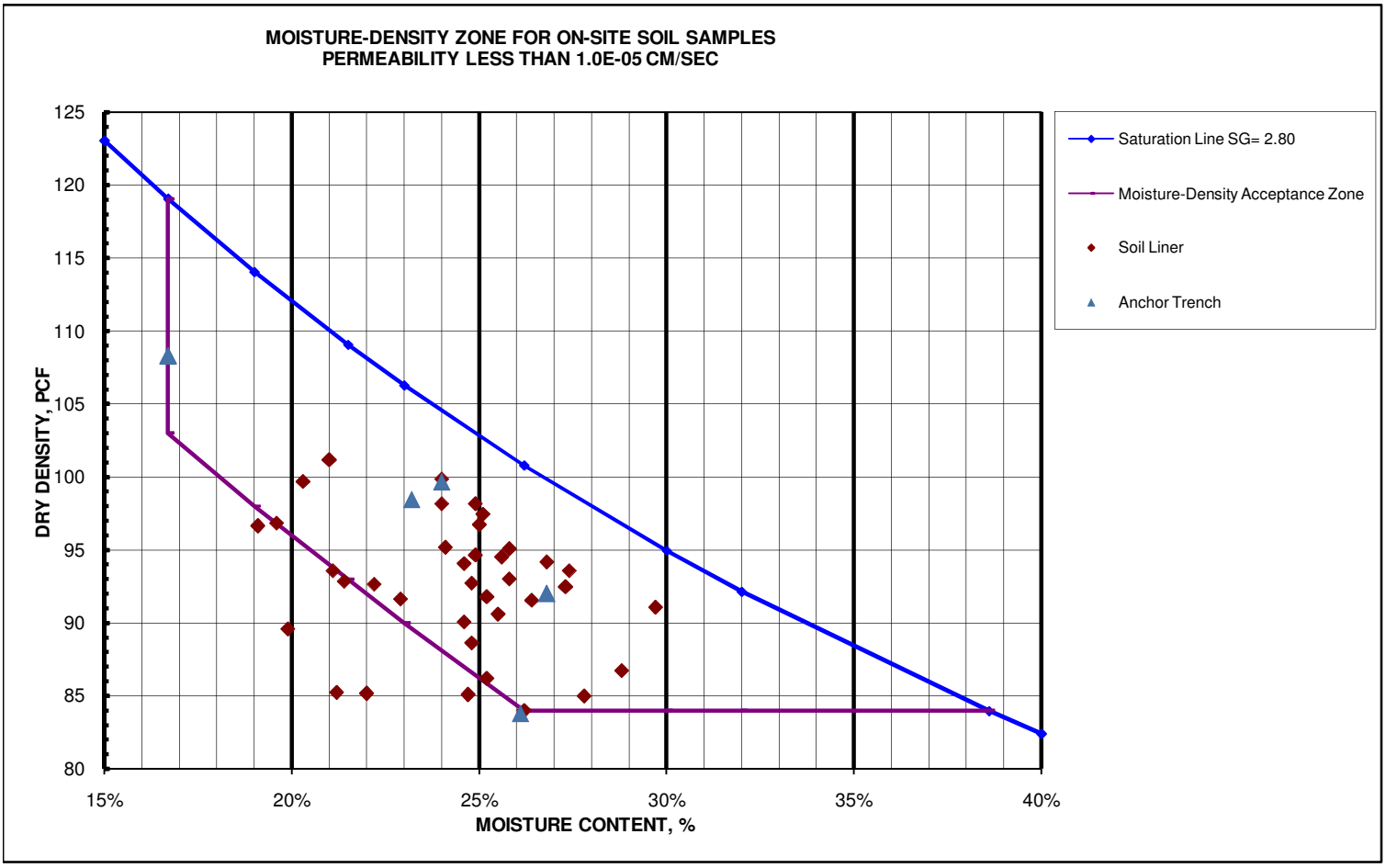
PRE-CONSTRUCTION REMOLDED CQA TESTING

Perm	Sample	Remold			Standard Proctor		Remolded Lab Samples				Perm
No.	I.D.		Sample Description	USCS	OMC	MDD	MC	OMC-MC	DD	DD/MDD	(cm/sec)
	CCL1	Remold	Red-brn elastic Silt	MH	27.5%	89.7	31.2%	3.7%	87.2	97.2%	3.4E-07
	CCL2	Remold	Brown fat Clay	CH	18.5%	103.5	21.7%	3.2%	100.5	97.1%	6.3E-07
	CCL3	Remold	Brown Silt	ML	19.0%	104.1	22.9%	3.9%	101.4	97.4%	5.0E-07
	CCL4	Remold	Brown lean Clay	CL	16.0%	109.8	19.9%	3.9%	106.1	96.6%	3.8E-07
	CCL5	Remold	Brown fat Clay	CH	26.0%	94.2	28.3%	2.3%	91.1	96.7%	2.6E-07
	CCL6	Remold	Red-brn fat Clay	CH	22.0%	98.8	25.6%	3.6%	95.9	97.1%	7.4E-07
	CCL7	Remold	Red-brn Silt	ML	21.3%	100.5	24.3%	3.0%	98.2	97.7%	2.9E-06
	CCL8	Remold	Red-brn elastic Silt	MH	28.6%	89.5	31.1%	2.5%	87.4	97.7%	4.0E-07
	CCL9	Remold	Brn sandy elastic Silt	MH	18.8%	106.4					

TEST PAD Constructed on September 1, 2009

Lab ID	Test Pad	LIFT	ST	Standard Proctor		Undisturbed Shelby Tube				Perm
2009-666-05-02	TP-1	LIFT 1	ST1	16.0%	109.8	17.8%	1.8%	105.0	95.6%	2.30E-07
2009-666-05-04	TP-1	LIFT 2	ST3	21.3%	100.5	21.3%	0.0%	99.1	98.6%	4.40E-07
2009-666-05-06	TP-1	LIFT 3	ST5	21.3%	100.5	22.8%	1.5%	100.2	99.7%	3.00E-07
2009-666-05-08	TP-1	LIFT 4	ST7	21.3%	100.5	21.6%	0.3%	99.6	99.1%	3.10E-07
2009-666-05-03	TP-2	LIFT 1	ST2	18.5%	103.5	18.4%	-0.1%	100.7	97.3%	3.40E-07
2009-666-05-05	TP-2	LIFT 2	ST4	22.0%	98.8	24.2%	2.2%	98.5	99.7%	2.30E-07
2009-666-05-07	TP-2	LIFT 3	ST6	18.5%	103.5	22.2%	3.7%	100.7	97.3%	5.20E-07
2009-666-05-09	TP-2	LIFT 4	ST8	16.0%	109.8	15.7%	-0.3%	104.3	95.0%	6.30E-07

TABLE 3
SOIL LINER CONSTRUCTION TESTING RESULTS



		SOIL LINER Construction started on September 11, 2009												
Lab ID	Tube	ACRE	LIFT	WD	MC	DD	K cm/sec	LL	PL	PI	USCS	Gravel	Sand	Silt/Clay
No.	No.	Ref.		pcf	%	pcf						%	%	%
666-06-01	ST-9	A1	L1	119.9	20.3%	99.7	1.7E-07	45	31	14	ML	5.15	33.21	61.64
666-06-02	ST-10	A1	L2	122.4	21.0%	101.2	4.5E-07	47	34	13	ML	2.93	41.66	55.41
666-07-05	ST-15	A1	L3	118.1	24.1%	95.2	5.7E-07	40	35	5	ML	3.49	47.20	49.31
666-07-01	ST-11	A2	L1	115.8	19.6%	96.8	1.4E-06	43	35	8	ML	3.54	46.65	49.81
666-07-03	ST-13	A2	L2	118.1	29.7%	91.1	1.7E-07	49	38	11	ML	1.01	36.45	62.54
666-07-06	ST-16	A2	L3	118.7	25.6%	94.5	3.4E-07	46	34	12	ML	0.92	47.58	51.50
666-08-01	ST-18	A3	L1	121.9	25.1%	97.4	3.4E-07	50	41	9	MH	3.37	41.10	55.53
666-08-02	ST-19	A3	L2	120.9	25.0%	96.7	1.8E-07	48	35	13	ML	4.78	39.32	55.90
666-09-01	ST-20	A3	L3	123.8	24.0%	99.8	3.0E-07	45	37	8	ML	5.46	43.97	50.57
666-10-06	ST-32	A4	L1	112.2	24.6%	90.0	4.2E-06	48	38	10	ML	0.58	34.32	65.10
666-09-07	ST-33	A4	L2	113.2	22.2%	92.6	7.2E-06	47	39	8	ML	0.08	40.02	59.90
666-12-03	ST-34	A4	L3	117.2	24.6%	94.1	4.7E-06	45	39	6	ML	0.27	41.94	57.79
666-09-05	ST-24	A5	L1	119.2	27.4%	93.6	4.3E-07	45	35	10	ML	0.53	36.36	63.11
666-09-10	ST-29	A5	L2	110.6	24.8%	88.6	2.7E-06	48	42	6	ML	1.03	35.81	63.16
666-10-05	ST-30	A5	L3	113.3	21.1%	93.6	9.5E-06	44	39	5	ML	0.24	38.41	61.35

Lab ID No.	Tube No.	ACRE Ref.	LIFT	WD pcf	MC %	DD pcf	K cm/sec	LL	PL	PI	USCS	Gravel %	Sand %	Silt/Clay %
666-09-02	ST-21	A6	L1	121.7	24.0%	98.1	1.8E-07	55	33	22	MH	0.45	37.06	62.49
666-09-03	ST-22	A6	L2	112.7	21.4%	92.8	2.4E-05	37	32	5	ML	3.38	42.02	54.60
666-09-03	ST-22B	A6	L2B	115.1	19.1%	96.6	3.9E-05	37	32	5	ML	3.38	42.02	54.60
666-10-03	ST-22A	A6	L2R	115.7	24.8%	92.7	2.3E-06	49	41	8	ML	0.45	38.94	60.61
666-09-04	ST-23	A6	L3	111.7	28.8%	86.72	5.7E-06	45	38	7	ML	0.50	38.85	60.65
666-11-01	ST-23A	A6	L3R	108.6	27.8%	85.0	2.8E-06	45	38	7	ML	0.15	36.03	63.82
666-09-06	ST-25	A7	L1	115.7	26.4%	91.5	1.4E-06	47	39	8	ML	2.16	43.03	54.81
666-09-08	ST-27	A7	L2	103.9	22.0%	85.2	1.5E-05	47	43	4	ML	0.22	38.28	61.50
666-10-04	ST-27A	A7	L2	119.4	26.8%	94.2	1.3E-06	44	38	6	ML	0.79	53.63	45.58
666-12-04	ST-35	A7	L3	106.1	24.7%	85.1	3.2E-05	47	39	8	ML	3.87	40.50	55.63
666-14-01	ST-35A	A7	L3R	107.4	19.9%	89.6	5.6E-06	49	41	8	ML	6.3	34.36	59.34
666-09-07	ST-26	A8	L1	117.7	27.3%	92.5	1.4E-06	43	34	9	ML	1.65	36.33	62.02
666-09-09	ST-28	A8	L2	103.3	21.2%	85.2	8.8E-05	45	40	5	ML	0.56	44.67	54.77
666-12-02	ST-28A	A8	L2R	117.0	25.8%	93.0	4.9E-06	47	37	10	ML	1.58	36.19	62.23
666-12-01	ST-31	A8	L3	106.0	26.2%	84.0	3.7E-06	47	39	8	ML	0.13	41.27	58.60
666-07-02	ST-12	A9A	L1	119.6	25.8%	95.1	8.0E-07	47	36	11	ML	5.26	44.17	50.57
666-07-04	ST-14	A9A	L2	113.7	25.5%	90.6	2.1E-06	46	36	10	ML	3.12	44.41	52.47
666-07-07	ST-17	A9A	L3	122.6	24.9%	98.2	1.1E-07	49	33	16	ML	1.67	39.61	58.72
666-13-01	ST-36	A9B	L1	114.9	25.2%	91.8	3.3E-05	46	36	10	ML	0.17	43.19	56.64
666-13-01	ST-36A	A9BR	L1	112.6	22.9%	91.6	8.0E-06	50	36	14	MH	4.21	43.69	52.10
666-13-02	ST-37	A9B	L2	107.9	25.2%	86.2	9.9E-06	51	43	8	MH	0.53	43.87	55.60
666-13-03	ST-38	A9B	L3	118.2	24.9%	94.6	2.8E-06	51	43	8	MH	0.99	38.1	60.91
PERIMETER ANCHOR TRENCH														
666-10-01	ST-1	PH1 CCH3		121.3	23.2%	98.5	5.3E-07	45	33	12	ML	0.39	42.53	57.08
666-10-02	ST-2	PH2		105.7	26.1%	83.8	1.0E-04	37	35	2	ML	0	46.81	53.19
666-10-02	ST-2R	PH2 B		116.7	26.8%	92.0	9.3E-05	37	35	2	ML	0	46.81	53.19
666-13-04	ST-3	PH1		126.4	16.7%	108.3	4.0E-07	49	31	18	ML	5.78	57.89	36.33
666-13-05	ST-4	PH1		123.6	24.0%	99.7	1.0E-05	43	32	11	ML	8.22	68.68	23.10

Notes:
ST = Shelby Tube
A = Acre designation
L = Lift designation
L2B = Lift 2 backup sample
L2R = Lift 2 reworked and resampled
9A = Acre 9 berm construction
9B = Acre 9 sump and floor constrcution
Moisture-Density Acceptance Zone defined to include most passing results.

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ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

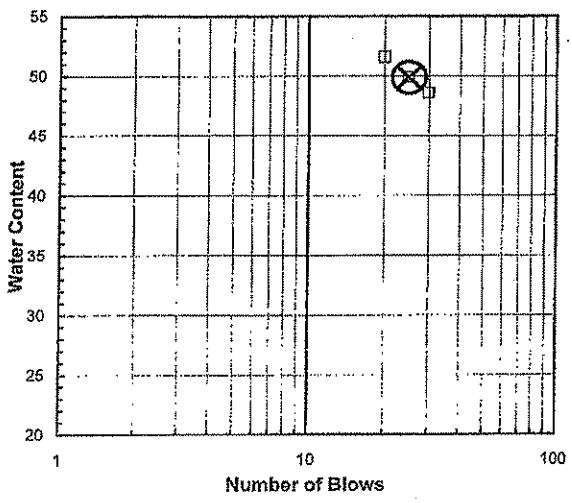
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	234	289	350	M U L T I P O I N T
Wt. of Tare & WS (gm)	39.18	42.07	40.20	
Wt. of Tare & DS (gm)	32.58	34.54	32.75	
Wt. of Tare (gm)	18.99	19.45	18.31	
Wt. of Water (gm)	6.6	7.5	7.5	
Wt. of DS (gm)	13.6	15.1	14.4	
Moisture Content (%)	**48.6**	**49.9**	**51.6**	
Number of Blows	**30**	**25**	**20**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	322	329	
Wt. of Tare & WS (gm)	25.81	25.83	
Wt. of Tare & DS (gm)	24.41	24.38	
Wt. of Tare (gm)	19.79	19.64	
Wt. of Water (gm)	1.4	1.5	
Wt. of DS (gm)	4.6	4.7	
Moisture Content (%)	**30.3**	**30.6**	**-0.3**

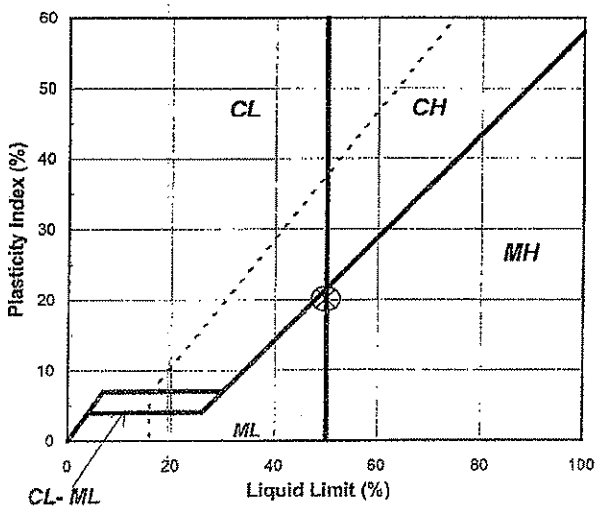
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**50**
Plastic Limit (%)	**30**
Plasticity Index (%)	**20**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By JP *Date* 7/22/09 *Checked By* KB *Date* 7-23-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID	2009-666-02-02	Soil Description	**BROWN FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

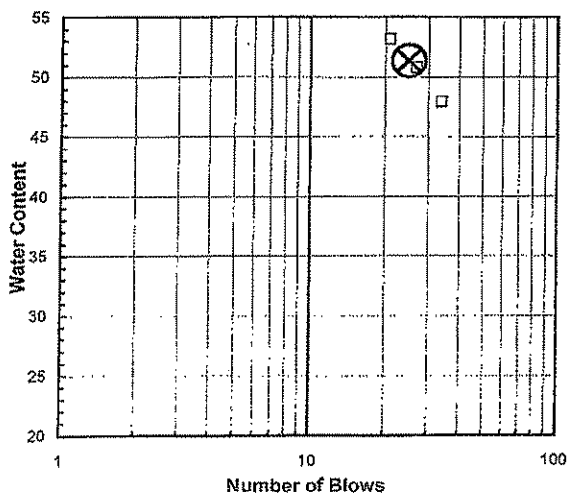
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A119	293	316	M U L T I P O I N T
Wt. of Tare & WS (gm)	40.03	39.88	41.23	
Wt. of Tare & DS (gm)	33.21	32.63	33.29	
Wt. of Tare (gm)	18.98	18.35	18.34	
Wt. of Water (gm)	6.8	7.3	7.9	
Wt. of DS (gm)	14.2	14.3	15.0	
Moisture Content (%)	**47.9**	**50.8**	**53.1**	
Number of Blows	**34**	**27**	**21**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	32	103	
Wt. of Tare & WS (gm)	25.49	20.68	
Wt. of Tare & DS (gm)	24.17	19.39	
Wt. of Tare (gm)	19.17	14.57	
Wt. of Water (gm)	1.3	1.3	
Wt. of DS (gm)	5.0	4.8	
Moisture Content (%)	**26.4**	**26.8**	**-0.4**

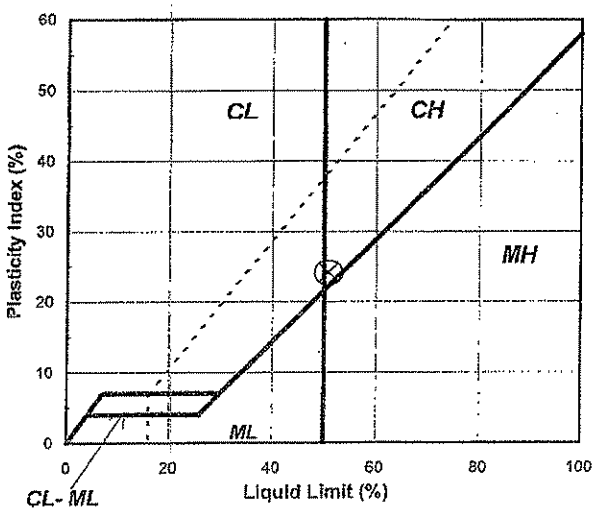
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**51**
Plastic Limit (%)	**27**
Plasticity Index (%)	**24**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By *JP* *Date* *7/22/09* *Checked By* *KB* *Date* *7-23-09*

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03	Soil Description	**BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

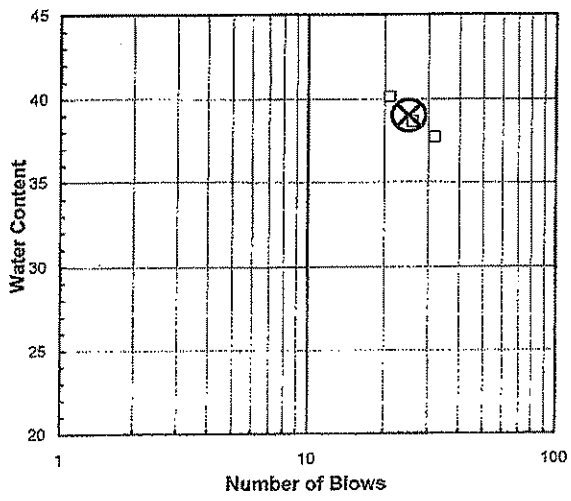
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	230	232	286	MULTIPOINT
Wt. of Tare & WS (gm)	39.65	42.86	43.69	
Wt. of Tare & DS (gm)	33.80	35.91	36.66	
Wt. of Tare (gm)	18.28	17.91	19.13	
Wt. of Water (gm)	5.9	7.0	7.0	
Wt. of DS (gm)	15.5	18.0	17.5	
Moisture Content (%)	**37.7**	**38.6**	**40.1**	
Number of Blows	**32**	**26**	**21**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	301	1882	
Wt. of Tare & WS (gm)	26.10	25.86	
Wt. of Tare & DS (gm)	24.36	24.30	
Wt. of Tare (gm)	18.72	19.22	
Wt. of Water (gm)	1.7	1.6	
Wt. of DS (gm)	5.6	5.1	
Moisture Content (%)	**30.9**	**30.7**	**0.1**

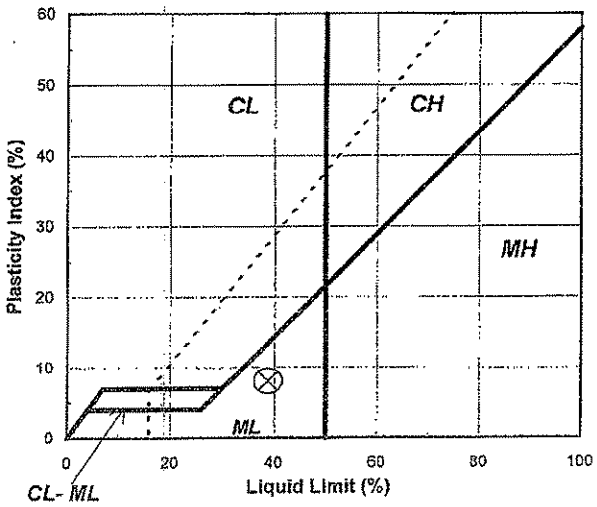
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**39**
Plastic Limit (%)	**31**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By BS *Date* 7/22/09 *Checked By* KB *Date* 7-23-09

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ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID	2009-666-02-04	Soil Description	**BROWN LEAN CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

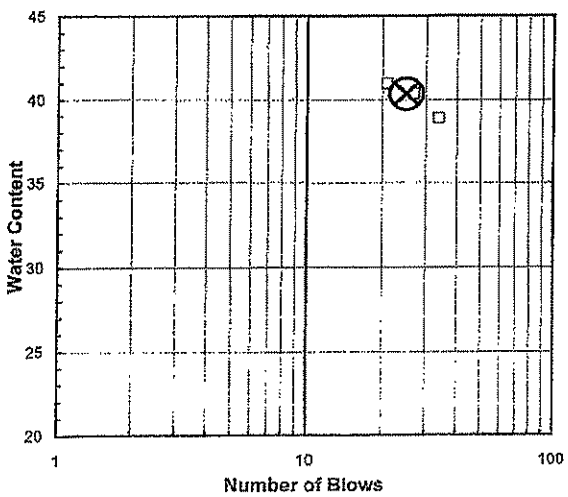
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	125	278	354	MULTIPOINT
Wt. of Tare & WS (gm)	40.61	40.82	39.89	
Wt. of Tare & DS (gm)	34.44	34.44	33.66	
Wt. of Tare (gm)	18.56	18.62	18.44	
Wt. of Water (gm)	6.2	6.4	6.2	
Wt. of DS (gm)	15.9	15.8	15.2	
Moisture Content (%)	**38.9**	**40.3**	**40.9**	
Number of Blows	**34**	**27**	**21**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	271	327	
Wt. of Tare & WS (gm)	21.32	26.12	
Wt. of Tare & DS (gm)	20.28	25.08	
Wt. of Tare (gm)	15.18	20.04	
Wt. of Water (gm)	1.0	1.0	
Wt. of DS (gm)	5.1	5.0	
Moisture Content (%)	**20.4**	**20.6**	**-0.2**

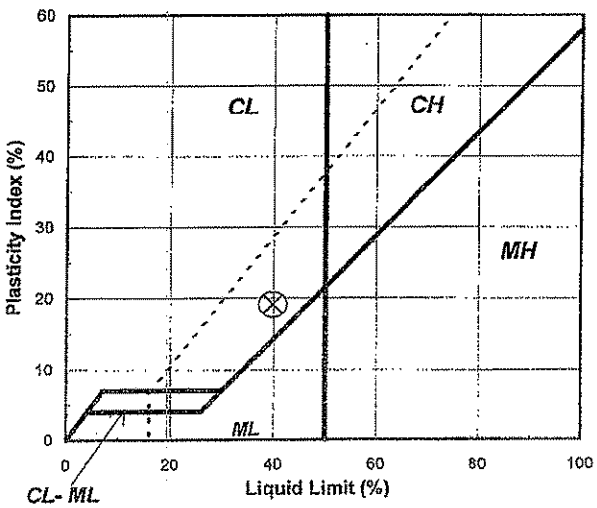
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**40**
Plastic Limit (%)	**21**
Plasticity Index (%)	**19**
USCS Symbol	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 7/22/09 *Checked By* KB *Date* 7-23-09

page 1 of 1 DCN: CT-S4B DATE: 12/20/06 REVISION: 3

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID	2009-666-02-05	Soil Description	**BROWN FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

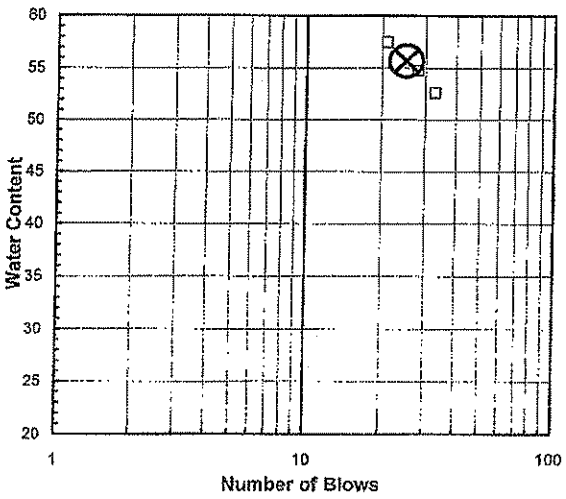
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	282	287	347	M
Wt. of Tare & WS (gm)	40.24	43.36	40.18	U
Wt. of Tare & DS (gm)	32.62	34.67	32.40	L
Wt. of Tare (gm)	18.13	18.80	18.86	T
Wt. of Water (gm)	7.6	8.7	7.8	I
Wt. of DS (gm)	14.5	15.9	13.5	P
				O
Moisture Content (%)	**52.6**	**54.8**	**57.5**	I
Number of Blows	**33**	**28**	**21**	N
				T

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	110	221	
Wt. of Tare & WS (gm)	21.46	26.23	
Wt. of Tare & DS (gm)	20.00	24.87	
Wt. of Tare (gm)	14.94	20.20	
Wt. of Water (gm)	1.5	1.4	
Wt. of DS (gm)	5.1	4.7	
Moisture Content (%)	**28.9**	**29.1**	**-0.3**

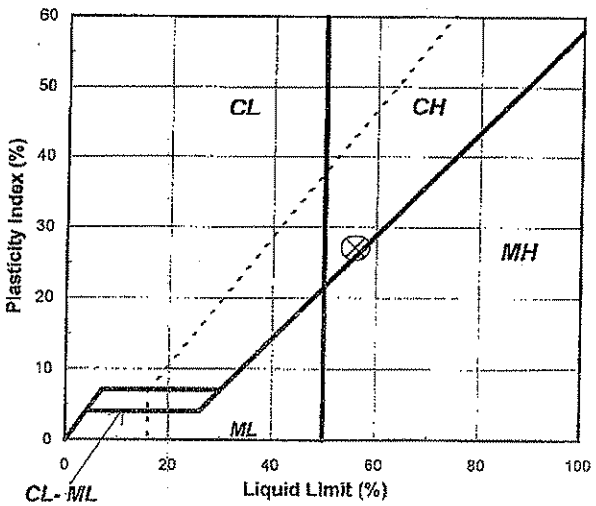
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**56**
Plastic Limit (%)	**29**
Plasticity Index (%)	**27**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



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ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID	2009-666-02-06	Soil Description	**REDDISH BROWN FAT CLAY**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

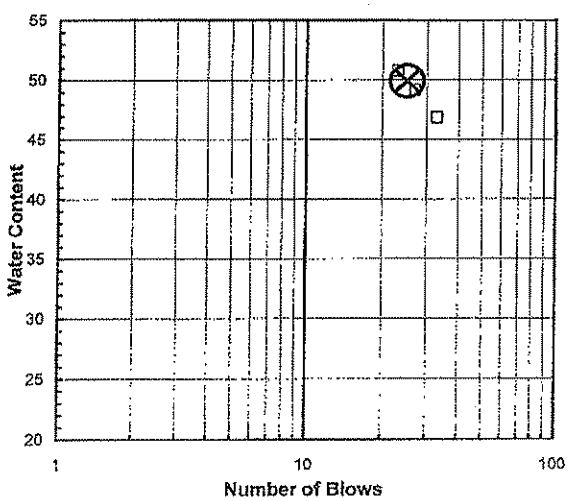
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	317	347	350	MULTIPOINT
Wt. of Tare & WS (gm)	38.80	38.97	39.16	
Wt. of Tare & DS (gm)	32.40	32.34	32.14	
Wt. of Tare (gm)	18.74	18.85	18.31	
Wt. of Water (gm)	6.4	6.6	7.0	
Wt. of DS (gm)	13.7	13.5	13.8	
Moisture Content (%)	**46.9**	**49.1**	**50.8**	
Number of Blows	**33**	**27**	**23**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	7	32	
Wt. of Tare & WS (gm)	20.21	25.56	
Wt. of Tare & DS (gm)	18.89	24.19	
Wt. of Tare (gm)	13.92	19.16	
Wt. of Water (gm)	1.3	1.4	
Wt. of DS (gm)	5.0	5.0	
Moisture Content (%)	**26.6**	**27.2**	**-0.7**

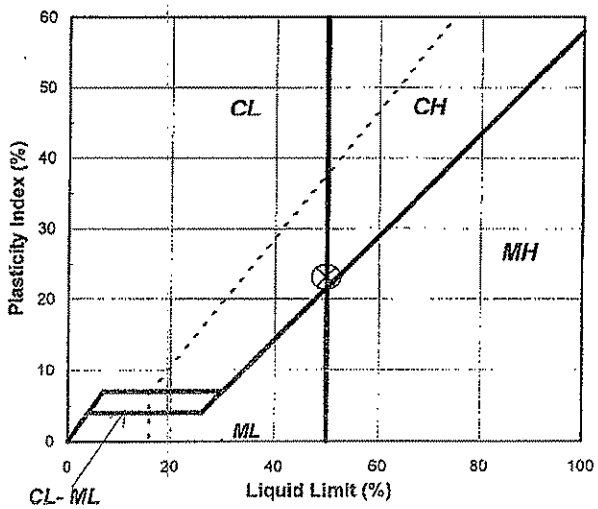
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**50**
Plastic Limit (%)	**27**
Plasticity Index (%)	**23**
USCS Symbol	**CH**

Flow Curve



Plasticity Chart



Tested By *JP* *Date* *7/23/09* *Checked By* KR *Date* 7-24-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 12/20/06 **REVISION:** 3

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID	2009-666-04-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

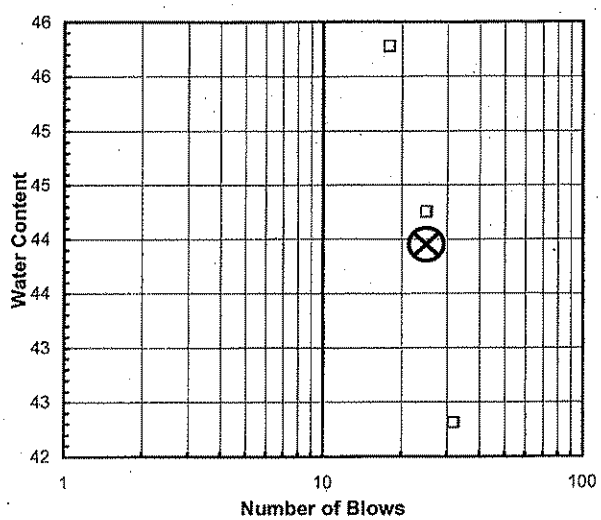
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	M	F	A-D	MULTIPOINT
Wt. of Tare & WS (gm)	22.94	24.76	27.93	
Wt. of Tare & DS (gm)	19.15	20.49	24.19	
Wt. of Tare (gm)	10.87	10.84	15.35	
Wt. of Water (gm)	3.8	4.3	3.7	
Wt. of DS (gm)	8.3	9.7	8.8	
Moisture Content (%)	**45.8**	**44.2**	**42.3**	
Number of Blows	**18**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	K	A-I	
Wt. of Tare & WS (gm)	21.97	22.89	
Wt. of Tare & DS (gm)	20.19	20.95	
Wt. of Tare (gm)	15.24	15.45	
Wt. of Water (gm)	1.8	1.9	
Wt. of DS (gm)	5.0	5.5	
Moisture Content (%)	**36.0**	**35.3**	**0.7**

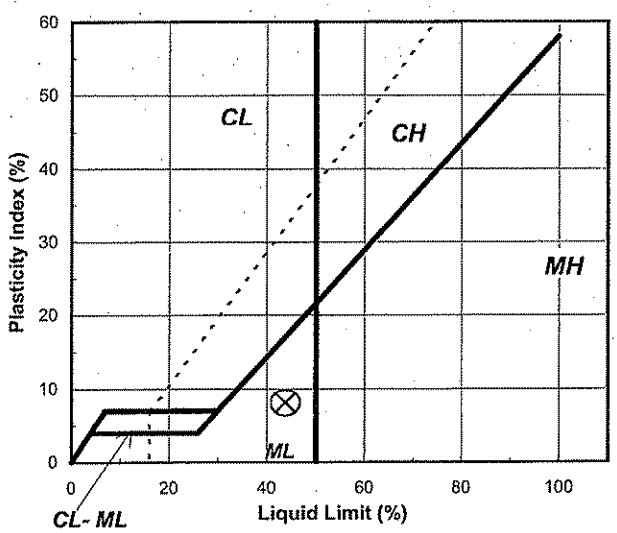
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**44**
Plastic Limit (%)	**36**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID	2009-666-04-02	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

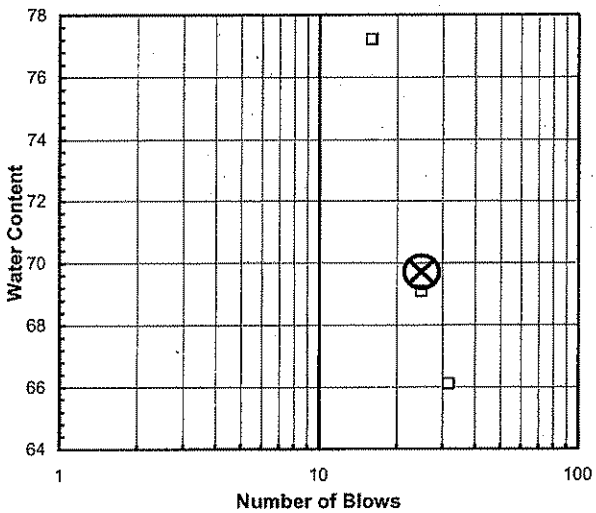
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	K-A	B	W	**MULTIPOINT**
Wt. of Tare & WS (gm)	25.37	25.68	26.73	
Wt. of Tare & DS (gm)	21.07	21.39	22.11	
Wt. of Tare (gm)	15.50	15.18	15.12	
Wt. of Water (gm)	4.3	4.3	4.6	
Wt. of DS (gm)	5.6	6.2	7.0	
Moisture Content (%)	**77.2**	**69.1**	**66.1**	
Number of Blows	**16**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-N	Y	
Wt. of Tare & WS (gm)	22.33	21.46	
Wt. of Tare & DS (gm)	20.39	19.70	
Wt. of Tare (gm)	15.42	15.26	
Wt. of Water (gm)	1.9	1.8	
Wt. of DS (gm)	5.0	4.4	
Moisture Content (%)	**39.0**	**39.6**	**-0.6**

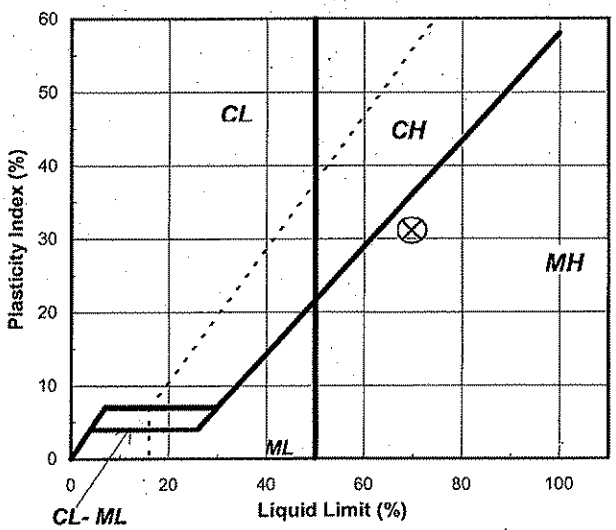
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**70**
Plastic Limit (%)	**39**
Plasticity Index (%)	**31**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



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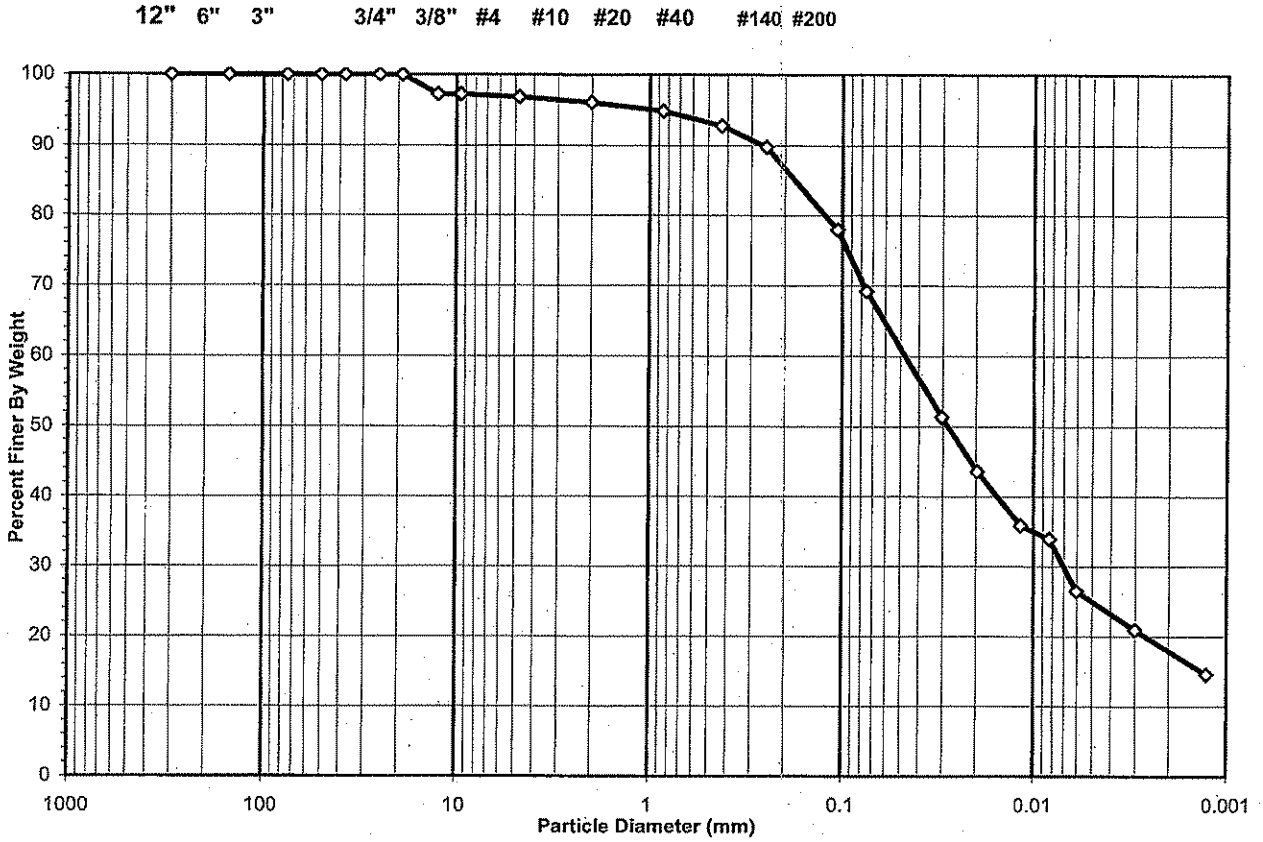
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	3.18
#4 To #200	*Sand*	27.66
Finer Than #200	*Silt & Clay*	69.16

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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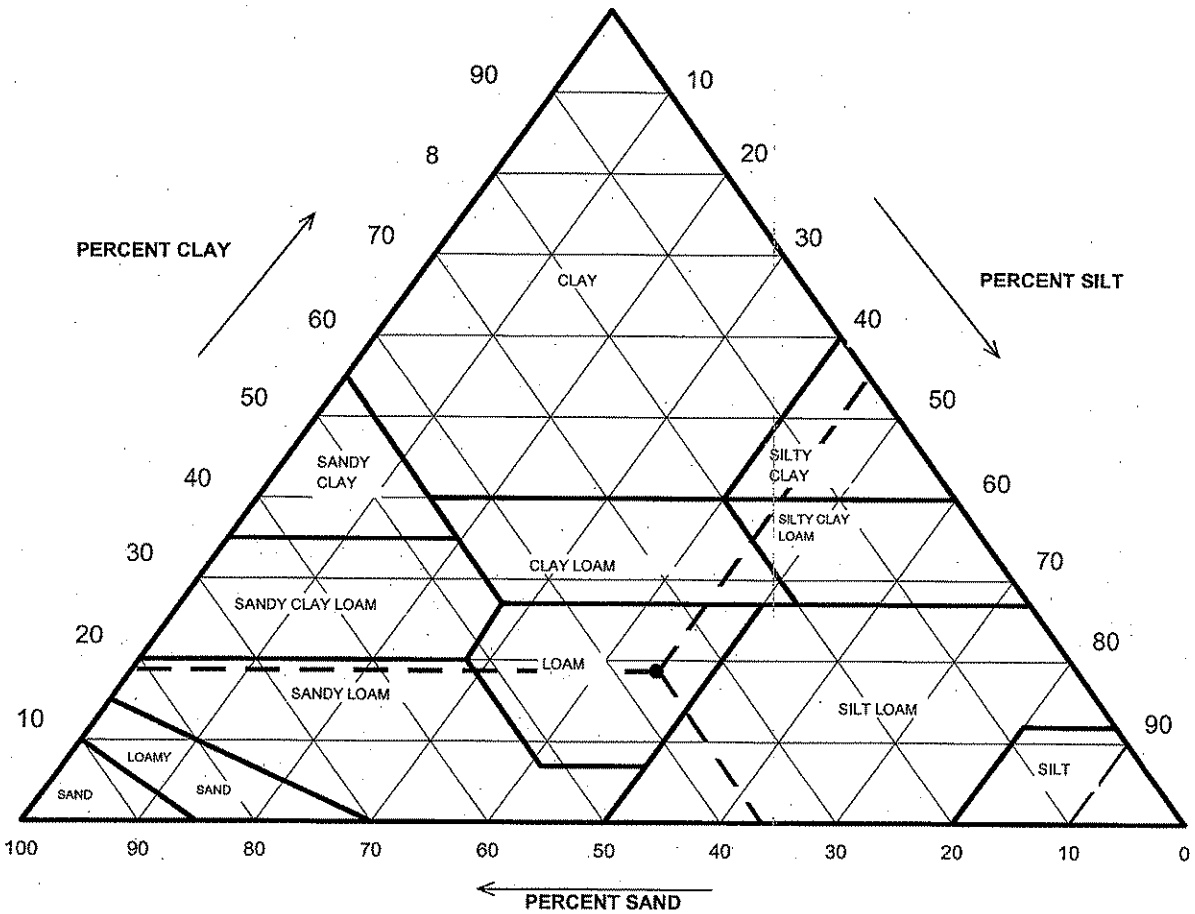
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.95	**0.00**
2	96.05	*Sand*	34.87	**36.31**
0.05	61.17	*Silt*	43.26	**45.04**
0.002	17.92	*Clay*	17.92	**18.66**

USDA Classification: ***LOAM***

 DGN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	P-12	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	673.52	Wgt.Tare + Wet Soil (gm)	58.19
Wgt.Tare + Dry Soil (gm)	591.92	Wgt.Tare + Dry Soil (gm)	57.63
Weight of Tare (gm)	196.47	Weight of Tare (gm)	21.92
Weight of Water (gm)	81.60	Weight of Water (gm)	0.56
Weight of Dry Soil (gm)	395.45	Weight of Dry Soil (gm)	35.71
Moisture Content (%)	**20.6**	**Moisture Content (%)**	**1.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	477.05	Weight of the Dry Sample (gm)	444.68
Dry Weight +#10 Material(gm)	395.5	Weight of minus #200 material (gm)	35.45
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	409.23
Dry Weight Hydro. Material (gm)	49.23		
Total Dry Weight Sample (gm)	444.68	**J-FACTOR (%FINER THAN #10)**	**0.9605**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	11.00	2.78	2.78	97.22	**97.22**
3/8"	9.50	0.00	0.00	2.78	97.22	**97.22**
#4	4.75	1.59	0.40	3.18	96.82	**96.82**
#10	2.00	3.05	0.77	3.95	96.05	**96.05**
#20	0.85	0.60	1.22	1.22	98.78	**94.87**
#40	0.425	1.06	2.15	3.37	96.63	**92.81**
#60	0.250	1.55	3.15	6.52	93.48	**89.78**
#140	0.106	6.06	12.31	18.83	81.17	**77.96**
#200	0.075	4.51	9.16	27.99	72.01	**69.16**
Pan	-	35.45	72.01	100.00	-	-

Notes :

Tested By SD Date 7/30/2009 Checked By GEM Date 7-31-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	31.0	31.0	24.3	4.45	26.6	53.4	0.01278	0.0303	**51.3**
5		27.0	24.3	4.45	22.6	45.4	0.01278	0.0197	**43.6**
15		23.0	24.3	4.45	18.6	37.3	0.01278	0.0117	**35.8**
30		22.0	24.3	4.45	17.6	35.3	0.01278	0.0083	**33.9**
60		18.0	24.5	4.31	13.7	27.5	0.01275	0.0060	**26.4**
250		15.0	24.7	4.18	10.8	21.8	0.01272	0.0030	**20.9**
1440		12.0	24.3	4.45	7.6	15.2	0.01278	0.0013	**14.6**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.23	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	96.05
Weight of Dry Material (gm)	49.23		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 7/28/2009 Checked By GEM Date 7-31-09

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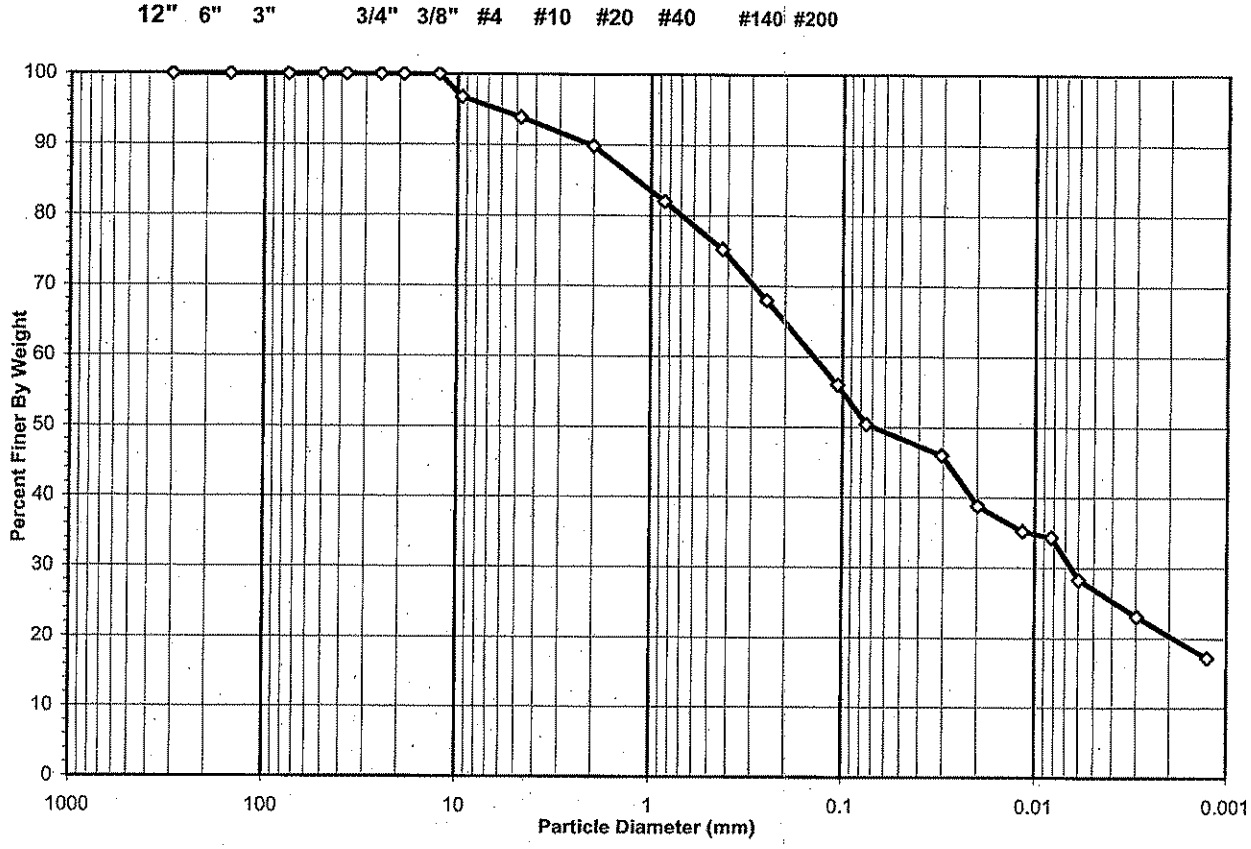
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID	2009-666-02-02	Soil Color	**BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	6.14
#4 To #200	*Sand*	43.46
Finer Than #200	*Silt & Clay*	50.39

USCS Symbol ***CH, TESTED***

USCS Classification ***SANDY FAT CLAY***

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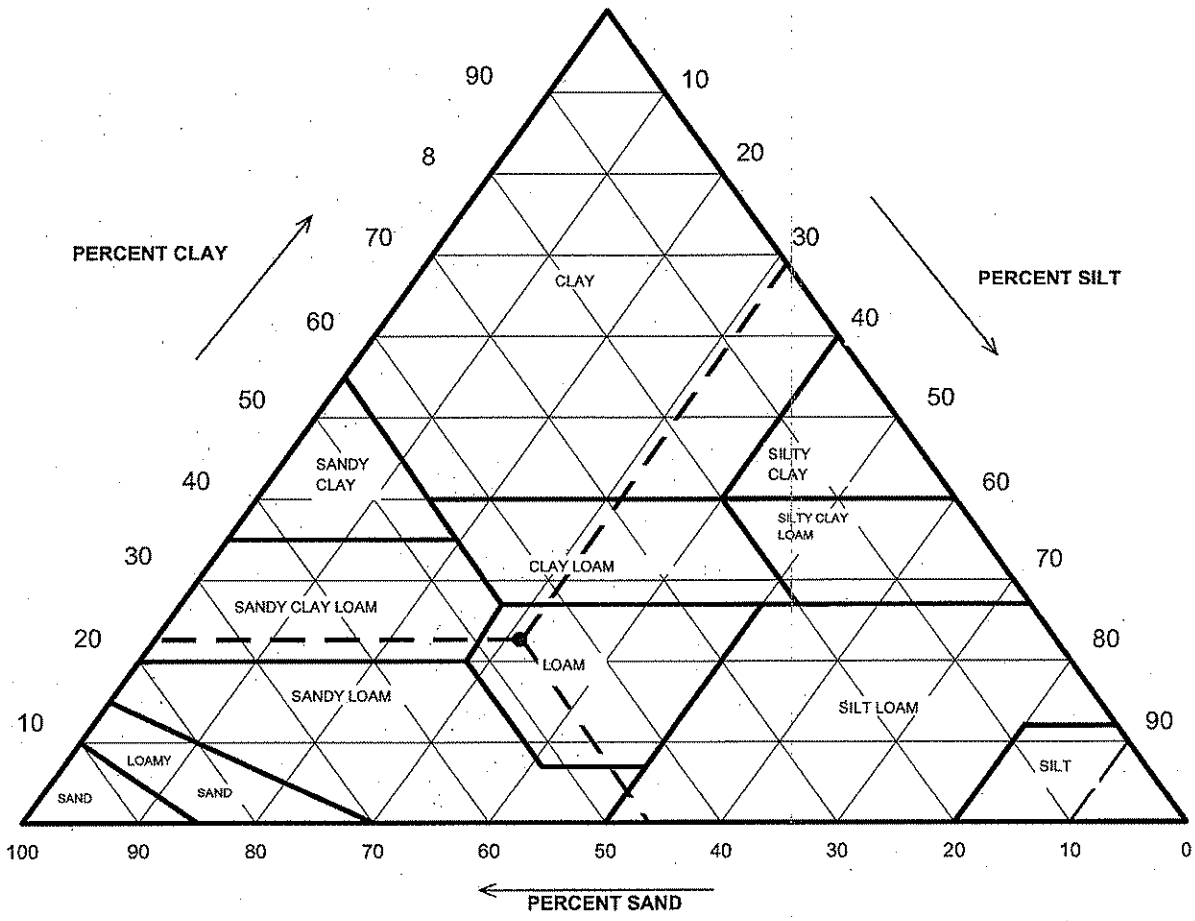
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID	2009-666-02-02	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	10.19	**0.00**
2	89.81	*Sand*	41.40	**46.10**
0.05	48.41	*Silt*	28.03	**31.21**
0.002	20.38	*Clay*	20.38	**22.69**

USDA Classification: ***LOAM***

 DCN: CT-53P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID	2009-666-02-02	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	838	Tare No.	B-1
Wgt.Tare + Wet Soil (gm)	766.52	Wgt.Tare + Wet Soil (gm)	30.31
Wgt.Tare + Dry Soil (gm)	710.94	Wgt.Tare + Dry Soil (gm)	30.13
Weight of Tare (gm)	261.79	Weight of Tare (gm)	15.85
Weight of Water (gm)	55.58	Weight of Water (gm)	0.18
Weight of Dry Soil (gm)	449.15	Weight of Dry Soil (gm)	14.28
Moisture Content (%)	**12.4**	**Moisture Content (%)**	**1.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	504.73	Weight of the Dry Sample (gm)	498.55
Dry Weight +#10 Material(gm)	449.2	Weight of minus #200 material (gm)	27.72
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	470.83
Dry Weight Hydro. Material (gm)	49.40		
Total Dry Weight Sample (gm)	498.55	**J-FACTOR (%FINER THAN #10)**	**0.8981**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	14.50	3.23	3.23	96.77	**96.77**
#4	4.75	13.09	2.91	6.14	93.86	**93.86**
#10	2.00	18.17	4.05	10.19	89.81	**89.81**
#20	0.85	4.30	8.70	8.70	91.30	**81.99**
#40	0.425	3.75	7.59	16.30	83.70	**75.18**
#60	0.250	3.98	8.06	24.35	75.65	**67.94**
#140	0.106	6.58	13.32	37.67	62.33	**55.98**
#200	0.075	3.07	6.21	43.89	56.11	**50.39**
Pan	-	27.72	56.11	100.00	-	-

Notes :

Tested By SD Date 7/30/2009 Checked By GJM Date 7-31-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID	2009-666-02-02	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	30.0	30.0	24.3	4.45	25.6	51.2	0.01278	0.0305	**46.0**
5		26.0	24.3	4.45	21.6	43.2	0.01278	0.0198	**38.8**
15		24.0	24.3	4.45	19.6	39.2	0.01278	0.0116	**35.2**
30		23.5	24.3	4.45	19.1	38.2	0.01278	0.0082	**34.3**
60		20.0	24.5	4.31	15.7	31.4	0.01275	0.0059	**28.2**
250		17.0	24.7	4.18	12.8	25.7	0.01272	0.0030	**23.1**
1440		14.0	24.3	4.45	9.6	19.1	0.01278	0.0013	**17.2**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.40	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	89.81
Weight of Dry Material (gm)	49.40		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 7/28/2009 Checked By GDM Date 7-31-09

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SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03	Soil Color	**BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	0.19
#4 To #200	*Sand*	50.06
Finer Than #200	*Silt & Clay*	49.75

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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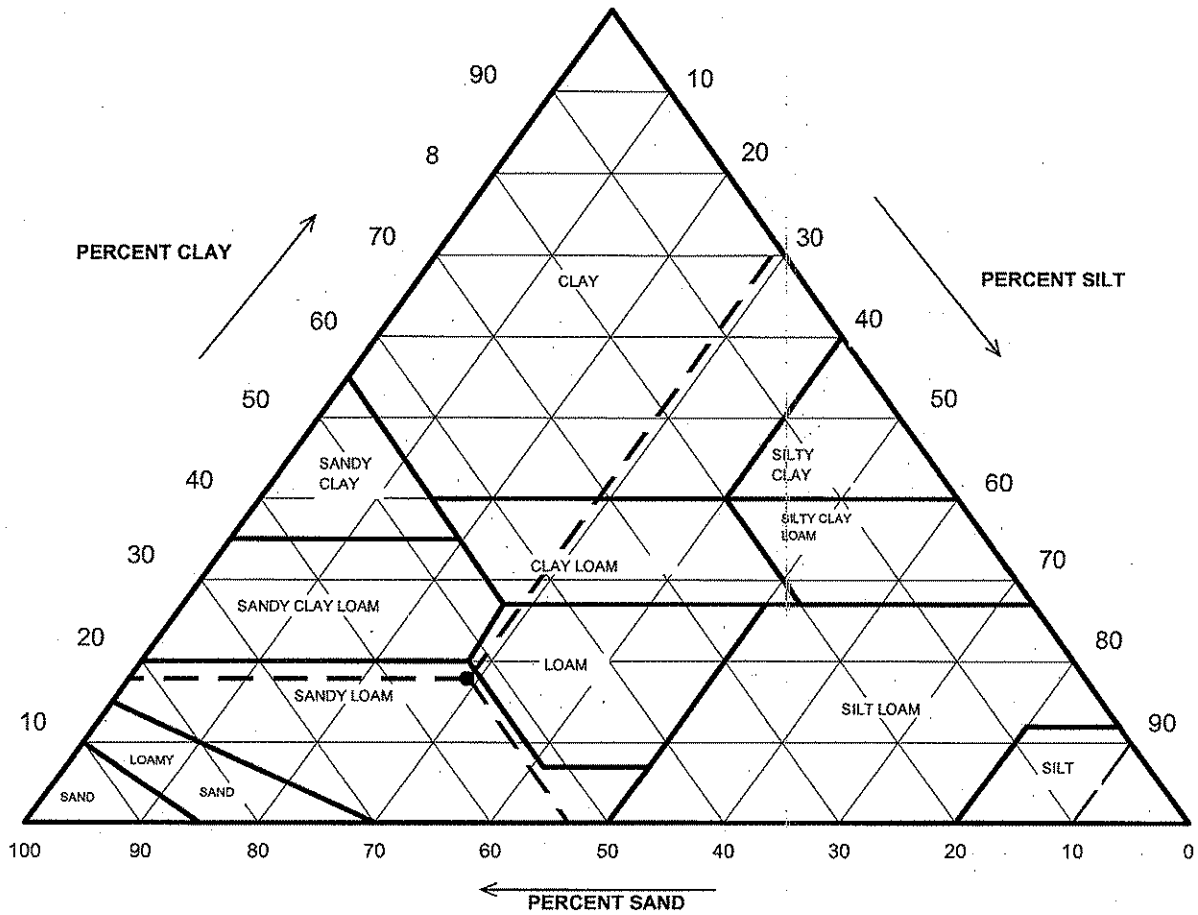
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.02	**0.00**
2	96.98	*Sand*	51.61	**53.21**
0.05	45.38	*Silt*	28.11	**28.98**
0.002	17.27	*Clay*	17.27	**17.81**

USDA Classification: ***SANDY LOAM***

 DCN: CT-53F DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-03 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	216	Tare No.	U-1
Wgt.Tare + Wet Soil (gm)	611.40	Wgt.Tare + Wet Soil (gm)	54.31
Wgt.Tare + Dry Soil (gm)	541.16	Wgt.Tare + Dry Soil (gm)	49.99
Weight of Tare (gm)	170.79	Weight of Tare (gm)	15.66
Weight of Water (gm)	70.24	Weight of Water (gm)	4.32
Weight of Dry Soil (gm)	370.37	Weight of Dry Soil (gm)	34.33
Moisture Content (%)	**19.0**	**Moisture Content (%)**	**12.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	440.61	Weight of the Dry Sample (gm)	414.83
Dry Weight +#10 Material(gm)	370.4	Weight of minus #200 material (gm)	22.81
Wet Weight Hydro. Material.(gm)	50.05	Weight of plus #200 material (gm)	392.02
Dry Weight Hydro. Material (gm)	44.46		
Total Dry Weight Sample (gm)	414.83	**J-FACTOR (%FINER THAN #10)**	**0.9698**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.69	0.19	0.19	99.81	**99.81**
#10	2.00	10.48	2.83	3.02	96.98	**96.98**
#20	0.85	4.38	9.85	9.85	90.15	**87.43**
#40	0.425	4.36	9.81	19.66	80.34	**77.92**
#60	0.250	3.76	8.46	28.12	71.88	**69.71**
#140	0.106	6.29	14.15	42.27	57.73	**55.99**
#200	0.075	2.86	6.43	48.70	51.30	**49.75**
Pan	-	22.81	51.30	100.00	-	-

Notes :

Tested By SD Date 7/15/2009 Checked By GEM Date 7-20-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	23.2	5.19	18.8	41.9	0.01294	0.0322	**40.6**
5		20.0	23.2	5.19	14.8	33.0	0.01294	0.0209	**32.0**
15		19.0	23.3	5.12	13.9	30.9	0.01293	0.0121	**30.0**
30		18.0	23.3	5.12	12.9	28.7	0.01293	0.0086	**27.8**
60		16.0	23.4	5.06	10.9	24.4	0.01291	0.0062	**23.6**
250		14.0	23.4	5.06	8.9	19.9	0.01291	0.0031	**19.3**
1440		12.0	23.5	4.99	7.0	15.6	0.01290	0.0013	**15.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	44.46	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	96.98
Weight of Dry Material (gm)	44.46		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 7/14/2009 Checked By GZM Date 7-20-09

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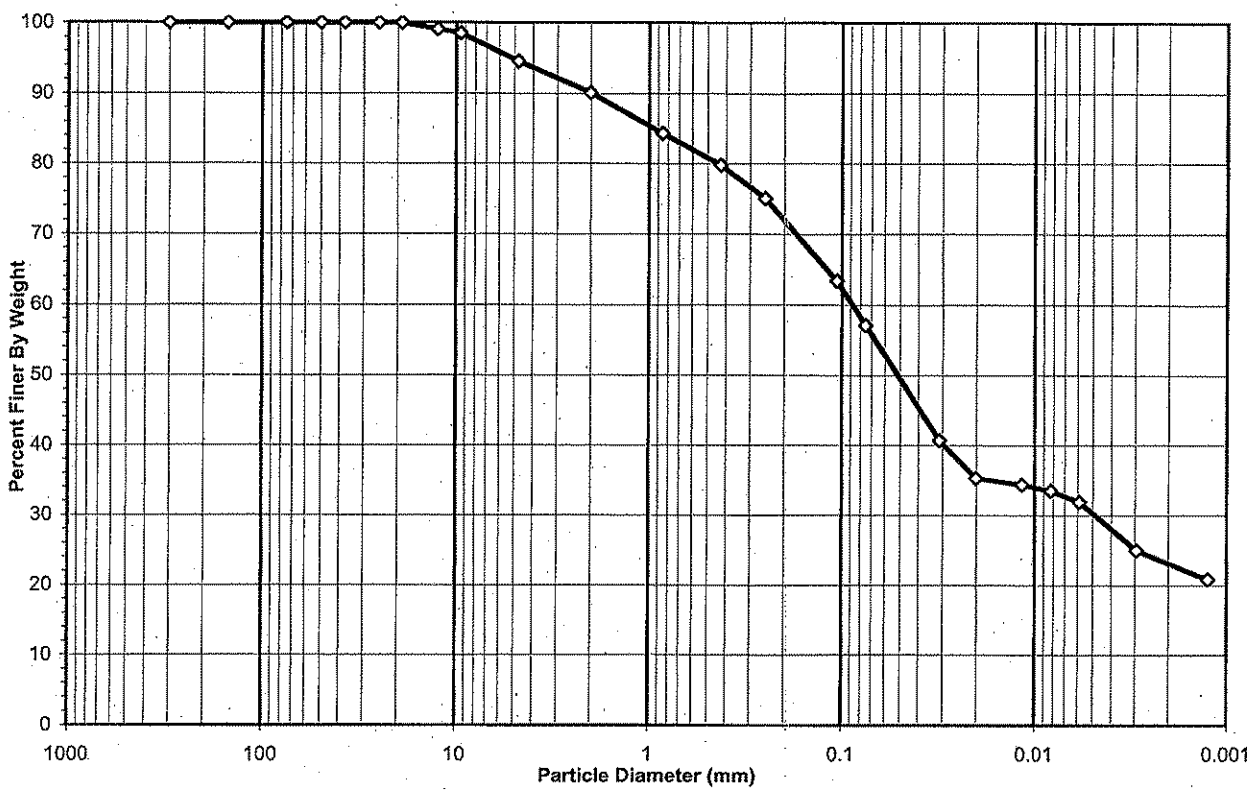
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID	2009-666-02-04	Soil Color	**BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	5.49
#4 To #200	*Sand*	37.44
Finer Than #200	*Silt & Clay*	57.07

USCS Symbol ***CL, TESTED***

USCS Classification ***SANDY LEAN CLAY***

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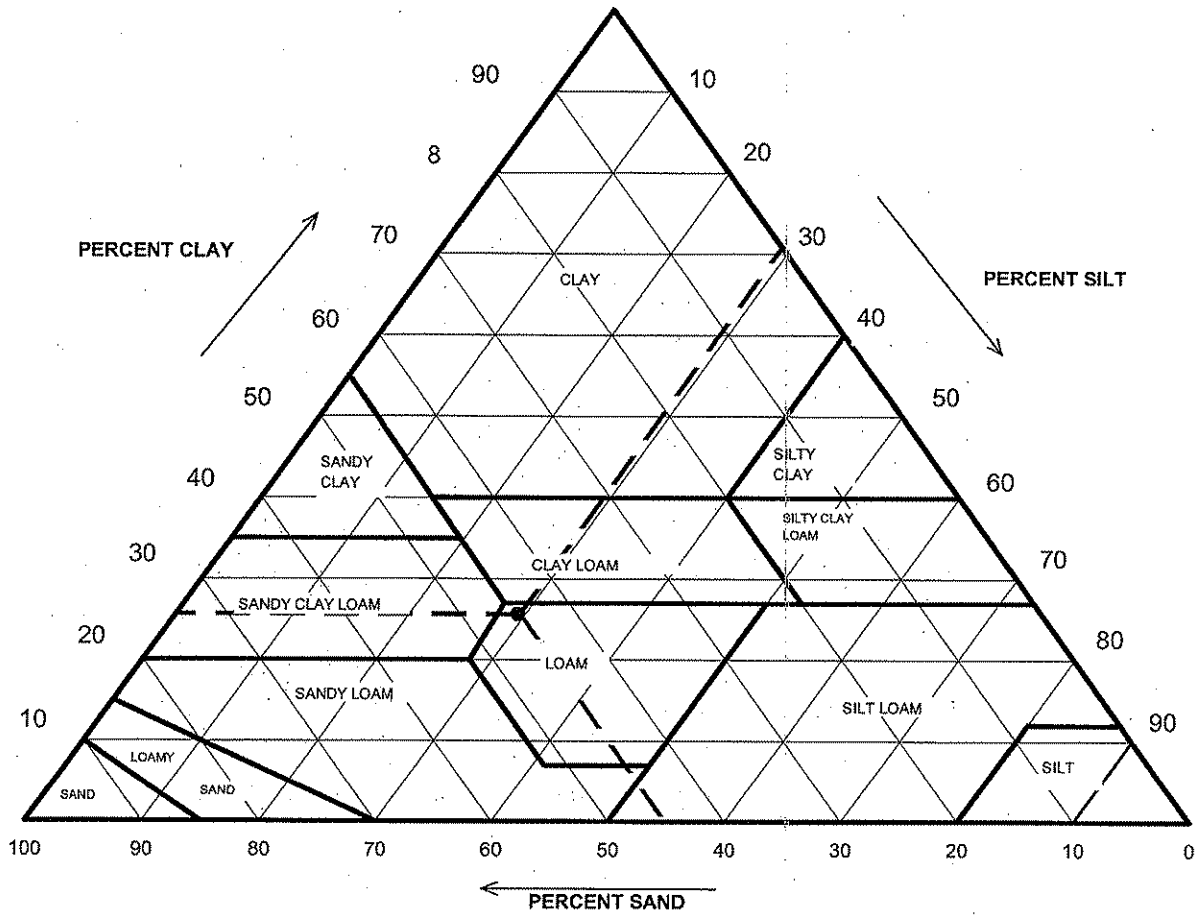
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID	2009-666-02-04	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	9.93	**0.00**
2	90.07	*Sand*	40.56	**45.03**
0.05	49.51	*Silt*	26.42	**29.33**
0.002	23.09	*Clay*	23.09	**25.64**

USDA Classification: ***LOAM***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID	2009-666-02-04	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	203	Tare No.	W
Wgt.Tare + Wet Soil (gm)	673.72	Wgt.Tare + Wet Soil (gm)	42.66
Wgt.Tare + Dry Soil (gm)	624.18	Wgt.Tare + Dry Soil (gm)	42.31
Weight of Tare (gm)	171.05	Weight of Tare (gm)	15.15
Weight of Water (gm)	49.54	Weight of Water (gm)	0.35
Weight of Dry Soil (gm)	453.13	Weight of Dry Soil (gm)	27.16
Moisture Content (%)	**10.9**	**Moisture Content (%)**	**1.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	502.67	Weight of the Dry Sample (gm)	502.56
Dry Weight +#10 Material(gm)	453.1	Weight of minus #200 material (gm)	31.32
Wet Weight Hydro. Material.(gm)	50.07	Weight of plus #200 material (gm)	471.24
Dry Weight Hydro. Material (gm)	49.43		
Total Dry Weight Sample (gm)	502.56	**J-FACTOR (%FINER THAN #10)**	**0.9007**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	4.13	0.91	0.91	99.09	**99.09**
3/8"	9.50	2.71	0.60	1.51	98.49	**98.49**
#4	4.75	18.03	3.98	5.49	94.51	**94.51**
#10	2.00	20.13	4.44	9.93	90.07	**90.07**
#20	0.85	3.19	6.45	6.45	93.55	**84.26**
#40	0.425	2.46	4.98	11.43	88.57	**79.77**
#60	0.250	2.61	5.28	16.71	83.29	**75.02**
#140	0.106	6.40	12.95	29.66	70.34	**63.36**
#200	0.075	3.45	6.98	36.64	63.36	**57.07**
Pan	-	31.32	63.36	100.00	-	-

Notes :

Tested By SD Date 7/30/2009 Checked By GEM Date 7-31-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID	2009-666-02-04	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	24.3	4.45	22.6	45.2	0.01278	0.0311	**40.7**
5		24.0	24.3	4.45	19.6	39.2	0.01278	0.0201	**35.3**
15		23.5	24.3	4.45	19.1	38.2	0.01278	0.0116	**34.4**
30		23.0	24.3	4.45	18.6	37.2	0.01278	0.0083	**33.5**
60		22.0	24.5	4.31	17.7	35.4	0.01275	0.0059	**31.9**
250		18.0	24.7	4.18	13.8	27.7	0.01272	0.0029	**24.9**
1440		16.0	24.3	4.45	11.6	23.1	0.01278	0.0012	**20.8**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	49.43	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	90.07
Weight of Dry Material (gm)	49.43		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 7/28/2009 Checked By GZM Date 7-31-09

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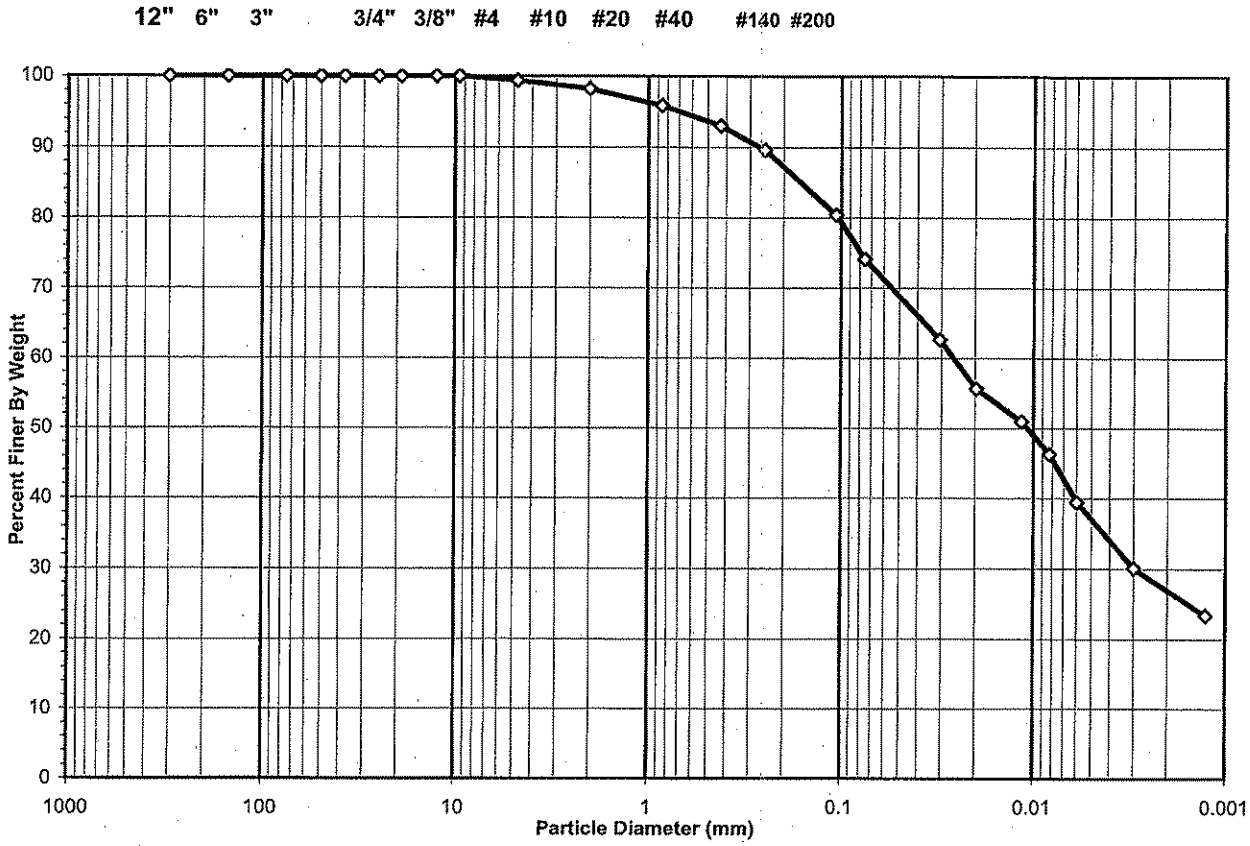
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL5
Lab ID	2009-662-02-05	Soil Color	**RED**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.61
#4 To #200	*Sand*	25.31
Finer Than #200	*Silt & Clay*	74.08

USCS Symbol ***ML, TESTED***

USCS Classification ***SILT WITH SAND***

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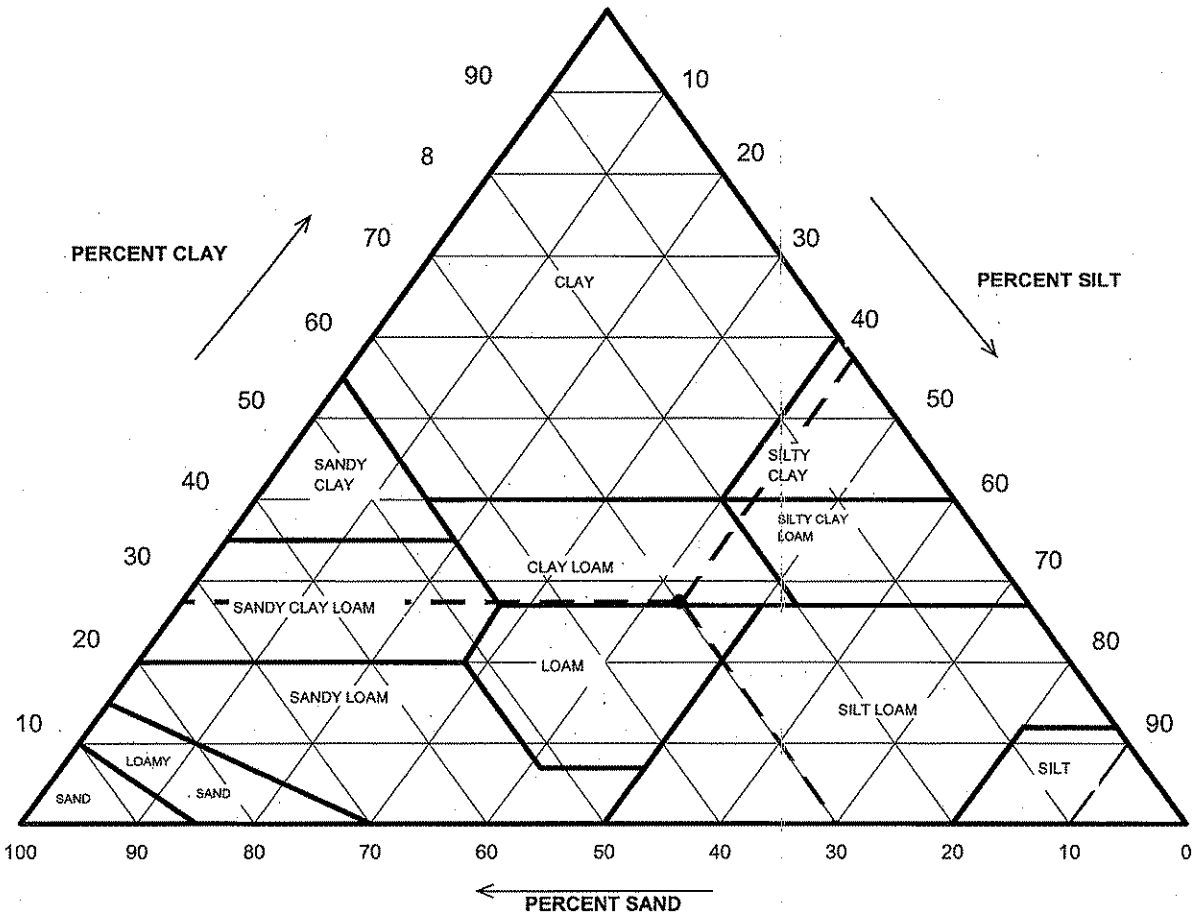
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL5
Lab ID	2009-662-02-05	Soil Color	RED



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.74	**0.00**
2	98.26	*Sand*	29.33	**29.85**
0.05	68.93	*Silt*	41.97	**42.72**
0.002	26.96	*Clay*	26.96	**27.43**

USDA Classification: ***CLAY LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL5
Lab ID	2009-662-02-05	Soil Color	**RED**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	842	Tare No.	Z-1
Wgt.Tare + Wet Soil (gm)	617.90	Wgt.Tare + Wet Soil (gm)	53.29
Wgt.Tare + Dry Soil (gm)	537.14	Wgt.Tare + Dry Soil (gm)	46.97
Weight of Tare (gm)	255.76	Weight of Tare (gm)	15.65
Weight of Water (gm)	80.76	Weight of Water (gm)	6.32
Weight of Dry Soil (gm)	281.38	Weight of Dry Soil (gm)	31.32
Moisture Content (%)	**28.7**	**Moisture Content (%)**	**20.2**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	362.14	Weight of the Dry Sample (gm)	323.03
Dry Weight +#10 Material(gm)	281.4	Weight of minus #200 material (gm)	31.40
Wet Weight Hydro. Material.(gm)	50.05	Weight of plus #200 material (gm)	291.63
Dry Weight Hydro. Material (gm)	41.65		
Total Dry Weight Sample (gm)	323.03	**J-FACTOR (%FINER THAN #10)**	**0.9826**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.71	0.61	0.61	99.39	**99.39**
#10	2.00	3.18	1.13	1.74	98.26	**98.26**
#20	0.85	1.02	2.45	2.45	97.55	**95.86**
#40	0.425	1.20	2.88	5.33	94.67	**93.02**
#60	0.250	1.46	3.51	8.84	91.16	**89.58**
#140	0.106	3.89	9.34	18.18	81.82	**80.40**
#200	0.075	2.68	6.44	24.61	75.39	**74.08**
Pan	-	31.40	75.39	100.00	-	**-**

Notes :

Tested By SD Date 7/15/2009 Checked By Gam Date 7-20-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL5
Lab ID	2009-662-02-05	Soil Color	**RED**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	32.0	32.0	23.2	5.19	26.8	63.7	0.01294	0.0304	**62.6**
5		29.0	23.2	5.19	23.8	56.6	0.01294	0.0197	**55.6**
15		27.0	23.2	5.19	21.8	51.8	0.01294	0.0115	**50.9**
30		25.0	23.2	5.19	19.8	47.1	0.01294	0.0083	**46.3**
60		22.0	23.3	5.12	16.9	40.1	0.01293	0.0059	**39.4**
250		18.0	23.3	5.12	12.9	30.6	0.01293	0.0030	**30.1**
1440		15.0	23.5	4.99	10.0	23.8	0.01290	0.0013	**23.4**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	41.65	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.26
Weight of Dry Material (gm)	41.65		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 7/14/2009 Checked By Gem Date 7-20-09

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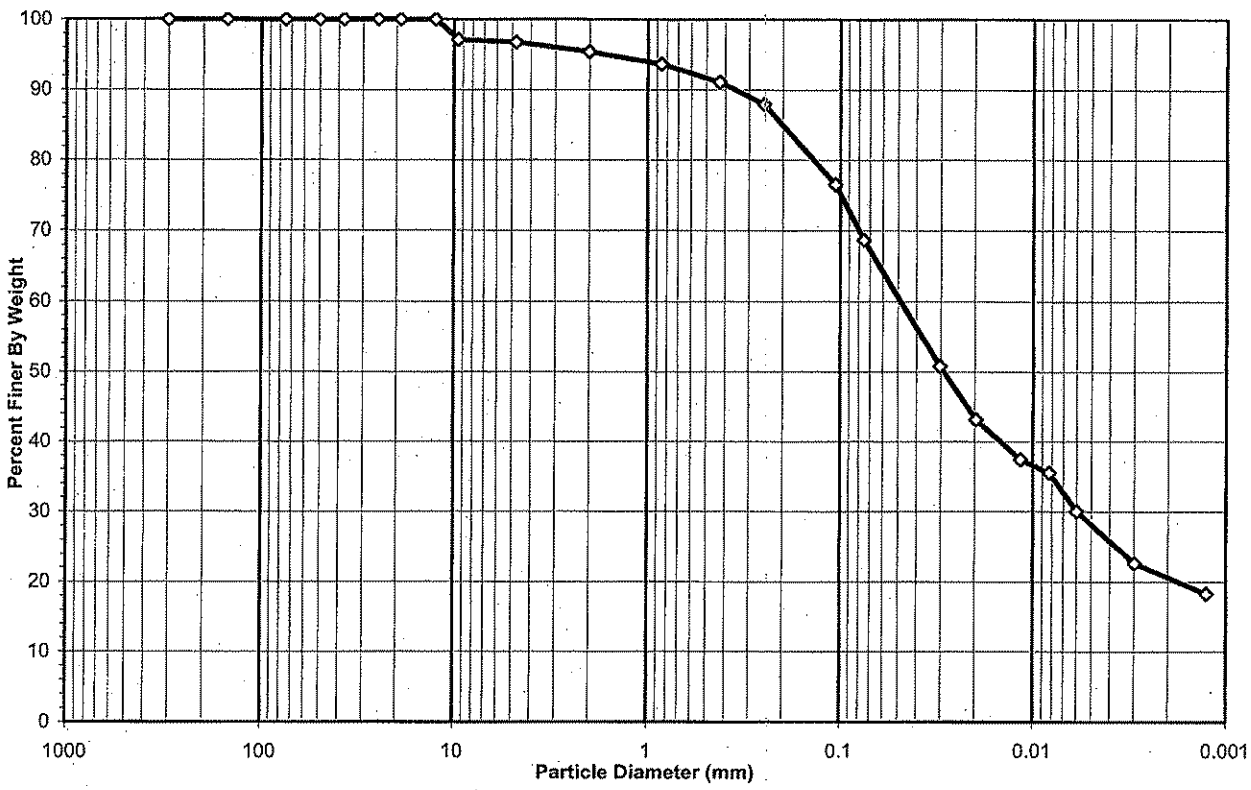
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID	2009-666-02-06	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	3.23
#4 To #200	*Sand*	28.12
Finer Than #200	*Silt & Clay*	68.65

USCS Symbol ***CH, TESTED***

USCS Classification ***SANDY FAT CLAY***

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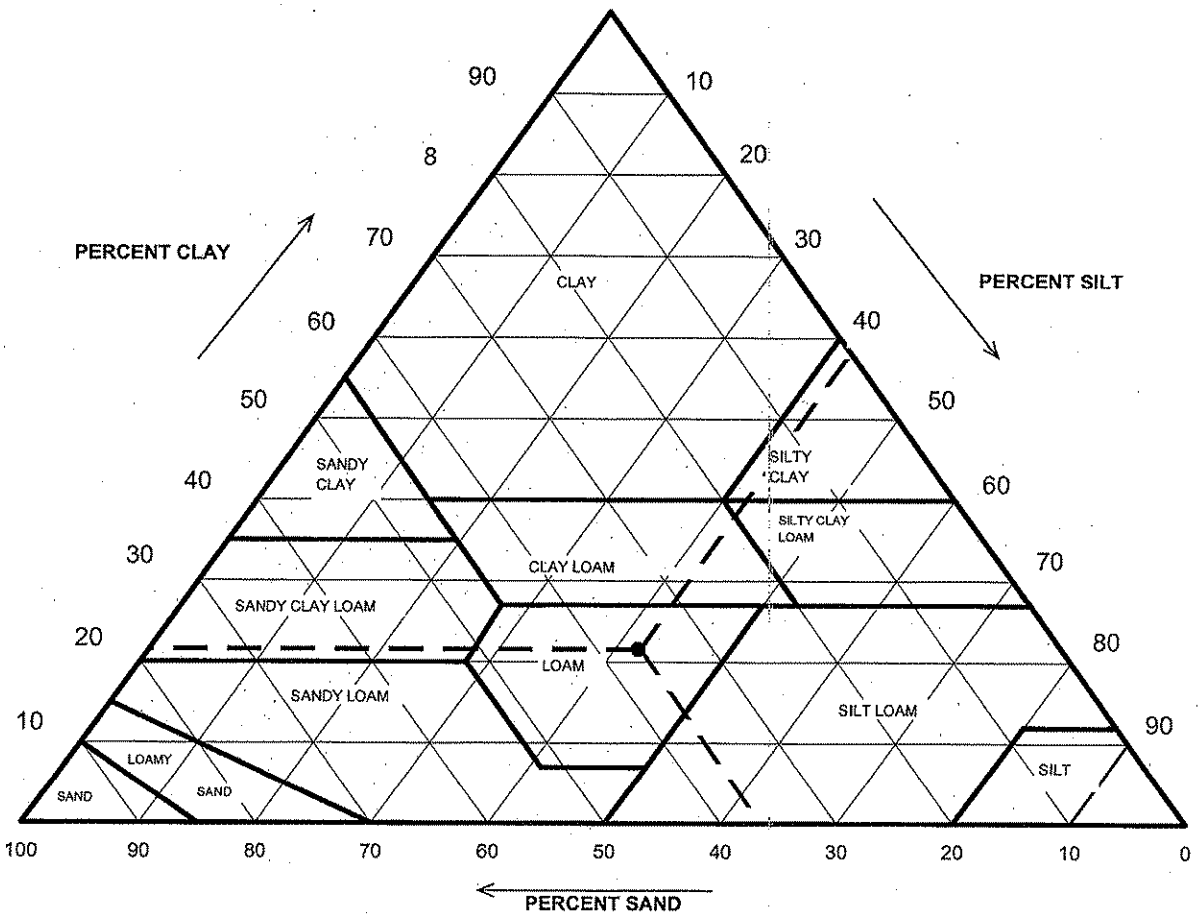
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID	2009-666-02-06	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	4.59	**0.00**
2	95.41	*Sand*	34.74	**36.41**
0.05	60.67	*Silt*	40.07	**42.00**
0.002	20.60	*Clay*	20.60	**21.59**

USDA Classification: ***LOAM***

 DCN: CT-SSP DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-06 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID	2009-666-02-06	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	830	Tare No.	A-M
Wgt.Tare + Wet Soil (gm)	743.53	Wgt.Tare + Wet Soil (gm)	40.80
Wgt.Tare + Dry Soil (gm)	672.65	Wgt.Tare + Dry Soil (gm)	40.48
Weight of Tare (gm)	258.41	Weight of Tare (gm)	15.36
Weight of Water (gm)	70.88	Weight of Water (gm)	0.32
Weight of Dry Soil (gm)	414.24	Weight of Dry Soil (gm)	25.12
Moisture Content (%)	**17.1**	**Moisture Content (%)**	**1.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	485.12	Weight of the Dry Sample (gm)	463.63
Dry Weight +#10 Material(gm)	414.2	Weight of minus #200 material (gm)	35.54
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	428.09
Dry Weight Hydro. Material (gm)	49.39		
Total Dry Weight Sample (gm)	463.63	**J-FACTOR (%FINER THAN #10)**	**0.9541**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	12.01	2.90	2.90	97.10	**97.10**
#4	4.75	1.37	0.33	3.23	96.77	**96.77**
#10	2.00	5.64	1.36	4.59	95.41	**95.41**
#20	0.85	0.92	1.86	1.86	98.14	**93.63**
#40	0.425	1.31	2.65	4.52	95.48	**91.10**
#60	0.250	1.64	3.32	7.84	92.16	**87.93**
#140	0.106	5.92	11.99	19.82	80.18	**76.50**
#200	0.075	4.06	8.22	28.04	71.96	**68.65**
Pan	-	35.54	71.96	100.00	-	-

Notes :

Tested By GL Date 7/30/2009 Checked By GM Date 7-31-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID	2009-666-02-06	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	31.0	31.0	24.3	4.45	26.6	53.2	0.01278	0.0303	**50.8**
5		27.0	24.3	4.45	22.6	45.2	0.01278	0.0197	**43.1**
15		24.0	24.3	4.45	19.6	39.2	0.01278	0.0116	**37.4**
30		23.0	24.3	4.45	18.6	37.2	0.01278	0.0083	**35.5**
60		20.0	24.5	4.31	15.7	31.4	0.01275	0.0059	**30.0**
250		16.0	24.7	4.18	11.8	23.7	0.01272	0.0030	**22.6**
1440		14.0	24.3	4.45	9.6	19.1	0.01278	0.0013	**18.3**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	49.39	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	95.41
Weight of Dry Material (gm)	49.39		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 7/28/2009 Checked By GZM Date 7-31-09

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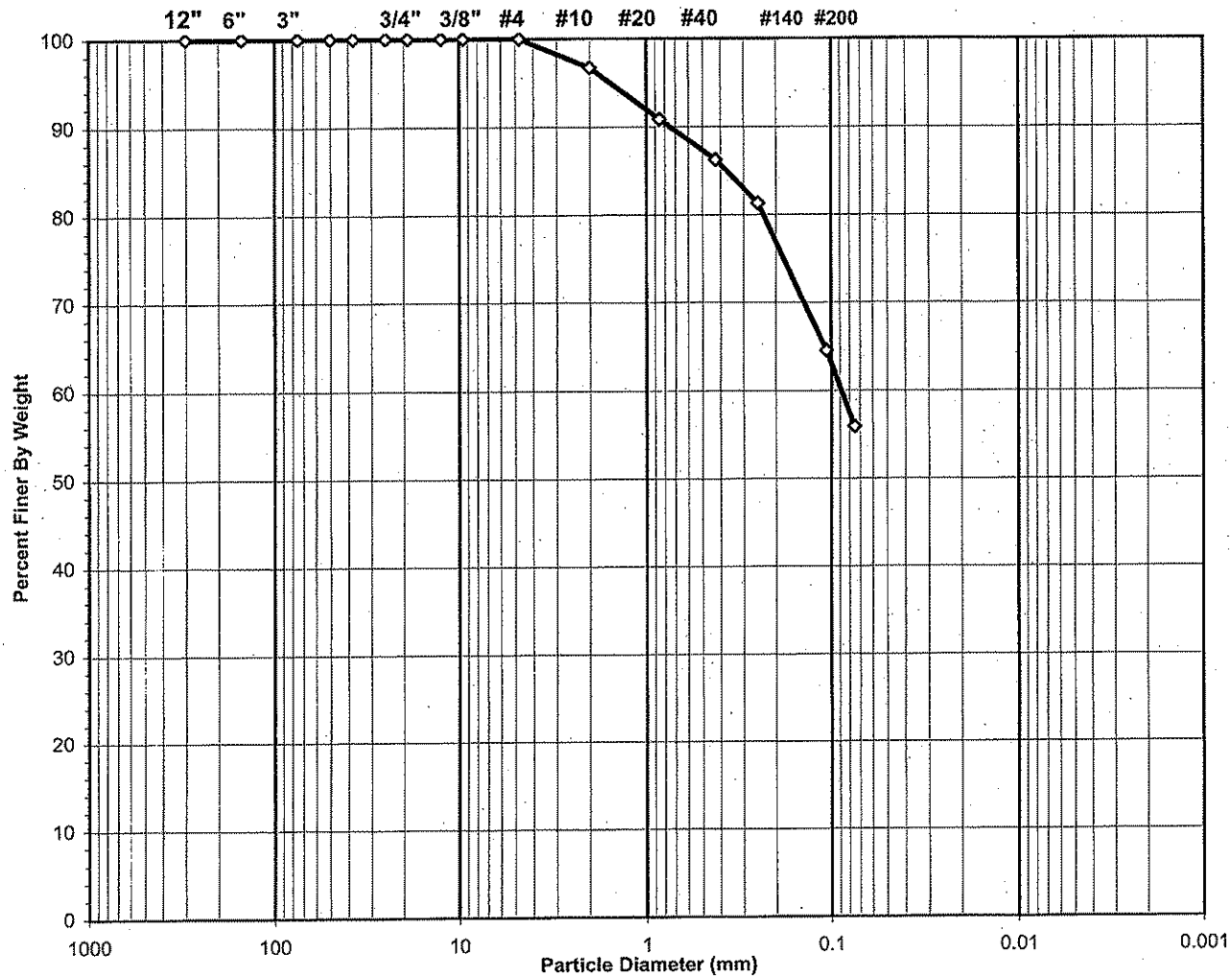
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID	2009-666-04-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS		*HYDROMETER*
USCS	gravel	sand	silt and clay



USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

Tested By GL Date 8/11/2009 Checked By GZM Date 8-11-09

 DCN: CT-S3C DATE 6-25-98 REVISION: 2 *\\Server\data drive\Data Sheets\[SIEVON REV 4.XLS]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID	2009-666-04-01	Soil Color	**REDDISH BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	842	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	625.71	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	545.13	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	255.79	Weight of Tare (gm)	NA
Weight of Water (gm)	80.58	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	289.34	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**27.8**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	289.34
Dry Weight - 3/4" Sample (gm)	127.6	Weight of minus #200 material (gm)	161.76
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	127.58
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.50	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	0.00	0.0	0.0	100.0	**100.0**
#10	2.00	9.56	3.3	3.3	96.7	**96.7**
#20	0.850	17.02	5.9	9.2	90.8	**90.8**
#40	0.425	13.19	4.6	13.7	86.3	**86.3**
#60	0.250	14.27	4.9	18.7	81.3	**81.3**
#140	0.106	48.70	16.8	35.5	64.5	**64.5**
#200	0.075	24.84	8.6	44.1	55.9	**55.9**
Pan	-	161.76	55.9	100.0	-	-

Tested By GL Date 8/11/2009 Checked By GEM Date 8-11-09

DCN: CT-S3C DATE 6-25-98 REVISION: 2

\\Server\data drive\Data Sheets\[SIEVON REV 4.XLS]Sheet1

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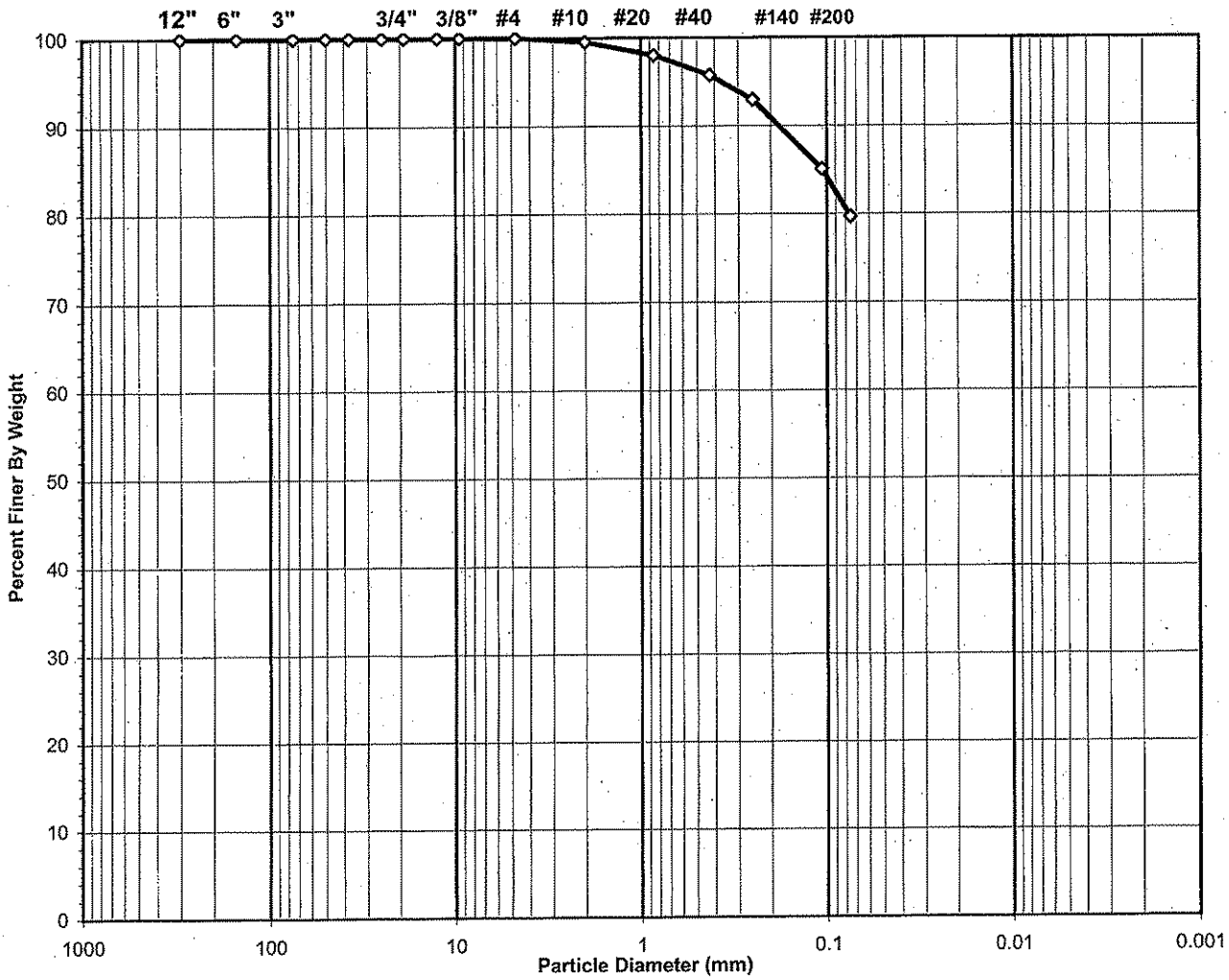
SIEVE ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID	2009-666-04-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS		HYDROMETER
USCS	gravel	sand	silt and clay



USCS Symbol ***MH, TESTED***

USCS Classification ***ELASTIC SILT WITH SAND***

Tested By GL Date 8/11/2009 Checked By GEM Date 8-11-09

DCN: CT-S3C DATE 6-25-98 REVISION 2 *C:\Documents and Settings\owner\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-04-02 SIEVON REV 4.XLS]Sheet1*

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WASH SIEVE ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID	2009-666-04-02	Soil Color	**REDDISH BROWN**

Moisture Content of Passing 3/4" Material		Water Content of Retained 3/4" Material	
Tare No.	837	Tare No.	NA
Wgt.Tare + Wet Specimen (gm)	642.82	Wgt.Tare + Wet Specimen (gm)	NA
Wgt.Tare + Dry Specimen (gm)	548.07	Wgt.Tare + Dry Specimen (gm)	NA
Weight of Tare (gm)	260.70	Weight of Tare (gm)	NA
Weight of Water (gm)	94.75	Weight of Water (gm)	NA
Weight of Dry Soil (gm)	287.37	Weight of Dry Soil (gm)	NA
Moisture Content (%)	**33.0**	**Moisture Content (%)**	**NA**

Wet Weight -3/4" Sample (gm)	NA	Weight of the Dry Specimen (gm)	287.37
Dry Weight - 3/4" Sample (gm)	58.4	Weight of minus #200 material (gm)	228.96
Wet Weight +3/4" Sample (gm)	NA	Weight of plus #200 material (gm)	58.41
Dry Weight + 3/4" Sample (gm)	0.00		
Total Dry Weight Sample (gm)	NA		

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.0	0.0	100.0	**100.0**
6"	150	0.00	0.0	0.0	100.0	**100.0**
3"	75	0.00	0.0	0.0	100.0	**100.0**
2"	50	0.00	0.0	0.0	100.0	**100.0**
1 1/2"	37.5	0.00	0.0	0.0	100.0	**100.0**
1"	25.0	0.00	0.0	0.0	100.0	**100.0**
3/4"	19.0	0.00	0.0	0.0	100.0	**100.0**
1/2"	12.50	0.00	0.0	0.0	100.0	**100.0**
3/8"	9.50	0.00	0.0	0.0	100.0	**100.0**
#4	4.75	0.00	0.0	0.0	100.0	**100.0**
#10	2.00	1.37	0.5	0.5	99.5	**99.5**
#20	0.850	4.37	1.5	2.0	98.0	**98.0**
#40	0.425	6.52	2.3	4.3	95.7	**95.7**
#60	0.250	8.03	2.8	7.1	92.9	**92.9**
#140	0.106	22.70	7.9	15.0	85.0	**85.0**
#200	0.075	15.42	5.4	20.3	79.7	**79.7**
Pan	-	228.96	79.7	100.0	-	-

Tested By GL Date 8/11/2009 Checked By GAM Date 8-11-09

DCN: CT-S3C DATE 6-25-98 REVISION 2 *C:\Documents and Settings\Owner\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-04-02 SIEVON REV 4.XLS]Sheet1*

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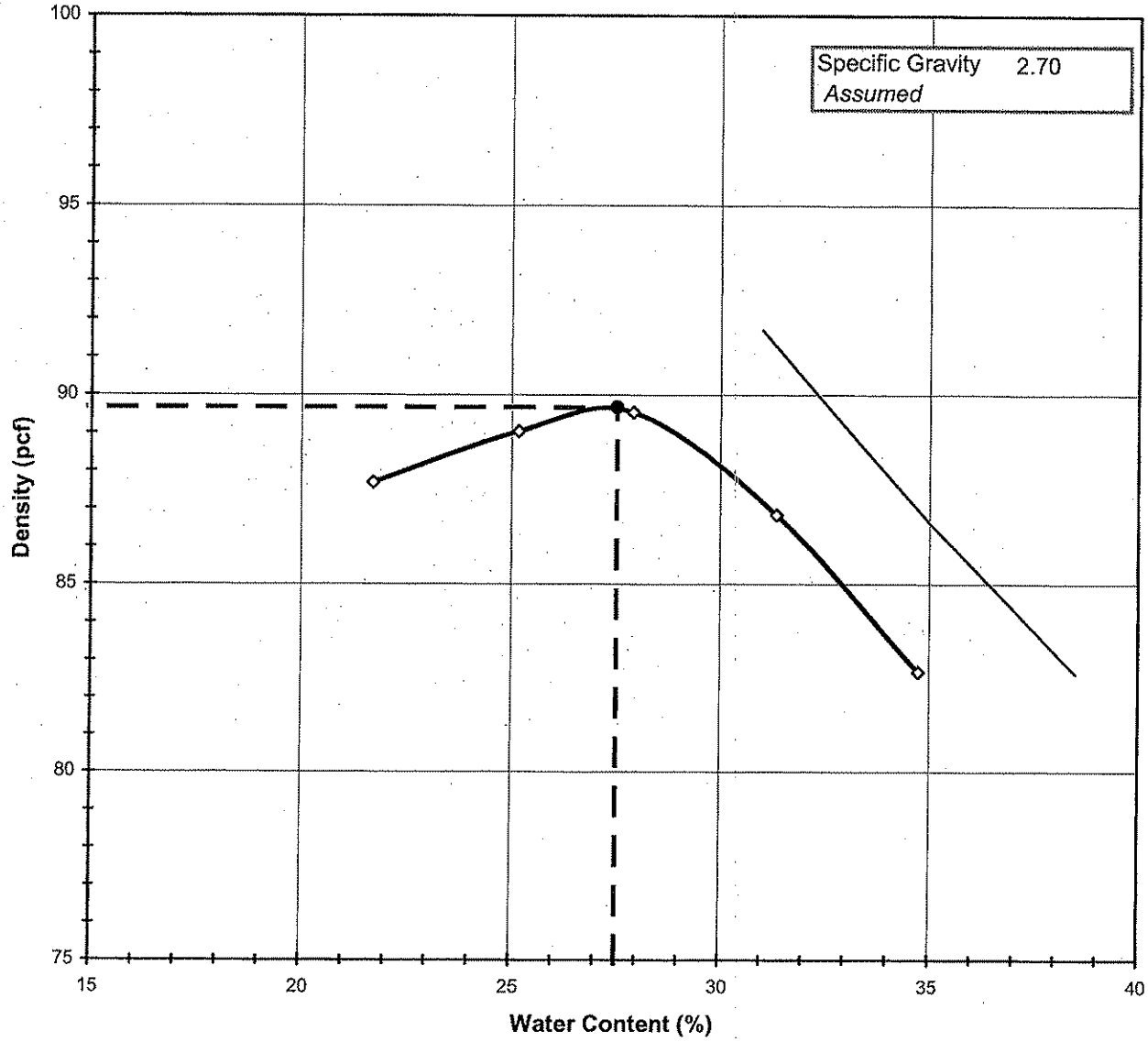
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01	Test Method	**STANDARD**

Visual Description REDDISH BROWN SANDY ELASTIC SILT

Optimum Water Content	**27.5**
Maximum Dry Density	**89.7**



Tested By SD *Date* 7/20/2009 *Checked By* GZM *Date* 7-31-09

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID	2009-666-02-01		

Visual Description REDDISH BROWN SANDY ELASTIC SILT

Total Weight of the Sample (gm)	20648
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	1
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5919	5990	6036	6029	5989
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1603	1674	1720	1713	1673
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	811	806	805	803	801
Wt. of Tare & WS (gm)	390.50	403.80	403.00	448.20	496.10
Wt. of Tare & DS (gm)	339.88	343.17	338.27	365.97	395.71
Wt. of Tare (gm)	106.70	102.30	106.30	103.80	106.80
Wt. of Water (gm)	50.62	60.63	64.73	82.23	100.39
Wt. of DS (gm)	233.18	240.87	231.97	262.17	288.91

Wet Density (gm/cc)	1.71	1.79	1.84	1.83	1.78
Wet Density (pcf)	106.7	111.5	114.5	114.1	111.4
Moisture Content (%)	**21.7**	**25.2**	**27.9**	**31.4**	**34.7**
Dry Density (pcf)	**87.7**	**89.0**	**89.5**	**86.8**	**82.7**

Zero Air Voids

Moisture Content (%)	31.0	35.0	38.5
Dry Unit Weight (pcf)	91.7	86.6	82.6

Tested By SD *Date* 7/20/2009 *Checked By* GZM *Date* 7-31-09

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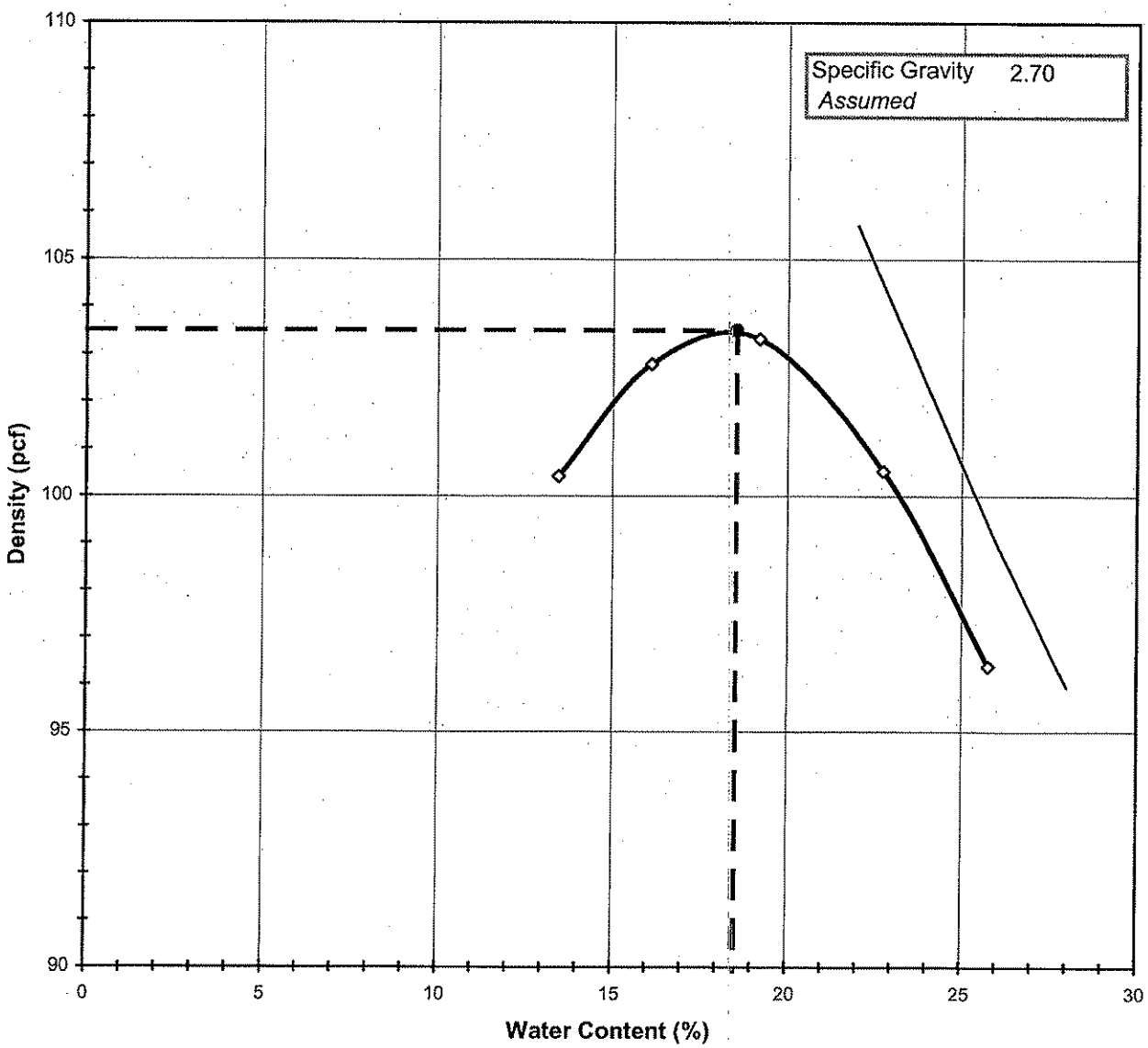
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL2
Lab ID	2009-662-02-02	Test Method	**STANDARD**

Visual Description BROWN SANDY FAT CLAY

Optimum Water Content **18.5**
Maximum Dry Density **103.5**



Tested By SD *Date* 7/24/2009 *Checked By* GZM *Date* 7-31-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-02 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL2
Lab ID	2009-662-02-02		

Visual Description BROWN SANDY FAT CLAY

Total Weight of the Sample (gm)	22441
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	4
Percent Retained on 3/8"	8
Percent Retained on #4	11
Oversize Material	Not included
Procedure Used	B

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6027	6109	6166	6170	6137
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1711	1793	1850	1854	1821
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	318	K-7	300	311	307
Wt. of Tare & WS (gm)	420.90	528.80	468.10	553.20	534.80
Wt. of Tare & DS (gm)	381.23	470.70	410.61	466.31	447.98
Wt. of Tare (gm)	86.50	110.00	110.90	84.40	111.10
Wt. of Water (gm)	39.67	58.10	57.49	86.89	86.82
Wt. of DS (gm)	294.73	360.70	299.71	381.91	336.88

Wet Density (gm/cc)	1.83	1.91	1.97	1.98	1.94
Wet Density (pcf)	113.9	119.3	123.1	123.4	121.2
Moisture Content (%)	**13.5**	**16.1**	**19.2**	**22.8**	**25.8**
Dry Density (pcf)	**100.4**	**102.8**	**103.3**	**100.5**	**96.4**

Zero Air Voids

Moisture Content (%)	22.0	26.0	28.0
Dry Unit Weight (pcf)	105.7	99.0	95.9

Tested By SD *Date* 7/24/2009 *Checked By* GEM *Date* 7-31-09

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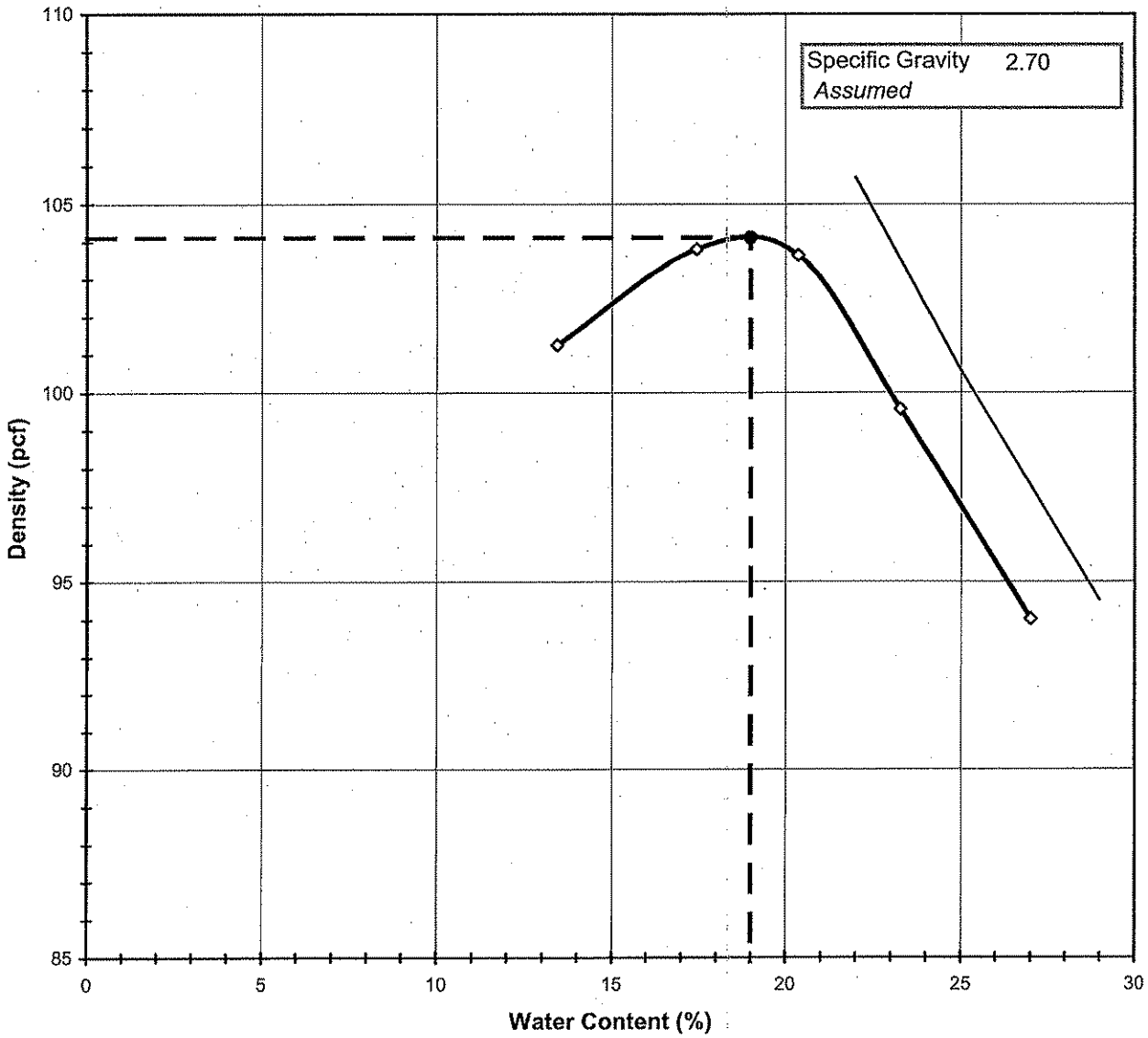
ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSWLF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03	Test Method	**STANDARD**

Visual Description BROWN SILTY SAND

Optimum Water Content **19.0**
Maximum Dry Density **104.1**



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 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 Proctor.XLS]Sheet1*

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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSWLF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID	2009-666-02-03		

Visual Description BROWN SILTY SAND

Total Weight of the Sample (gm)	22499
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6041	6147	6190	6160	6109
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1725	1831	1874	1844	1793
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	312	310	398	300	305
Wt. of Tare & WS (gm)	517.70	531.90	545.60	459.00	430.80
Wt. of Tare & DS (gm)	466.40	469.25	467.49	393.33	357.19
Wt. of Tare (gm)	84.40	110.10	84.10	111.20	84.60
Wt. of Water (gm)	51.30	62.65	78.11	65.67	73.61
Wt. of DS (gm)	382.00	359.15	383.39	282.13	272.59

Wet Density (gm/cc)	1.84	1.95	2.00	1.97	1.91
Wet Density (pcf)	114.9	121.9	124.8	122.7	119.4
Moisture Content (%)	**13.4**	**17.4**	**20.4**	**23.3**	**27.0**
Dry Density (pcf)	**101.3**	**103.8**	**103.6**	**99.6**	**94.0**

Zero Air Voids

Moisture Content (%)	22.0	25.0	29.0
Dry Unit Weight (pcf)	105.7	100.6	94.5

Tested By SD *Date* 7/13/2009 *Checked By* GEM *Date* 7-31-09

DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 Proctor.XLS]Sheet1*

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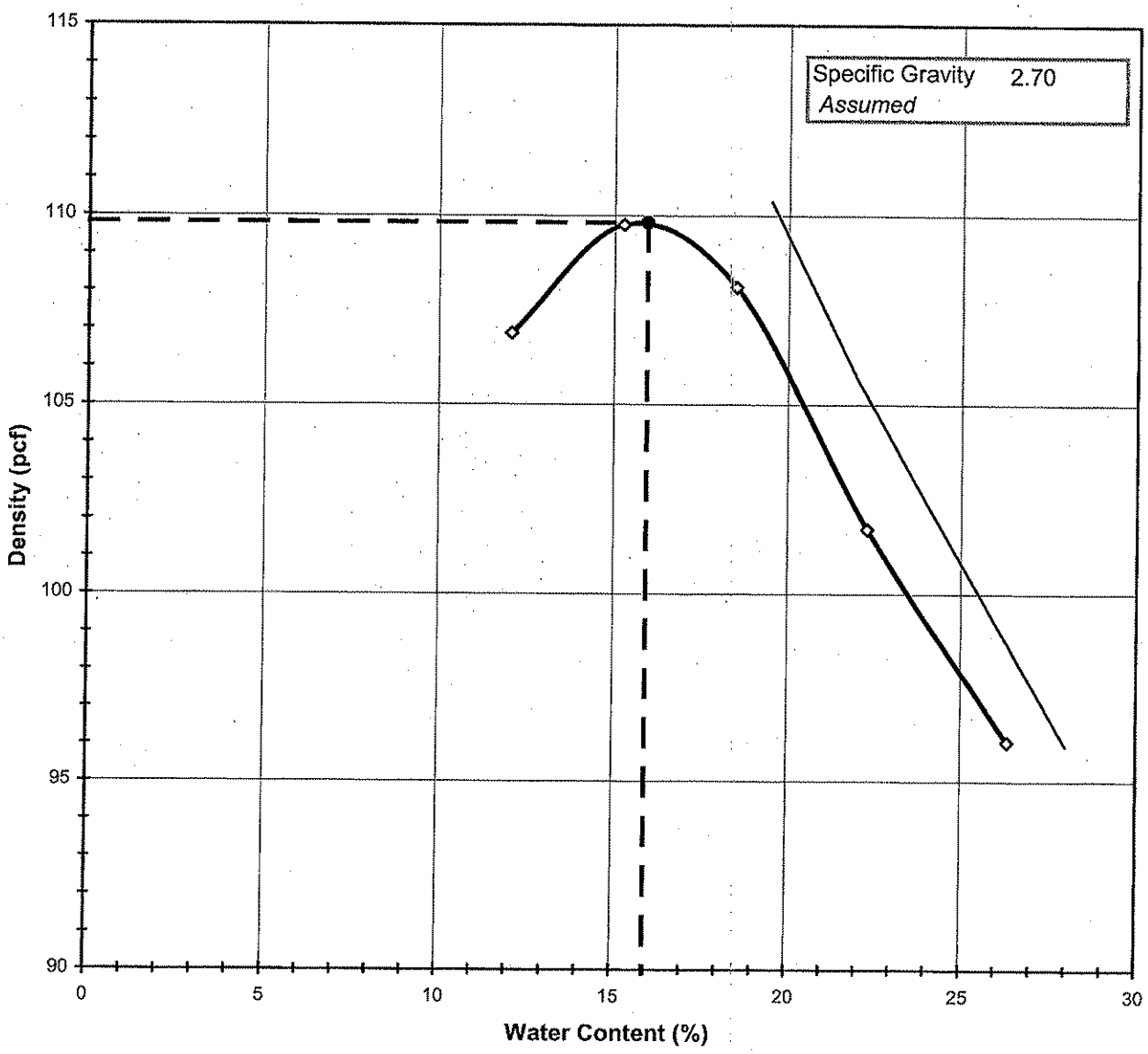
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL4
Lab ID	2009-662-02-04	Test Method	**STANDARD**

Visual Description BROWN SANDY LEAN CLAY

Optimum Water Content **16.0**
Maximum Dry Density **109.8**



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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL4
Lab ID	2009-662-02-04		

Visual Description BROWN SANDY LEAN CLAY

Total Weight of the Sample (gm)	19766
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	12
Percent Retained on 3/8"	0
Percent Retained on #4	0
Oversize Material	Not included
Procedure Used	C

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	173
Mold diameter		4"
Weight of the Mold		5561
Volume of the Mold(cc)		2120

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	9631	9859	9914	9788	9684
Wt.of Mold (gm)	5561	5561	5561	5561	5561
Wt. of WS	4070	4298	4353	4227	4123
Mold Volume (cc)	2120	2120	2120	2120	2120

Moisture Content / Density

Tare Number	809	800	814	802	810
Wt. of Tare & WS (gm)	392.20	572.30	444.60	486.00	682.30
Wt. of Tare & DS (gm)	362.38	510.25	392.66	416.21	564.25
Wt. of Tare (gm)	115.50	103.90	111.90	103.50	116.10
Wt. of Water (gm)	29.82	62.05	51.94	69.79	118.05
Wt. of DS (gm)	246.88	406.35	280.76	312.71	448.15

Wet Density (gm/cc)	1.92	2.03	2.05	1.99	1.94
Wet Density (pcf)	119.8	126.5	128.1	124.4	121.4
Moisture Content (%)	**12.1**	**15.3**	**18.5**	**22.3**	**26.3**
Dry Density (pcf)	**106.9**	**109.7**	**108.1**	**101.7**	**96.0**

Zero Air Voids

Moisture Content (%)	19.5	22.0	28.0
Dry Unit Weight (pcf)	110.4	105.7	95.9

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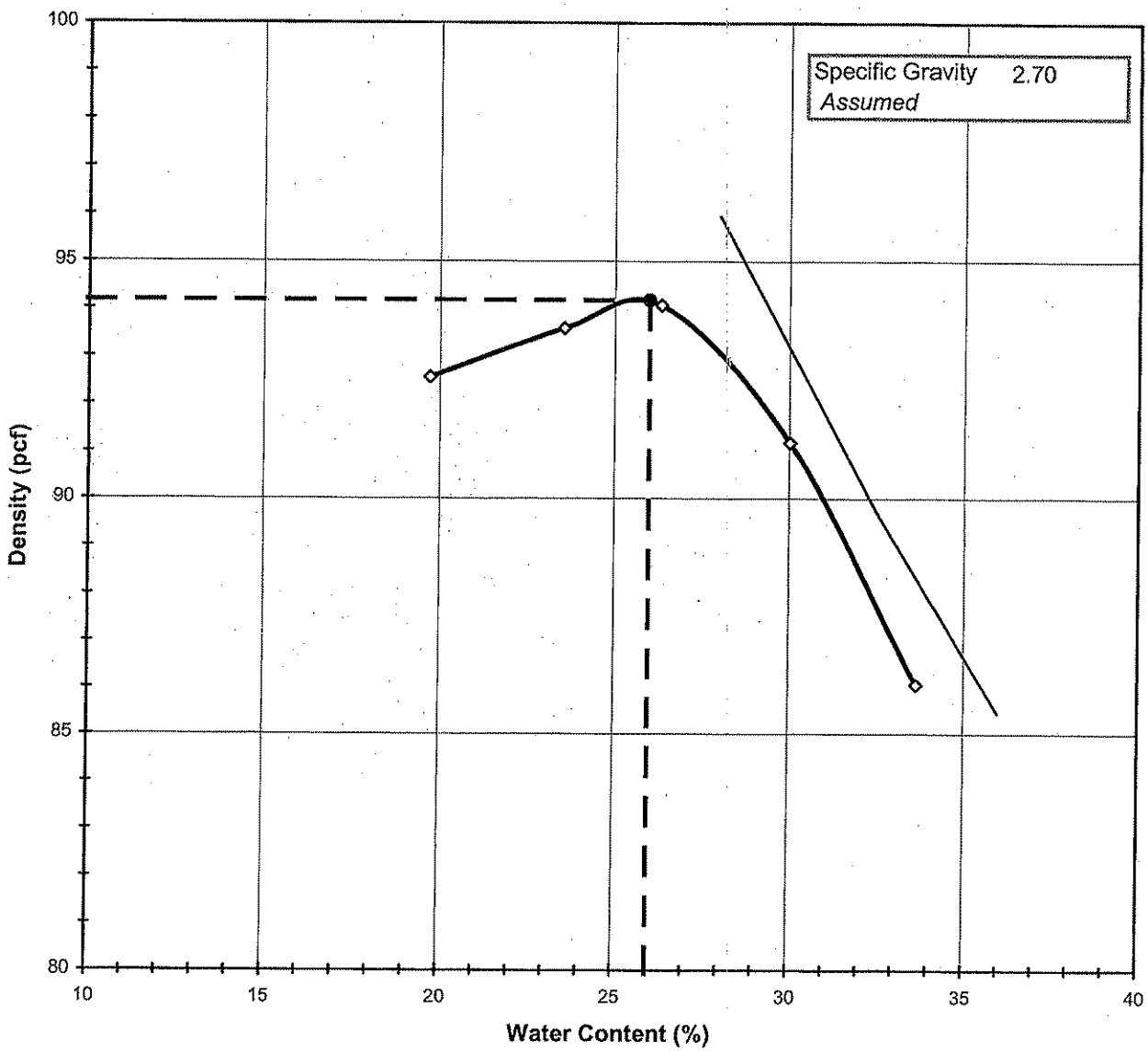
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSWLF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID	2009-666-02-05	Test Method	**STANDARD**

Visual Description RED SILTY WITH SAND

Optimum Water Content **26.0**
Maximum Dry Density **94.2**



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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSWLF PH III	Depth (ft)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID	2009-666-02-05		

Visual Description RED SILTY WITH SAND

Total Weight of the Sample (gm)	18724
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	2
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5981	6053	6101	6097	6044
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1665	1737	1785	1781	1728
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	303	306	311	315	399
Wt. of Tare & WS (gm)	458.50	443.20	523.50	563.20	499.70
Wt. of Tare & DS (gm)	401.32	375.57	431.90	458.57	395.54
Wt. of Tare (gm)	111.50	88.50	84.20	110.20	86.20
Wt. of Water (gm)	57.18	67.63	91.60	104.63	104.16
Wt. of DS (gm)	289.82	287.07	347.70	348.37	309.34

Wet Density (gm/cc)	1.78	1.85	1.90	1.90	1.84
Wet Density (pcf)	110.8	115.6	118.8	118.6	115.0
Moisture Content (%)	**19.7**	**23.6**	**26.3**	**30.0**	**33.7**
Dry Density (pcf)	**92.6**	**93.6**	**94.1**	**91.2**	**86.0**

Zero Air Voids

Moisture Content (%)	28.0	32.5	36.0
Dry Unit Weight (pcf)	95.9	89.7	85.4

Tested By SD *Date* 7/13/2009 *Checked By* CAM *Date* 7-31-09

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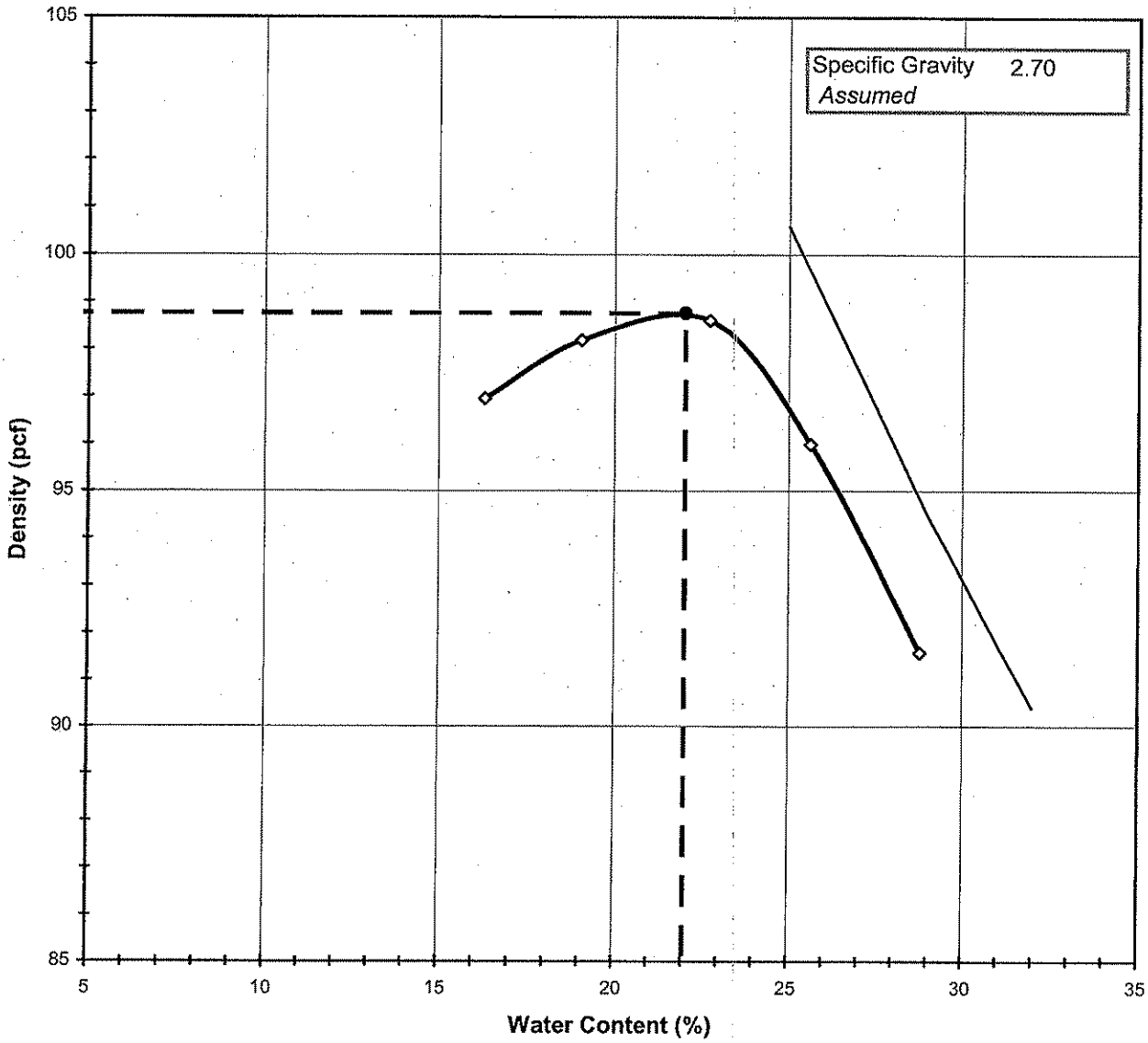
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL6
Lab ID	2009-662-02-06	Test Method	**STANDARD**

Visual Description REDDISH BROWN SANDY FAT CLAY

Optimum Water Content	**22.0**
Maximum Dry Density	**98.8**



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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-662-02	Sample No.	CCL6
Lab ID	2009-662-02-06		

Visual Description REDDISH BROWN SANDY FAT CLAY

Total Weight of the Sample (gm)	23857
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	0
Percent Retained on 3/8"	2
Percent Retained on #4	2
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4316
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6010	6072	6134	6127	6088
Wt.of Mold (gm)	4316	4316	4316	4316	4316
Wt. of WS	1694	1756	1818	1811	1772
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	301	314	310	312	304
Wt. of Tare & WS (gm)	491.60	468.60	480.50	439.90	480.40
Wt. of Tare & DS (gm)	434.49	407.11	411.90	367.33	397.68
Wt. of Tare (gm)	84.30	84.40	110.20	84.30	110.50
Wt. of Water (gm)	57.11	61.49	68.60	72.57	82.72
Wt. of DS (gm)	350.19	322.71	301.70	283.03	287.18

Wet Density (gm/cc)	1.81	1.87	1.94	1.93	1.89
Wet Density (pcf)	112.8	116.9	121.0	120.6	118.0
Moisture Content (%)	**16.3**	**19.1**	**22.7**	**25.6**	**28.8**
Dry Density (pcf)	**96.9**	**98.2**	**98.6**	**96.0**	**91.6**

Zero Air Voids

Moisture Content (%)	25.0	29.0	32.0
Dry Unit Weight (pcf)	100.6	94.5	90.4

Tested By SD *Date* 7/24/2009 *Checked By* GEM *Date* 7-31-09

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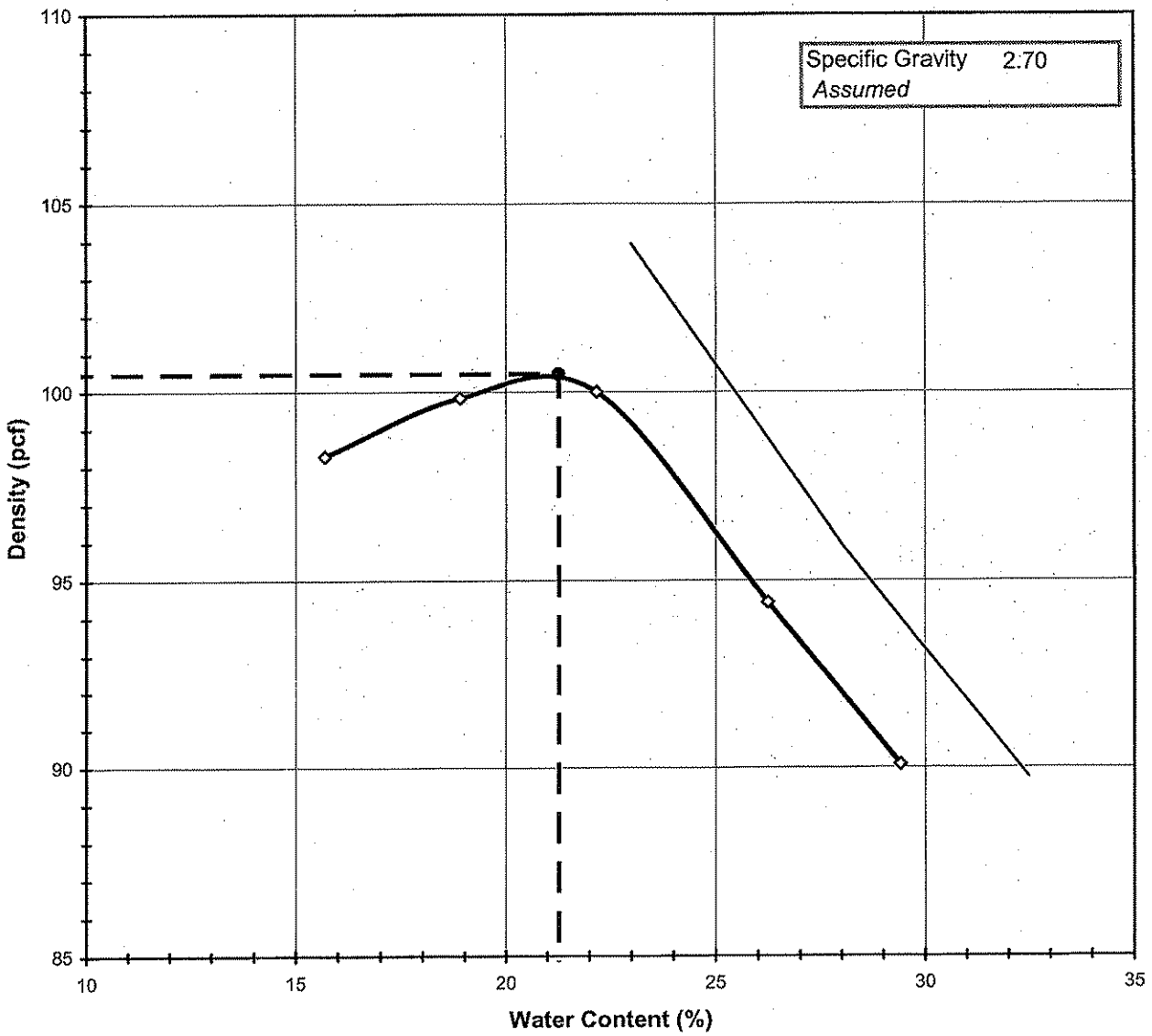
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID	2009-666-04-01	Test Method	**STANDARD**

Visual Description REDDISH BROWN SANDY SILT

Optimum Water Content **21.3**
Maximum Dry Density **100.5**



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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID	2009-666-04-01		

Visual Description REDDISH BROWN SANDY SILT

Total Weight of the Sample (gm)	20272
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4315
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6023	6098	6150	6105	6066
Wt.of Mold (gm)	4315	4315	4315	4315	4315
Wt. of WS	1708	1783	1835	1790	1751
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	307	305	314	317	310
Wt. of Tare & WS (gm)	447.60	483.20	543.90	525.30	600.30
Wt. of Tare & DS (gm)	401.89	419.85	460.54	433.64	488.90
Wt. of Tare (gm)	110.70	84.60	84.70	84.30	110.20
Wt. of Water (gm)	45.71	63.35	83.36	91.66	111.40
Wt. of DS (gm)	291.19	335.25	375.84	349.34	378.70

Wet Density (gm/cc)	1.82	1.90	1.96	1.91	1.87
Wet Density (pcf)	113.7	118.7	122.2	119.2	116.6
Moisture Content (%)	**15.7**	**18.9**	**22.2**	**26.2**	**29.4**
Dry Density (pcf)	**98.3**	**99.8**	**100.0**	**94.4**	**90.1**

Zero Air Voids

Moisture Content (%)	23.0	28.0	32.5
Dry Unit Weight (pcf)	103.9	95.9	89.7

Tested By SD *Date* 8/11/2009 *Checked By* GEM *Date* 8-12-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 INVOICES\AUG 09 INVOICES\[TOTAL AUG 09 INVOICES.xls]Sheet1*

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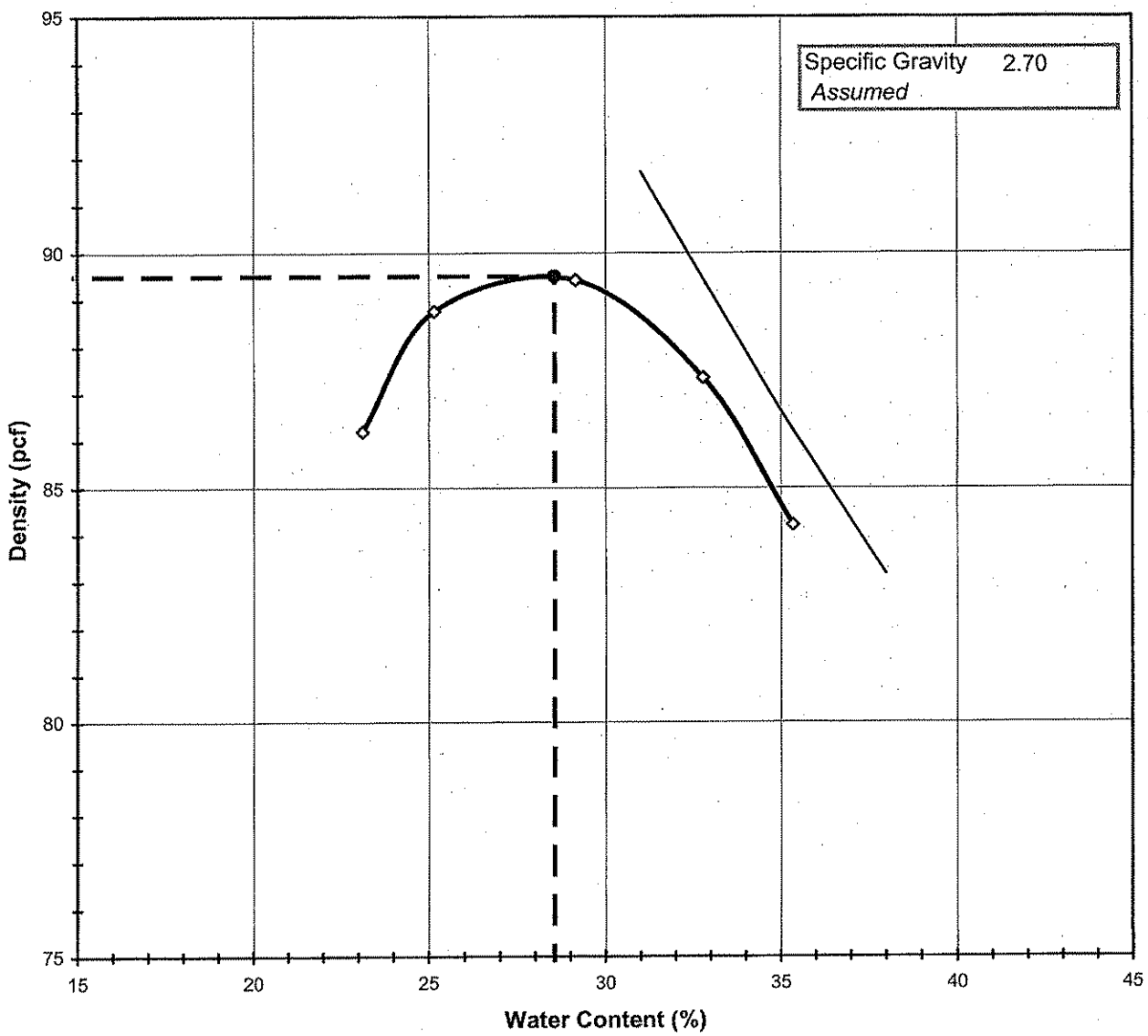
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID	2009-666-04-02	Test Method	**STANDARD**

Visual Description REDDISH BROWN ELASTIC SILT WITH SAND

Optimum Water Content	**28.6**
Maximum Dry Density	**89.5**



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Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID	2009-666-04-02		

Visual Description REDDISH BROWN ELASTIC SILT WITH SAND

Total Weight of the Sample (gm)	18565
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4315
Volume of the Mold(cc)		937

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	5909	5984	6050	6057	6027
Wt.of Mold (gm)	4315	4315	4315	4315	4315
Wt. of WS	1594	1669	1735	1742	1712
Mold Volume (cc)	937	937	937	937	937

Moisture Content / Density

Tare Number	399	318	315	K-7	308
Wt. of Tare & WS (gm)	420.80	462.50	544.90	543.10	560.60
Wt. of Tare & DS (gm)	357.97	387.01	446.91	436.25	443.26
Wt. of Tare (gm)	86.30	86.90	110.80	110.40	111.30
Wt. of Water (gm)	62.83	75.49	97.99	106.85	117.34
Wt. of DS (gm)	271.67	300.11	336.11	325.85	331.96

Wet Density (gm/cc)	1.70	1.78	1.85	1.86	1.83
Wet Density (pcf)	106.1	111.1	115.5	116.0	114.0
Moisture Content (%)	**23.1**	**25.2**	**29.2**	**32.8**	**35.3**
Dry Density (pcf)	**86.2**	**88.8**	**89.4**	**87.3**	**84.2**

Zero Air Voids

Moisture Content (%)	31.0	35.0	38.0
Dry Unit Weight (pcf)	91.7	86.6	83.2

Tested By SD *Date* 8/11/2009 *Checked By* GEM *Date* 8-13-09

DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-04-02 Proctor.XLS]Sheet1*

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

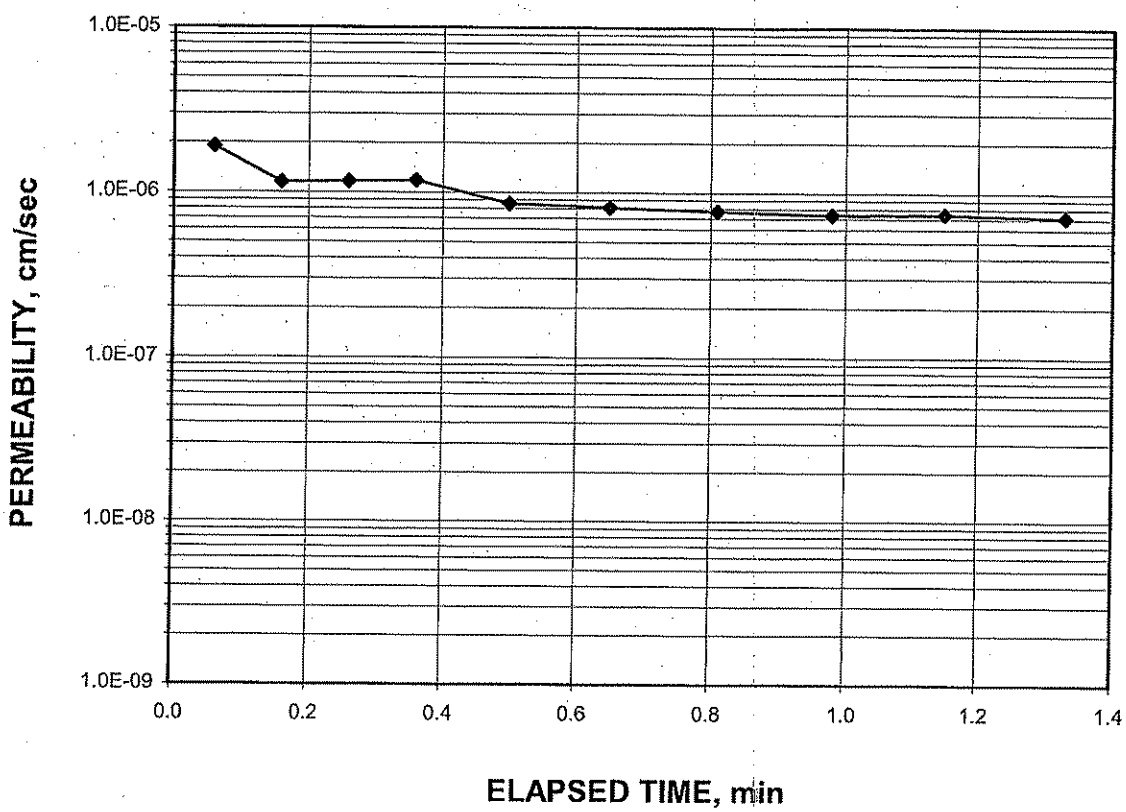
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID No.	2009-666-02-01		

Visual Description: PINK SILT

AVERAGE PERMEABILITY = 7.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 7.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 02/01/08 REVISION: 0 [...]JECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID No.	2009-666-02-01		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: PINK SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	824	803
Wt. of Tare & WS (gm.)	324.08	549.16
Wt. of Tare & DS (gm.)	279.26	439.64
Wt. of Tare (gm.)	135.39	103.8
Wt. of Water (gm.)	44.82	109.52
Wt. of DS (gm.)	143.87	335.84
Moisture Content (%)	**31.2**	**32.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	774.96	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	774.96	783.57
Length 1 (in.)	4.013	4.024
Length 2 (in.)	4.013	3.981
Length 3 (in.)	4.013	3.976
Top Diameter (in.)	2.861	2.865
Middle Diameter (in.)	2.861	2.859
Bottom Diameter (in.)	2.861	2.869
Average Length (in.)	4.01	3.99
Average Area (in.^{2})	6.43	6.44
Sample Volume (cm^3)	422.76	421.71
Unit Wet Wt. (gm./ cm^3)	1.833	1.858
Unit Wet Wt. (pcf)	114.4	116.0
Unit Dry Wt. (pcf)	87.2	87.5
Unit Dry Wt. (gm./ cm^3)	1.398	1.401
Void Ratio, e	0.932	0.927
Porosity, n	0.482	0.481
Pore Volume (cm^3)	203.9	202.9
Total Wt. Of Sample After Test		785.91

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 12-21-05 REVISION: 4 ECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID No.	2009-666-02-01		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	50.0	Sample Length (cm), L	10.14
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.57
Eff. Cons. Pressure(psi)	10.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 7.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 7.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	11	13.97	0	9.5	10.0	0	24.9	NA
8/4/2009	11	14.03	0	9.4	9.8	0	24.9	1.9E-06
8/4/2009	11	14.13	0	9.3	9.7	0	24.9	1.1E-06
8/4/2009	11	14.23	0	9.2	9.6	0	24.9	1.2E-06
8/4/2009	11	14.33	0	9.1	9.5	0	24.9	1.2E-06
8/4/2009	11	14.47	1	9.0	9.3	0	24.9	8.5E-07
8/4/2009	11	14.62	1	8.9	9.2	0	24.9	8.1E-07
8/4/2009	11	14.78	1	8.8	9.1	0	24.9	7.7E-07
8/4/2009	11	14.95	1	8.7	8.9	0	24.9	7.3E-07
8/4/2009	11	15.12	1	8.6	8.8	0	24.9	7.4E-07
8/4/2009	11	15.30	1	8.5	8.7	0	24.9	7.1E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

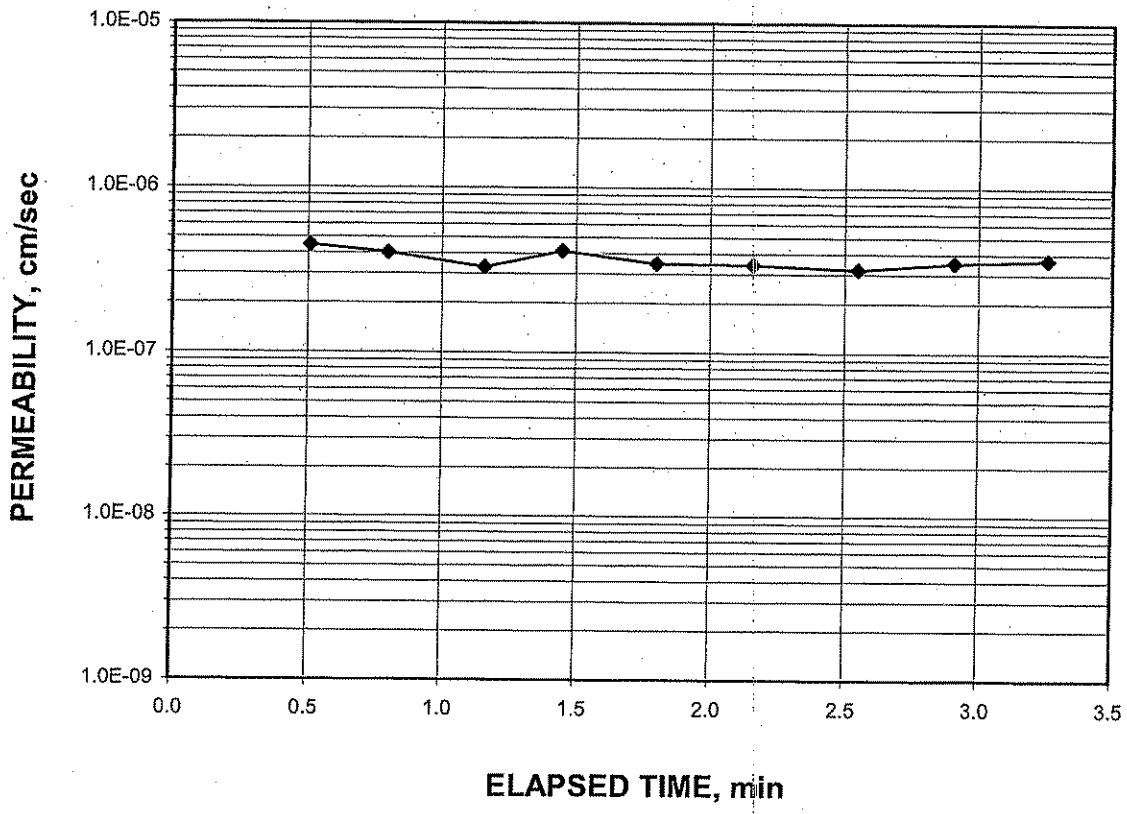
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID No.	2009-666-02-01		

Visual Description: PINK SILT

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 05/02/2008 REV: 0 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID No.	2009-666-02-01		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: PINK SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	824	803
Wt. of Tare & WS (gm.)	324.08	549.16
Wt. of Tare & DS (gm.)	279.26	439.64
Wt. of Tare (gm.)	135.39	103.8
Wt. of Water (gm.)	44.82	109.52
Wt. of DS (gm.)	143.87	335.84
Moisture Content (%)	**31.2**	**32.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	774.96	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	774.96	783.57
Length 1 (in.)	4.013	4.024
Length 2 (in.)	4.013	3.981
Length 3 (in.)	4.013	3.976
Top Diameter (in.)	2.861	2.865
Middle Diameter (in.)	2.861	2.859
Bottom Diameter (in.)	2.861	2.869
Average Length (in.)	4.01	3.99
Average Area (in.^{2})	6.43	6.44
Sample Volume (cm^3)	422.76	421.71
Unit Wet Wt. (gm./ cm^3)	1.833	1.858
Unit Wet Wt. (pcf)	114.4	116.0
Unit Dry Wt. (pcf)	87.2	87.5
Unit Dry Wt. (gm./ cm^3)	1.398	1.401
Void Ratio, e	0.932	0.927
Porosity, n	0.482	0.481
Pore Volume (cm^3)	203.9	202.9
Total Wt. Of Sample After Test		785.91

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL1
Lab ID No.	2009-666-02-01		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.14
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.57
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	14	37.32	0	9.5	10.0	0	24.9	NA
8/4/2009	14	37.83	1	9.3	9.7	0	24.9	4.5E-07
8/4/2009	14	38.12	1	9.2	9.6	0	24.9	4.0E-07
8/4/2009	14	38.48	1	9.1	9.5	0	24.9	3.3E-07
8/4/2009	14	38.77	1	9.0	9.3	0	24.9	4.1E-07
8/4/2009	14	39.12	2	8.9	9.2	0	24.9	3.5E-07
8/4/2009	14	39.48	2	8.8	9.1	0	24.9	3.4E-07
8/4/2009	14	39.87	3	8.7	8.9	0	24.9	3.2E-07
8/4/2009	14	40.23	3	8.6	8.8	0	24.9	3.5E-07
8/4/2009	14	40.58	3	8.5	8.7	0	24.9	3.7E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

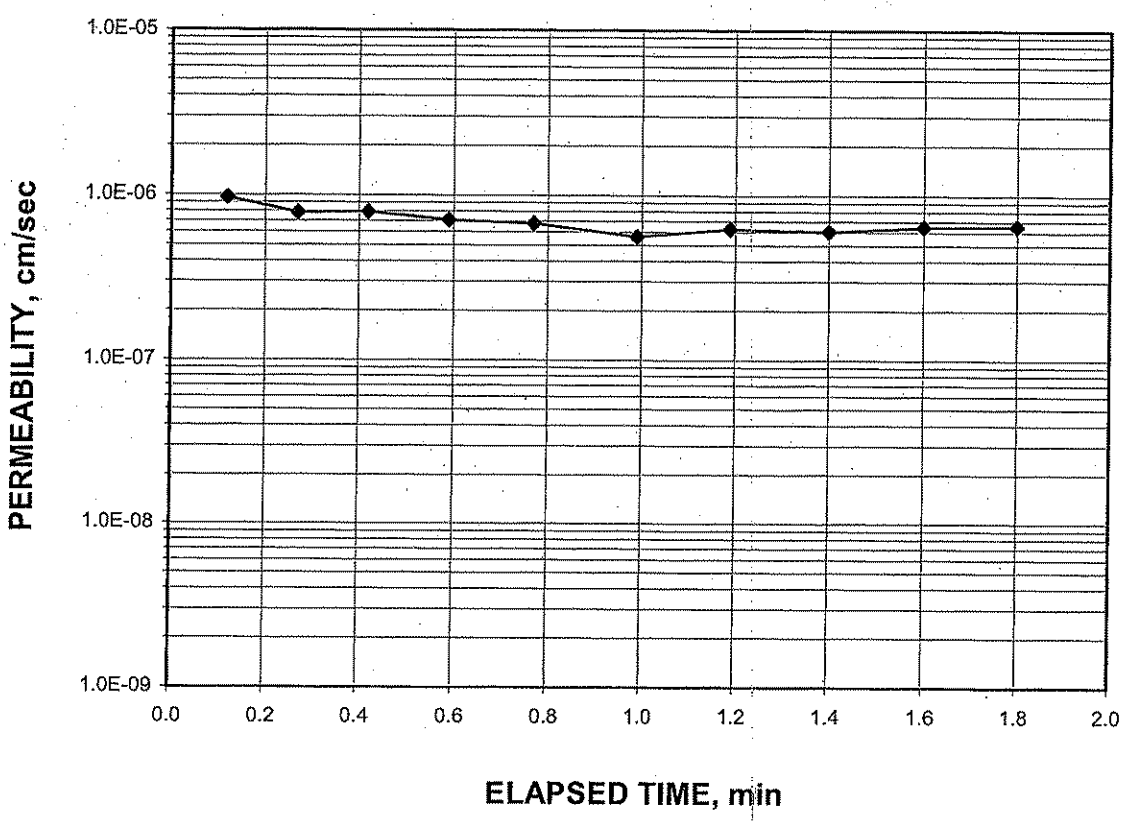
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID No.	2009-666-02-02		

Visual Description: PINK SILT

AVERAGE PERMEABILITY = 6.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 6.3E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 02/21/08 REVISION: 0 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID No.	2009-666-02-02		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: PINK SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	825	800
Wt. of Tare & WS (gm.)	302.41	599.06
Wt. of Tare & DS (gm.)	272.89	497.83
Wt. of Tare (gm.)	137.09	104.01
Wt. of Water (gm.)	29.52	101.23
Wt. of DS (gm.)	135.80	393.82
Moisture Content (%)	**21.7**	**25.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	828.22	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	828.22	855.21
Length 1 (in.)	4.013	4.079
Length 2 (in.)	4.013	4.074
Length 3 (in.)	4.013	4.056
Top Diameter (in.)	2.861	2.878
Middle Diameter (in.)	2.861	2.880
Bottom Diameter (in.)	2.861	2.835
Average Length (in.)	4.01	4.07
Average Area (in.^{2})	6.43	6.44
Sample Volume (cm^3)	422.76	429.73
Unit Wet Wt. (gm./ cm^3)	1.959	1.990
Unit Wet Wt. (pcf)	122.3	124.2
Unit Dry Wt. (pcf)	100.5	98.8
Unit Dry Wt. (gm./ cm^3)	1.609	1.583
Void Ratio, e	0.678	0.705
Porosity, n	0.404	0.414
Pore Volume (cm^3)	170.8	177.8
Total Wt. Of Sample After Test		855.00

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 12-01-05 REVISION: 04 ECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL2
Lab ID No.	2009-666-02-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.34
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.57
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 6.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 6.3E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	11	9.73	0	9.5	9.8	0	24.9	NA
8/4/2009	11	9.85	0	9.4	9.7	0	24.9	9.6E-07
8/4/2009	11	10.00	0	9.3	9.5	0	24.9	7.8E-07
8/4/2009	11	10.15	0	9.2	9.4	0	24.9	7.9E-07
8/4/2009	11	10.32	1	9.1	9.3	0	24.9	7.1E-07
8/4/2009	11	10.50	1	9.0	9.2	0	24.9	6.8E-07
8/4/2009	11	10.72	1	8.9	9.0	0	24.9	5.6E-07
8/4/2009	11	10.92	1	8.8	8.9	0	24.9	6.3E-07
8/4/2009	11	11.13	1	8.7	8.8	0	24.9	6.0E-07
8/4/2009	11	11.33	2	8.6	8.7	0	24.9	6.4E-07
8/4/2009	11	11.53	2	8.5	8.5	0	24.9	6.5E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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PERMEABILITY TEST

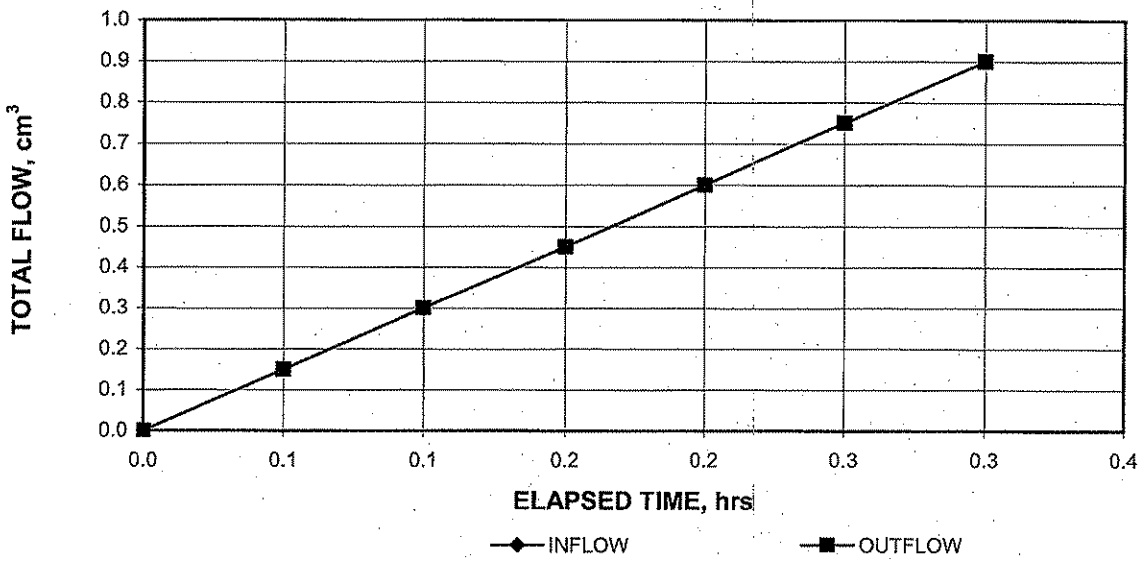
ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

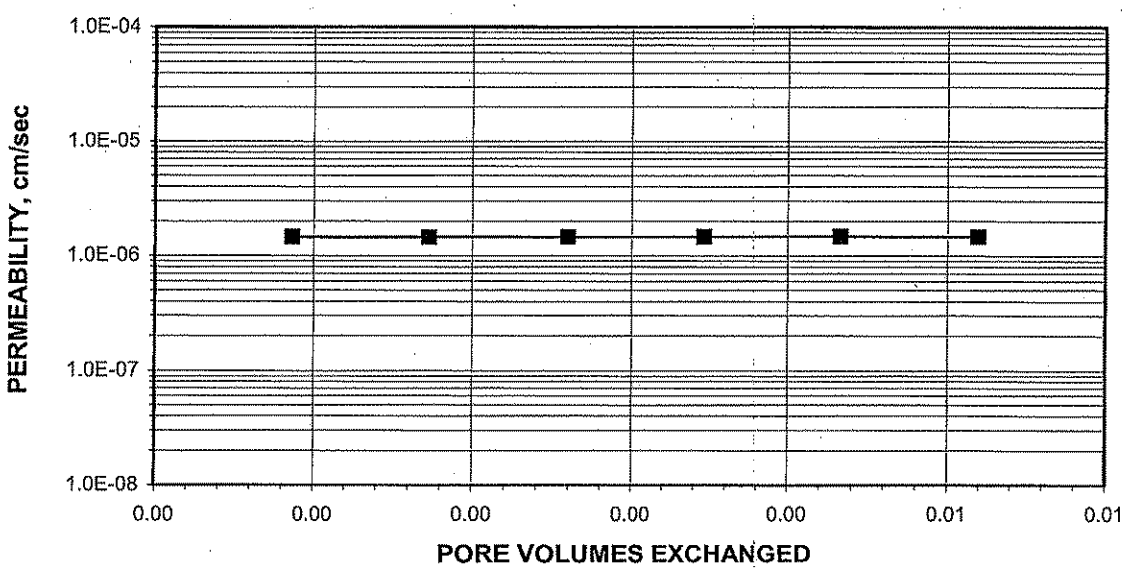
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID No.	2009-666-02-03		

AVERAGE PERMEABILITY = 1.5E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.5E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 7/16/2009 Checked By: GEM Date: 7-30-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID No.	2009-666-02-03		
		Specific Gravity	2.70 Assumed
		Sample Condition	Remolded

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	816	812
Wt. of Tare & WS (gm.)	390.37	483.11
Wt. of Tare & DS (gm.)	339.88	410.64
Wt. of Tare (gm.)	110.18	106.71
Wt. of Water (gm.)	50.49	72.47
Wt. of DS (gm.)	229.70	303.93
Moisture Content (%)	**22.0**	**23.8**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	829.12	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	829.12	841.79
Length 1 (in.)	4.013	4.052
Length 2 (in.)	4.013	4.038
Length 3 (in.)	4.013	3.989
Top Diameter (in.)	2.861	2.882
Middle Diameter (in.)	2.861	2.855
Bottom Diameter (in.)	2.861	2.854
Average Length (in.)	4.01	4.03
Average Area (in.^{2})	6.43	6.44
Sample Volume (cm^3)	422.76	424.96
Unit Wet Wt. (gm./ cm^3)	1.96	1.98
Unit Wet Wt. (pcf)	122.4	123.6
Unit Dry Wt. (pcf)	100.4	99.8
Unit Dry Wt. (gm./ cm^3)	1.61	1.60
Void Ratio, e	0.68	0.69
Porosity, n	0.40	0.41
Pore Volume (cm^3)	171.0	173.2
Total Wgt. Of Sample After Test		851.0

Tested By: TMS Date: 7/16/2009 Checked By: GM Date: 7-30-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID No.	2009-666-02-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	38.5	Sample Length (cm), L	10.23
Bottom Cap (psi)	40.0	Sample Diameter (cm)	7.27
Cell (psi)	65.0	Sample Area (cm^2), A	41.55
Total Pressure Head (cm)	105.5	Inflow Burette Area (cm^2), a-in	0.977
Hydraulic Gradient	10.31	Outflow Burette Area (cm^2), a-out	0.868
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.5E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.5E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW ($cm^{3)}$)	TOTAL OUTFLOW ($cm^{3)}$)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
7/16/2009	12	16	0.0	0.0	0.0	127.5	0	24.5	NA
7/16/2009	12	19	0.0	0.2	0.1	127.2	0	24.5	1.4E-06
7/16/2009	12	22	0.1	0.3	0.3	126.8	0	24.5	1.5E-06
7/16/2009	12	25	0.1	0.5	0.4	126.5	0	24.5	1.5E-06
7/16/2009	12	28	0.2	0.6	0.6	126.2	0	24.5	1.5E-06
7/16/2009	12	31	0.3	0.8	0.8	125.8	0	24.5	1.5E-06
7/16/2009	12	34	0.3	0.9	0.9	125.5	1	24.5	1.5E-06

Tested By: TMS Date: 7/16/2009 Checked By: GZm Date: 7-30-09

DCN: CT-22 DATE: 01-08-99 [illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-03 PERM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

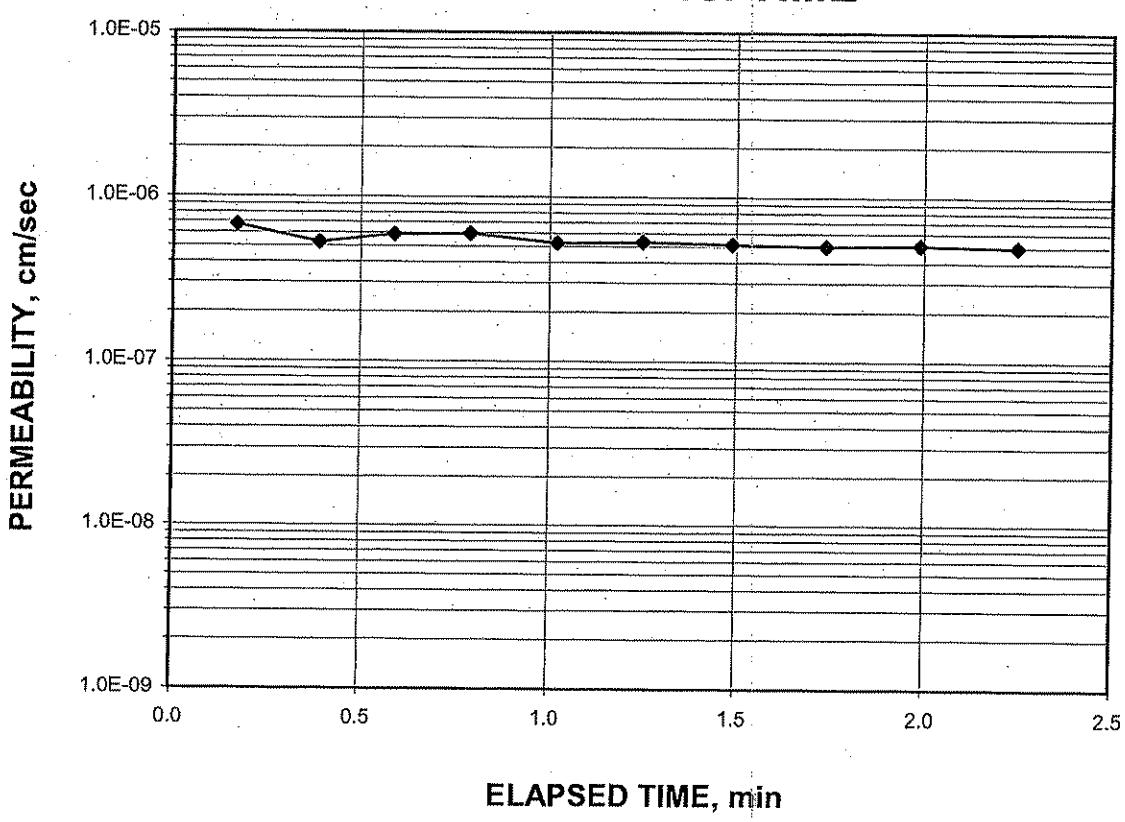
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID No.	2009-666-02-03		

Visual Description: RED SILT

AVERAGE PERMEABILITY = 5.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.0E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: [illegible] PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID No.	2009-666-02-03		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: RED SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	815	808
Wt. of Tare & WS (gm.)	337.04	456.67
Wt. of Tare & DS (gm.)	299.68	388.19
Wt. of Tare (gm.)	136.21	104.76
Wt. of Water (gm.)	37.36	68.48
Wt. of DS (gm.)	163.47	283.43
Moisture Content (%)	**22.9**	**24.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	843.41	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	843.41	852.38
Length 1 (in.)	4.013	4.022
Length 2 (in.)	4.013	3.997
Length 3 (in.)	4.013	4.002
Top Diameter (in.)	2.861	2.865
Middle Diameter (in.)	2.861	2.857
Bottom Diameter (in.)	2.861	2.861
Average Length (in.)	4.01	4.01
Average Area (in.^{2})	6.43	6.43
Sample Volume (cm^3)	422.76	422.13
Unit Wet Wt. (gm./ cm^3)	1.995	2.019
Unit Wet Wt. (pcf)	124.5	126.0
Unit Dry Wt. (pcf)	101.4	101.5
Unit Dry Wt. (gm./ cm^3)	1.624	1.626
Void Ratio, e	0.663	0.660
Porosity, n	0.399	0.398
Pore Volume (cm^3)	168.5	167.9
Total Wt. Of Sample After Test		843.00

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL3
Lab ID No.	2009-666-02-03		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.18
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.48
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 5.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	11	18.43	0	9.5	9.9	0	24.9	NA
8/4/2009	11	18.60	0	9.4	9.8	0	24.9	6.7E-07
8/4/2009	11	18.82	0	9.3	9.7	0	24.9	5.2E-07
8/4/2009	11	19.02	1	9.2	9.6	0	24.9	5.8E-07
8/4/2009	11	19.22	1	9.1	9.4	0	24.9	5.9E-07
8/4/2009	11	19.45	1	9.0	9.3	0	24.9	5.2E-07
8/4/2009	11	19.68	1	8.9	9.2	0	24.9	5.3E-07
8/4/2009	11	19.92	1	8.8	9.0	0	24.9	5.1E-07
8/4/2009	11	20.17	2	8.7	8.9	0	24.9	5.0E-07
8/4/2009	11	20.42	2	8.6	8.8	0	24.9	5.1E-07
8/4/2009	11	20.68	2	8.5	8.7	0	24.9	5.0E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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PERMOMETER METHOD

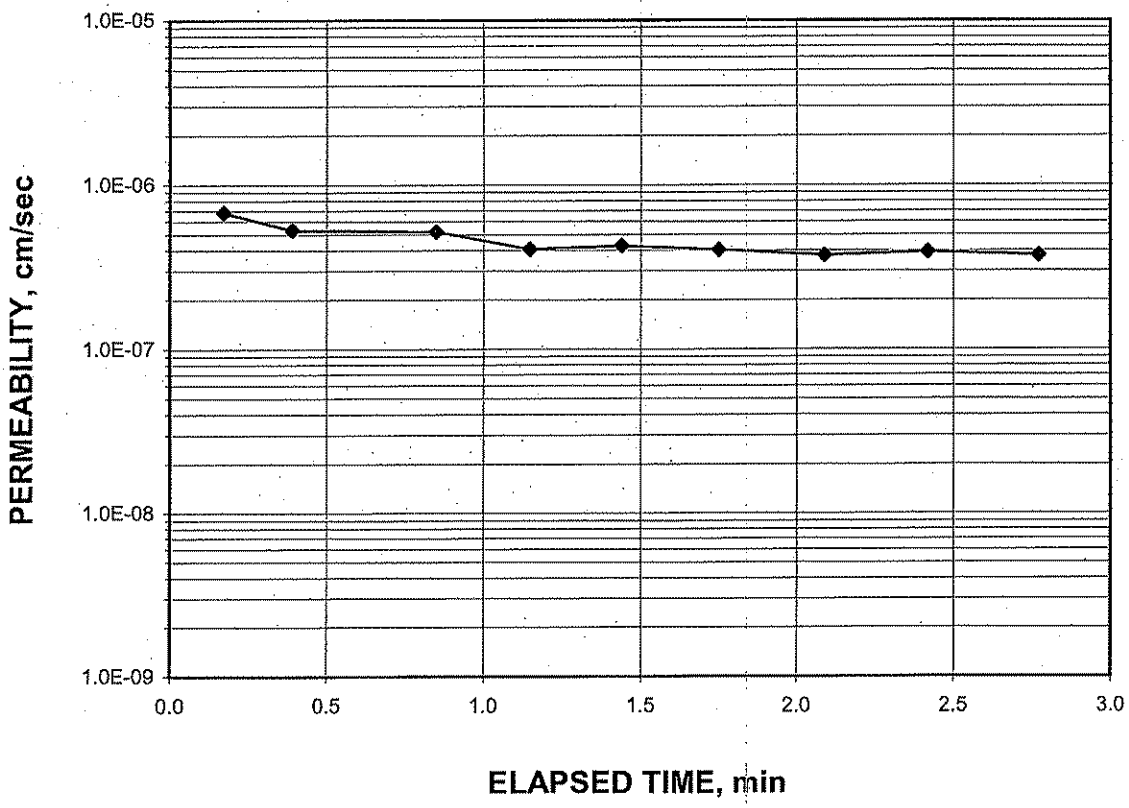
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID No.	2009-666-02-04		

Visual Description: BROWN PINK SILTY LEAN CLAY

AVERAGE PERMEABILITY = 3.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.8E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 5/5/09

DCN: CT-22C DATE: 10/21/08 REVISION: 0 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID No.	2009-666-02-04		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: BROWN PINK SILTY LEAN CLAY

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	821	812
Wt. of Tare & WS (gm.)	332.74	528.48
Wt. of Tare & DS (gm.)	300.01	450.43
Wt. of Tare (gm.)	135.87	106.73
Wt. of Water (gm.)	32.73	78.05
Wt. of DS (gm.)	164.14	343.70
Moisture Content (%)	**19.9**	**22.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	861.90	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	861.90	881.79
Length 1 (in.)	4.013	4.085
Length 2 (in.)	4.013	4.065
Length 3 (in.)	4.013	4.066
Top Diameter (in.)	2.861	2.874
Middle Diameter (in.)	2.861	2.874
Bottom Diameter (in.)	2.861	2.849
Average Length (in.)	4.01	4.07
Average Area (in.^{2})	6.43	6.45
Sample Volume (cm^3)	422.76	430.38
Unit Wet Wt. (gm./ cm^3)	2.039	2.049
Unit Wet Wt. (pcf)	127.3	127.9
Unit Dry Wt. (pcf)	106.1	104.2
Unit Dry Wt. (gm./ cm^3)	1.700	1.670
Void Ratio, e	0.588	0.617
Porosity, n	0.370	0.382
Pore Volume (cm^3)	156.6	164.2
Total Wt. Of Sample After Test		881.16

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL4
Lab ID No.	2009-666-02-04		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.34
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.61
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 3.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.8E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	11	26.88	0	9.5	9.8	0	24.9	NA
8/4/2009	11	27.05	0	9.4	9.7	0	24.9	6.8E-07
8/4/2009	11	27.27	0	9.3	9.5	0	24.9	5.3E-07
8/4/2009	11	27.73	1	9.1	9.3	0	24.9	5.2E-07
8/4/2009	11	28.03	1	9.0	9.2	0	24.9	4.1E-07
8/4/2009	11	28.32	1	8.9	9.0	0	24.9	4.3E-07
8/4/2009	11	28.63	2	8.8	8.9	0	24.9	4.0E-07
8/4/2009	11	28.97	2	8.7	8.8	0	24.9	3.7E-07
8/4/2009	11	29.30	2	8.6	8.6	0	24.9	3.9E-07
8/4/2009	11	29.65	3	8.5	8.5	1	24.9	3.7E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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PERMOMETER METHOD

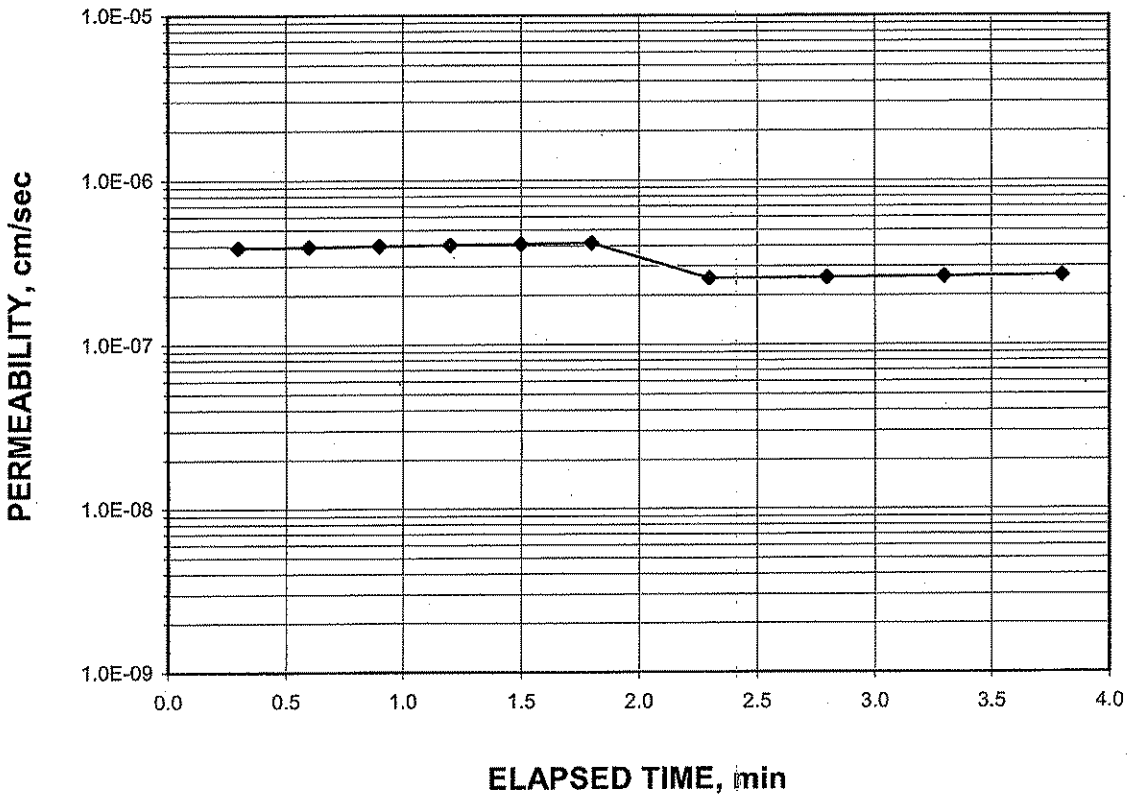
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID No.	2009-666-02-05		

Visual Description: RED SILT

AVERAGE PERMEABILITY = 2.6E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.6E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 7/21/2009 Checked By: GZM Date: 7-31-09

DCN: CT-22C DATE:12-21-08 REVISION: 0 \\Server\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID No.	2009-666-02-05		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: RED SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	825	8010
Wt. of Tare & WS (gm.)	270.65	581.57
Wt. of Tare & DS (gm.)	241.18	475.54
Wt. of Tare (gm.)	137.09	135.95
Wt. of Water (gm.)	29.47	106.03
Wt. of DS (gm.)	104.09	339.59
Moisture Content (%)	**28.3**	**31.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	791.37	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	791.37	809.32
Length 1 (in.)	4.013	4.041
Length 2 (in.)	4.013	3.971
Length 3 (in.)	4.013	4.028
Top Diameter (in.)	2.861	2.877
Middle Diameter (in.)	2.861	2.855
Bottom Diameter (in.)	2.861	2.866
Average Length (in.)	4.01	4.01
Average Area (in.^{2})	6.43	6.45
Sample Volume (cm^3)	422.76	424.28
Unit Wet Wt. (gm./ cm^3)	1.872	1.908
Unit Wet Wt. (pcf)	116.8	119.1
Unit Dry Wt. (pcf)	91.1	90.7
Unit Dry Wt. (gm./ cm^3)	1.459	1.454
Void Ratio, e	0.851	0.857
Porosity, n	0.460	0.462
Pore Volume (cm^3)	194.3	195.8
Total Wt. Of Sample After Test		808.21

Tested By: TMS Date: 7/21/2009 Checked By: GDM Date: 7-31-09

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID No.	2009-666-02-05		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.19
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.62
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 2.6E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.6E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
7/21/2009	13	19.80	0	9.5	10.0	0	23.5	NA
7/21/2009	13	20.10	0	9.4	9.9	0	23.5	3.9E-07
7/21/2009	13	20.40	1	9.3	9.7	0	23.5	3.9E-07
7/21/2009	13	20.70	1	9.2	9.6	0	23.5	4.0E-07
7/21/2009	13	21.00	1	9.1	9.5	0	23.5	4.0E-07
7/21/2009	13	21.30	2	9.0	9.4	0	23.5	4.1E-07
7/21/2009	13	21.60	2	8.9	9.2	0	23.5	4.2E-07
7/21/2009	13	22.10	2	8.8	9.1	0	23.5	2.5E-07
7/21/2009	13	22.60	3	8.7	9.0	0	23.5	2.6E-07
7/21/2009	13	23.10	3	8.6	8.8	0	23.5	2.6E-07
7/21/2009	13	23.60	4	8.5	8.7	1	23.5	2.6E-07

Tested By: TMS Date: 7/21/2009 Checked By: GEM Date: 7-31-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

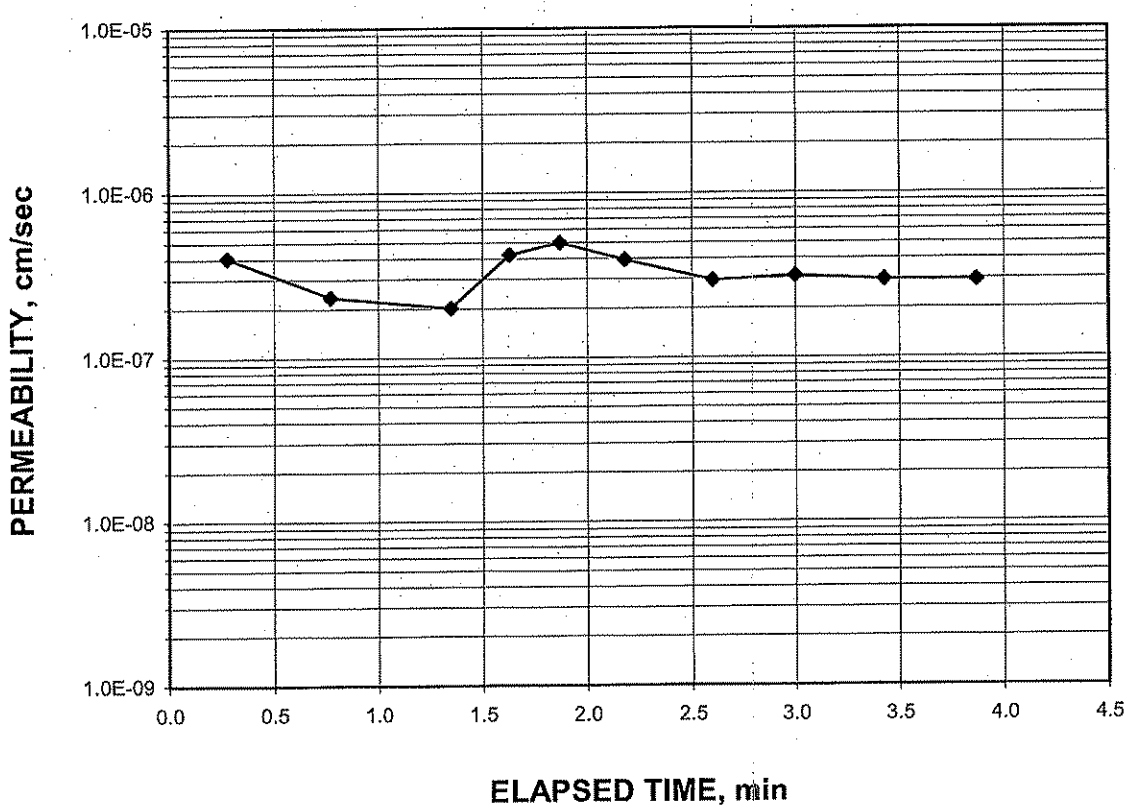
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID No.	2009-666-02-05		

Visual Description: RED SILT

AVERAGE PERMEABILITY = 3.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.0E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 6/24/08 REVISION: 0 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID No.	2009-666-02-05		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: RED SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	810	814
Wt. of Tare & WS (gm.)	309.56	540.97
Wt. of Tare & DS (gm.)	270.23	438.93
Wt. of Tare (gm.)	136.18	112.11
Wt. of Water (gm.)	39.33	102.04
Wt. of DS (gm.)	134.05	326.82
Moisture Content (%)	**29.3**	**31.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	802.15	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	802.15	813.82
Length 1 (in.)	4.013	4.046
Length 2 (in.)	4.013	4.003
Length 3 (in.)	4.013	3.980
Top Diameter (in.)	2.861	2.878
Middle Diameter (in.)	2.861	2.869
Bottom Diameter (in.)	2.861	2.863
Average Length (in.)	4.01	4.01
Average Area (in.^{2})	6.43	6.47
Sample Volume (cm^3)	422.76	425.07
Unit Wet Wt. (gm./ cm^3)	1.897	1.915
Unit Wet Wt. (pcf)	118.4	119.5
Unit Dry Wt. (pcf)	91.6	91.1
Unit Dry Wt. (gm./ cm^3)	1.467	1.459
Void Ratio, e	0.841	0.851
Porosity, n	0.457	0.460
Pore Volume (cm^3)	193.1	195.4
Total Wt. Of Sample After Test		816.87

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL5
Lab ID No.	2009-666-02-05		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.18
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.74
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 3.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	11	45.40	0	9.5	9.9	0	24.9	NA
8/4/2009	11	45.68	0	9.4	9.8	0	24.9	4.0E-07
8/4/2009	11	46.17	1	9.3	9.7	0	24.9	2.3E-07
8/4/2009	11	46.75	1	9.2	9.6	0	24.9	2.0E-07
8/4/2009	11	47.03	2	9.1	9.4	0	24.9	4.2E-07
8/4/2009	11	47.27	2	9.0	9.3	0	24.9	5.0E-07
8/4/2009	11	47.58	2	8.9	9.2	0	24.9	3.9E-07
8/4/2009	11	48.00	3	8.8	9.0	0	24.9	2.9E-07
8/4/2009	11	48.40	3	8.7	8.9	0	24.9	3.1E-07
8/4/2009	11	48.83	3	8.6	8.8	0	24.9	2.9E-07
8/4/2009	11	49.27	4	8.5	8.7	1	24.9	2.9E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 12-21-08 [illegible]\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

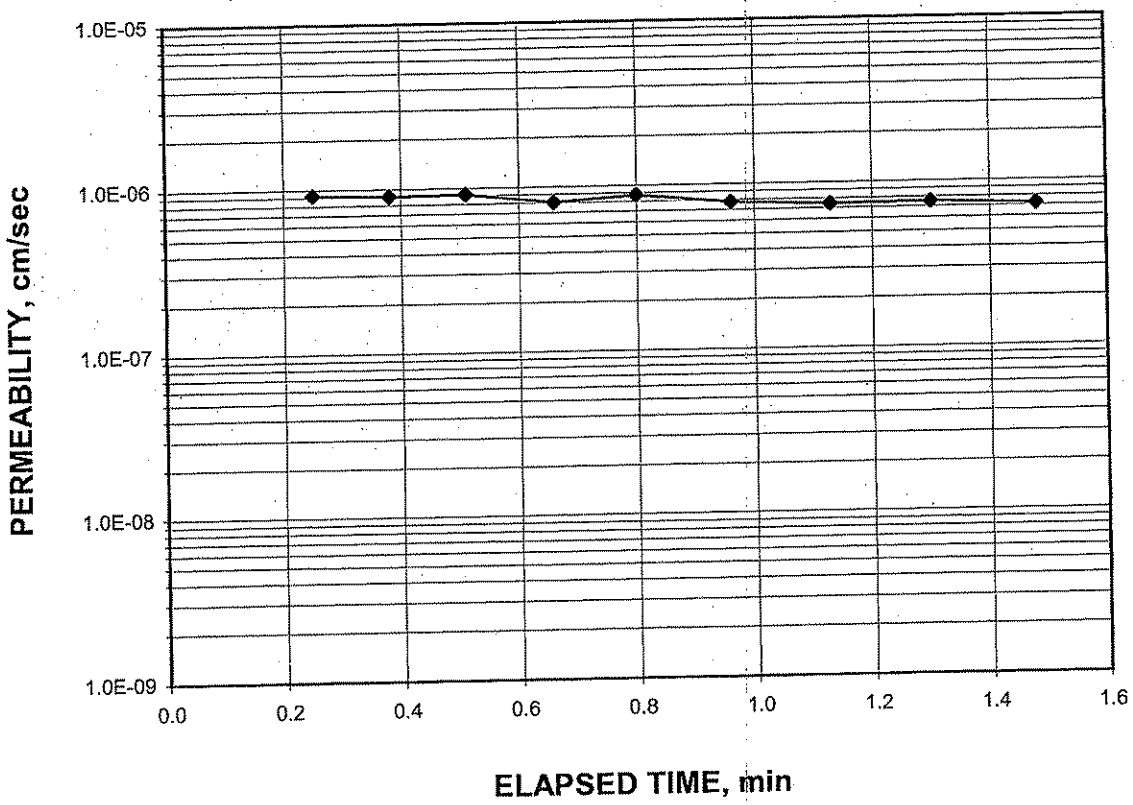
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID No.	2009-666-02-06		

Visual Description: PINK SILT

AVERAGE PERMEABILITY = 7.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 7.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID No.	2009-666-02-06		

Specific Gravity 2.70 Assumed
Sample Condition Remolded

Visual Description: PINK SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	826	801
Wt. of Tare & WS (gm.)	324.42	630.95
Wt. of Tare & DS (gm.)	286.20	514.9
Wt. of Tare (gm.)	137.11	106.83
Wt. of Water (gm.)	38.22	116.05
Wt. of DS (gm.)	149.09	408.07
Moisture Content (%)	**25.6**	**28.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	815.75	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	815.75	833.95
Length 1 (in.)	4.013	4.075
Length 2 (in.)	4.013	4.061
Length 3 (in.)	4.013	4.042
Top Diameter (in.)	2.861	2.888
Middle Diameter (in.)	2.861	2.876
Bottom Diameter (in.)	2.861	2.864
Average Length (in.)	4.01	4.06
Average Area (in.^{2})	6.43	6.50
Sample Volume (cm^3)	422.76	432.14
Unit Wet Wt. (gm./ cm^3)	1.930	1.930
Unit Wet Wt. (pcf)	120.4	120.5
Unit Dry Wt. (pcf)	95.9	93.8
Unit Dry Wt. (gm./ cm^3)	1.536	1.503
Void Ratio, e	0.758	0.797
Porosity, n	0.431	0.444
Pore Volume (cm^3)	182.3	191.7
Total Wt. Of Sample After Test		837.08

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-02	Sample No.	CCL6
Lab ID No.	2009-666-02-06		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	65.0	Sample Length (cm), L	10.31
Back Pressure(psi)	40.0	Sample Area (cm^2), A	41.91
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 7.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 7.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/4/2009	12	5.17	0	9.5	9.8	0	24.9	NA
8/4/2009	12	5.42	0	9.3	9.6	0	24.9	9.2E-07
8/4/2009	12	5.55	0	9.2	9.4	0	24.9	9.0E-07
8/4/2009	12	5.68	1	9.1	9.3	0	24.9	9.1E-07
8/4/2009	12	5.83	1	9.0	9.2	0	24.9	8.0E-07
8/4/2009	12	5.97	1	8.9	9.1	0	24.9	8.7E-07
8/4/2009	12	6.13	1	8.8	8.9	0	24.9	7.7E-07
8/4/2009	12	6.30	1	8.7	8.8	0	24.9	7.4E-07
8/4/2009	12	6.47	1	8.6	8.7	0	24.9	7.5E-07
8/4/2009	12	6.65	1	8.5	8.5	1	24.9	7.2E-07

Tested By: TMS Date: 8/4/2009 Checked By: JRB Date: 8/5/09

DCN: CT-22C DATE: 12-21-08 [illegible]\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-02-05 PERMOM 97% DENS..xls]Sheet1

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INTEGRITY IN TESTING

August 14, 2009

Project No. 2009-666-04

Mr. Hannu Kemppinen
Joyce Engineering, Inc.
2211 W. Meadowview Road
Greensboro, NC 27407

Transmittal
Laboratory Test Results
White Oak MSW Landfill Phase III

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was faxed to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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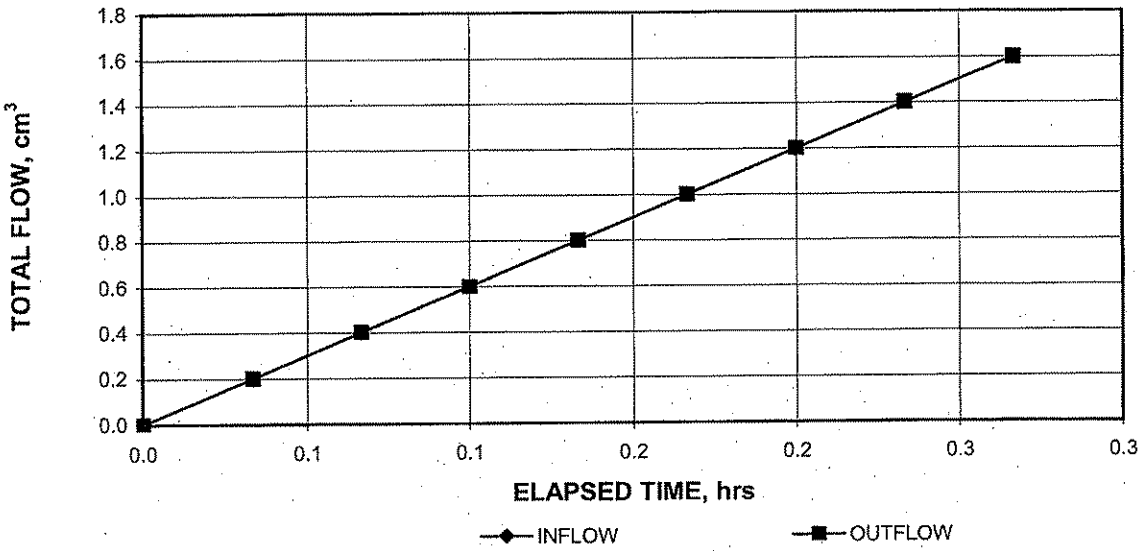
INTEGRITY IN TESTING

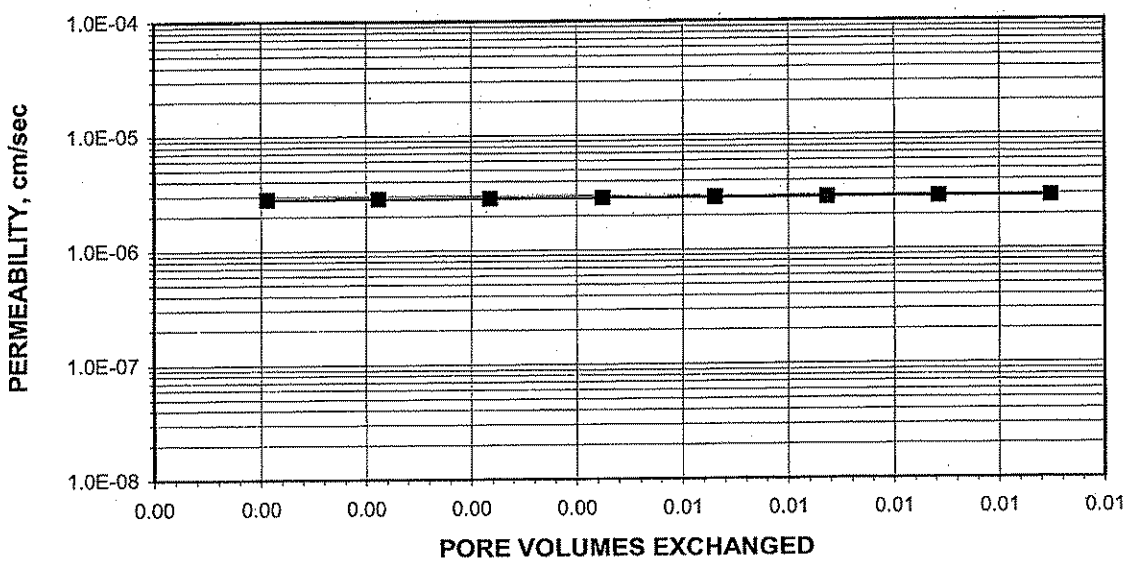
Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID No.	2009-666-04-01		

AVERAGE PERMEABILITY = 2.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.9E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 8/13/2009 Checked By: GEM Date: 8-14-09

DCN: CT-22 DATE: 01-08-08 REV: 5 [I:\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-04-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID No.	2009-666-04-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Remolded

Visual Description: RED/BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	803	814
Wt. of Tare & WS (gm.)	304.53	570.97
Wt. of Tare & DS (gm.)	265.24	474.69
Wt. of Tare (gm.)	103.79	111.96
Wt. of Water (gm.)	39.29	96.28
Wt. of DS (gm.)	161.45	362.73
Moisture Content (%)	**24.3**	**26.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	831.16	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	831.16	845.92
Length 1 (in.)	4.007	4.120
Length 2 (in.)	4.007	4.130
Length 3 (in.)	4.007	4.090
Top Diameter (in.)	2.871	2.870
Middle Diameter (in.)	2.871	2.867
Bottom Diameter (in.)	2.871	2.872
Average Length (in.)	4.01	4.11
Average Area (in.^{2})	6.47	6.47
Sample Volume (cm^3)	425.09	435.96
Unit Wet Wt. (gm./ cm^3)	1.96	1.94
Unit Wet Wt. (pcf)	122.1	121.1
Unit Dry Wt. (pcf)	98.2	95.7
Unit Dry Wt. (gm./ cm^3)	1.57	1.53
Void Ratio, e	0.72	0.76
Porosity, n	0.42	0.43
Pore Volume (cm^3)	177.5	188.4
Total Wgt. Of Sample After Test		850.5

Tested By: TMS Date: 8/13/2009 Checked By: GEM Date: 8-14-09

DCN: CT-22 DATE: 01-08-99 REVISED: 2 \\Server\Data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-04-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL7
Lab ID No.	2009-666-04-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.5	Sample Length (cm), L	10.45
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.29
Cell (psi)	75.0	Sample Area (cm^2), A	41.73
Total Pressure Head (cm)	105.5	Inflow Burette Area (cm^2), a-in	0.877
Hydraulic Gradient	10.09	Outflow Burette Area (cm^2), a-out	0.886
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.9E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	(min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/13/2009	12	38	0.0	0.0	0.0	130.1	0	25.0	NA
8/13/2009	12	40	0.0	0.2	0.2	129.7	0	25.0	2.8E-06
8/13/2009	12	42	0.1	0.4	0.4	129.2	0	25.0	2.8E-06
8/13/2009	12	44	0.1	0.6	0.6	128.8	0	25.0	2.8E-06
8/13/2009	12	46	0.1	0.8	0.8	128.3	0	25.0	2.9E-06
8/13/2009	12	48	0.2	1.0	1.0	127.9	0	25.0	2.9E-06
8/13/2009	12	50	0.2	1.2	1.2	127.4	0	25.0	2.9E-06
8/13/2009	12	52	0.2	1.4	1.4	127.0	0	25.0	2.9E-06
8/13/2009	12	54	0.3	1.6	1.6	126.5	1	25.0	2.9E-06

Tested By: TMS Date: 8/13/2009 Checked By: GJM Date: 8-14-09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

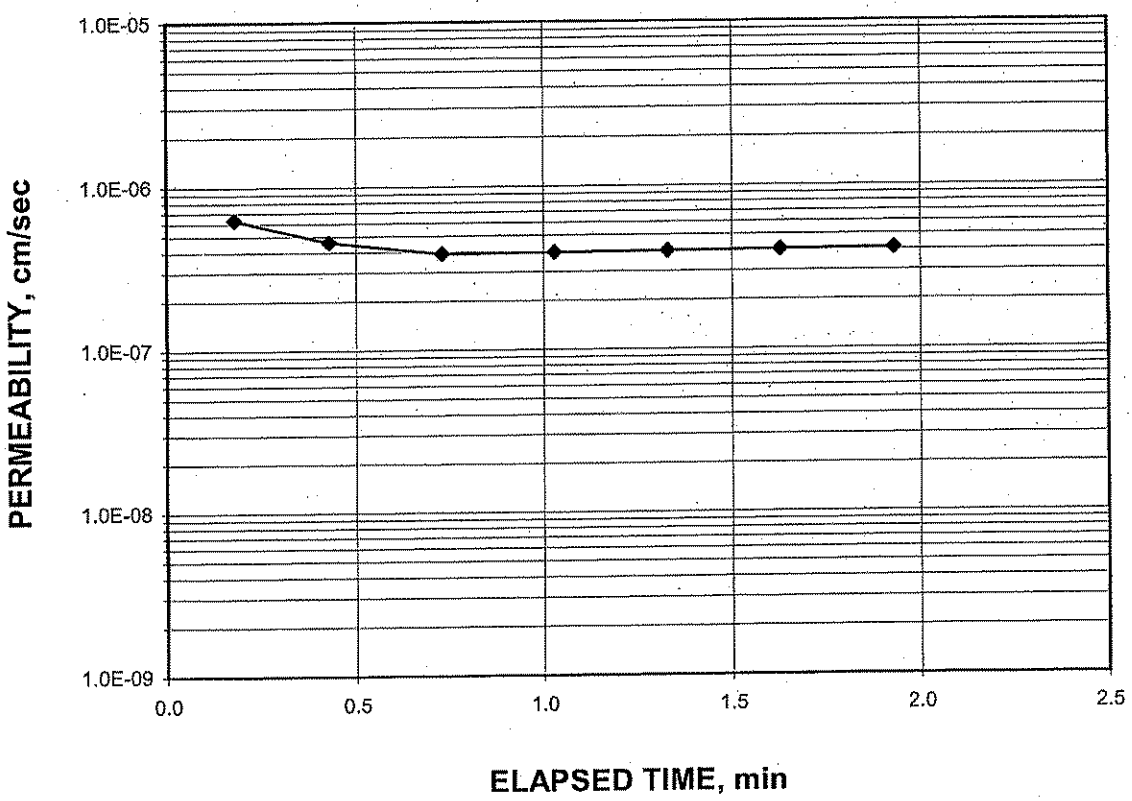
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Visual Description: RED/BROWN SILT

AVERAGE PERMEABILITY = 4.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.0E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/13/2009 Checked By: GM Date: 8-14-09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Specific Gravity 2.70 Assumed
Sample Condition Remolded

Visual Description: RED/BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	805	811
Wt. of Tare & WS (gm.)	403.00	408.51
Wt. of Tare & DS (gm.)	332.60	329.7
Wt. of Tare (gm.)	106.27	106.14
Wt. of Water (gm.)	70.40	78.81
Wt. of DS (gm.)	226.33	223.56
Moisture Content (%)	**31.1**	**35.3**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	780.34	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	780.34	805.02
Length 1 (in.)	4.007	4.122
Length 2 (in.)	4.007	4.052
Length 3 (in.)	4.007	4.099
Top Diameter (in.)	2.871	2.891
Middle Diameter (in.)	2.871	2.893
Bottom Diameter (in.)	2.871	2.875
Average Length (in.)	4.01	4.09
Average Area (in.^{2})	6.47	6.54
Sample Volume (cm^3)	425.09	438.65
Unit Wet Wt. (gm./ cm^3)	1.836	1.835
Unit Wet Wt. (pcf)	114.6	114.6
Unit Dry Wt. (pcf)	87.4	84.7
Unit Dry Wt. (gm./ cm^3)	1.400	1.357
Void Ratio, e	0.928	0.990
Porosity, n	0.481	0.497
Pore Volume (cm^3)	204.6	218.2
Total Wt. Of Sample After Test		804.62

Tested By: TMS Date: 8/13/2009 Checked By: Gam Date: 8-14-09

DCN: CT-22C DATE:12-21\[illegible]\Active\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-04-02 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Test Pressures	
Cell Pressure(psi)	75.0
Back Pressure(psi)	50.0
Eff. Cons. Pressure(psi)	25.0
Response (%)	100

Final Sample Dimensions	
Sample Length (cm), L	10.39
Sample Area (cm^2), A	42.21
Pipette Area (cm^2), a_p	0.03142
Annulus Area (cm^2), a_a	0.76712
Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 4.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/13/2009	11	54.47	0	9.5	9.8	0	25.0	NA
8/13/2009	11	54.65	0	9.4	9.7	0	25.0	6.3E-07
8/13/2009	11	54.90	0	9.3	9.6	0	25.0	4.6E-07
8/13/2009	11	55.20	1	9.2	9.4	0	25.0	3.9E-07
8/13/2009	11	55.50	1	9.1	9.3	0	25.0	3.9E-07
8/13/2009	11	55.80	1	9.0	9.2	0	25.0	4.0E-07
8/13/2009	11	56.10	2	8.9	9.0	0	25.0	4.0E-07
8/13/2009	11	56.40	2	8.8	8.9	1	25.0	4.1E-07

Tested By: TMS Date: 8/13/2009 Checked By: GEM Date: 8/14/09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

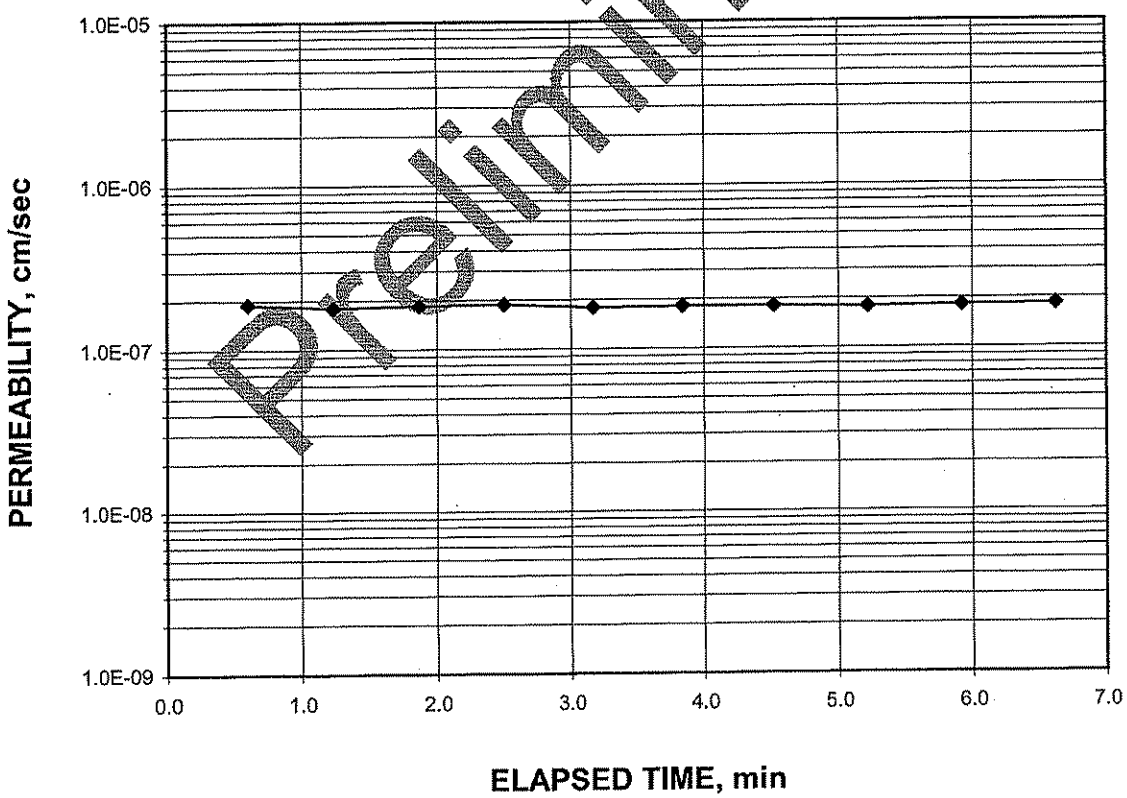
Client	JOYCE ENIGNEERING, INC.	Boring No.	4 LAYERS
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Visual Description: RED BROWN ELASTIC SILT WITH SAND - 4 LAYERS

AVERAGE PERMEABILITY = 1.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-09 m/sec @ 20°C

Preliminary

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/27/2009 Checked By: MM Date: 8-28-09

DCN: CT-22C DATE: 2009-PROJECT: 2009-666 JOYCE WHITE OAK\[2009-666-04-02 PERMOM 4 LAYER SCARIFICATION.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENIGNEERING, INC.	Boring No.	4 LAYERS
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Test Pressures

Cell Pressure(psi)	75.0
Back Pressure(psi)	50.0
Eff. Cons. Pressure(psi)	25.0
Response (%)	100

Final Sample Dimensions

Sample Length (cm), L	10.18
Sample Area (cm^2), A	41.77
Pipette Area (cm^2), a_p	0.03142
Annulus Area (cm^2), a_a	0.76712
Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 1.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/27/2009	13	9.73	0	9.5	9.9	0	24.8	NA
8/27/2009	13	10.33	1	9.4	9.8	0	24.8	1.9E-07
8/27/2009	13	10.97	1	9.3	9.7	0	24.8	1.8E-07
8/27/2009	13	11.60	2	9.2	9.6	0	24.8	1.8E-07
8/27/2009	13	12.23	2	9.1	9.4	0	24.8	1.9E-07
8/27/2009	13	12.90	3	9.0	9.3	0	24.8	1.8E-07
8/27/2009	13	13.57	4	8.9	9.2	0	24.8	1.8E-07
8/27/2009	13	14.25	5	8.8	9.0	0	24.8	1.8E-07
8/27/2009	13	14.95	5	8.7	8.9	0	24.8	1.8E-07
8/27/2009	13	15.65	6	8.6	8.8	0	24.8	1.8E-07
8/27/2009	13	16.35	7	8.5	8.7	1	24.8	1.8E-07

Preliminary

Tested By: TMS Date: 8/27/2009 TMS Checked By: TMS Date: 8-28-09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENIGNEERING, INC.	Boring No.	4 LAYERS
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: RED BROWN ELASTIC SILT WITH SAND - 4 LAYERS

Preliminary

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	818	818
Wt. of Tare & WS (gm.)	287.29	287.29
Wt. of Tare & DS (gm.)	251.20	251.2
Wt. of Tare (gm.)	137.42	137.42
Wt. of Water (gm.)	36.09	36.09
Wt. of DS (gm.)	113.78	113.78
Moisture Content (%)	**31.7**	**31.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	780.23	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	780.23	780.23
Length 1 (in.)	4.007	4.007
Length 2 (in.)	4.007	4.007
Length 3 (in.)	4.007	4.007
Top Diameter (in.)	2.871	2.871
Middle Diameter (in.)	2.871	2.871
Bottom Diameter (in.)	2.871	2.871
Average Length (in.)	4.01	4.01
Average Area (in.^{2})	6.47	6.47
Sample Volume (cm^3)	425.09	425.09
Unit Wet Wt. (gm./ cm^3)	1.835	1.835
Unit Wet Wt. (pcf)	114.6	114.6
Unit Dry Wt. (pcf)	87.0	87.0
Unit Dry Wt. (gm./ cm^3)	1.393	1.393
Void Ratio, e	0.938	0.938
Porosity, n	0.484	0.484
Pore Volume (cm^3)	205.7	205.7
Total Wt. Of Sample After Test		867.70

Tested By: TMS Date: 8/27/2009 Checked By: MMS Date: 8-28-09

DCN: CT-22C DATE: 02/12/09 PROJECTS\2009\666 JOYCE WHITE OAK\[2009-666-04-02 PERMOM 4 LAYER SCARIFICATION.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

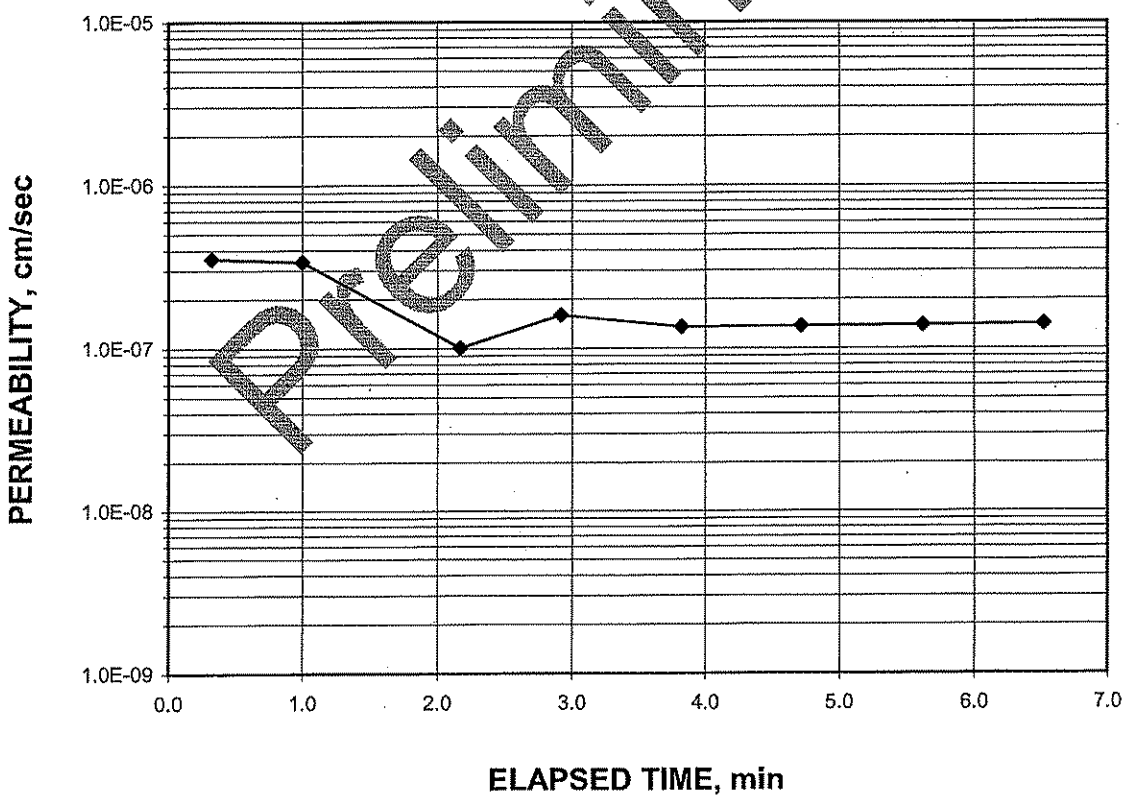
Client	JOYCE ENIGNEERING, INC.	Boring No.	NOT SCARIFIED
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Visual Description: RED BROWN ELASTIC SILT WITH SAND - NO SCARIFICATION

AVERAGE PERMEABILITY = 1.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-09 m/sec @ 20°C

Preliminary

PERMEABILITY vs. TIME



Tested By: TMS Date: 8/27/2009 Checked By: MMS Date: 8-28-09

DCN: CT-22C DATE: 8/12/2008 REV: 0 [G:\2009-666 JOYCE WHITE OAK\[2009-666-04-02 PERMOM NO SCARIFICATION.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENIGNEERING, INC.	Boring No.	NOT SCARIFIED
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: RED BROWN ELASTIC SILT WITH SAND - NO SCARIFICATION

Preliminary

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	818	818
Wt. of Tare & WS (gm.)	287.29	287.29
Wt. of Tare & DS (gm.)	251.20	251.2
Wt. of Tare (gm.)	137.42	137.42
Wt. of Water (gm.)	36.09	36.09
Wt. of DS (gm.)	113.78	113.78
Moisture Content (%)	**31.7**	**31.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	783.64	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	783.64	783.64
Length 1 (in.)	4.007	4.007
Length 2 (in.)	4.007	4.007
Length 3 (in.)	4.007	4.007
Top Diameter (in.)	2.871	2.871
Middle Diameter (in.)	2.871	2.871
Bottom Diameter (in.)	2.871	2.871
Average Length (in.)	4.01	4.01
Average Area (in.^{2})	6.47	6.47
Sample Volume (cm^3)	425.09	425.09
Unit Wet Wt. (gm./ cm^3)	1.843	1.843
Unit Wet Wt. (pcf)	115.1	115.1
Unit Dry Wt. (pcf)	87.4	87.4
Unit Dry Wt. (gm./ cm^3)	1.400	1.400
Void Ratio, e	0.929	0.929
Porosity, n	0.482	0.482
Pore Volume (cm^3)	204.7	204.7
Total Wt. Of Sample After Test		867.70

Tested By: TMS Date: 8/27/2009 Checked By: MMM Date: 8-28-09

DCN: CT-22C DATE: 4/2/2009 FILENAME: 2009-666 JOYCE WHITE OAK\[2009-666-04-02 PERMOM NO SCARIFICATION.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENIGNEERING, INC.	Boring No.	NOT SCARIFIED
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Test Pressures

Cell Pressure(psi)	75.0
Back Pressure(psi)	50.0
Eff. Cons. Pressure(psi)	25.0
Response (%)	98

Final Sample Dimensions

Sample Length (cm), L	10.18
Sample Area (cm^2), A	41.77
Pipette Area (cm^2), a_p	0.03142
Annulus Area (cm^2), a_a	0.76712
Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 1.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
8/27/2009	13	21.28	0	9.5	9.9	0	24.8	NA
8/27/2009	13	21.60	0	9.4	9.8	0	24.8	3.5E-07
8/27/2009	13	22.28	1	9.2	9.6	0	24.8	3.4E-07
8/27/2009	13	23.45	2	9.1	9.4	0	24.8	1.0E-07
8/27/2009	13	24.20	3	9.0	9.3	0	24.8	1.6E-07
8/27/2009	13	25.10	4	8.9	9.2	0	24.8	1.3E-07
8/27/2009	13	26.00	5	8.8	9.0	0	24.8	1.4E-07
8/27/2009	13	26.90	6	8.7	8.9	0	24.8	1.4E-07
8/27/2009	13	27.80	7	8.6	8.8	1	24.8	1.4E-07

Preliminary

Tested By: TMS Date: 8/27/2009 Checked By: Date: 8-28-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

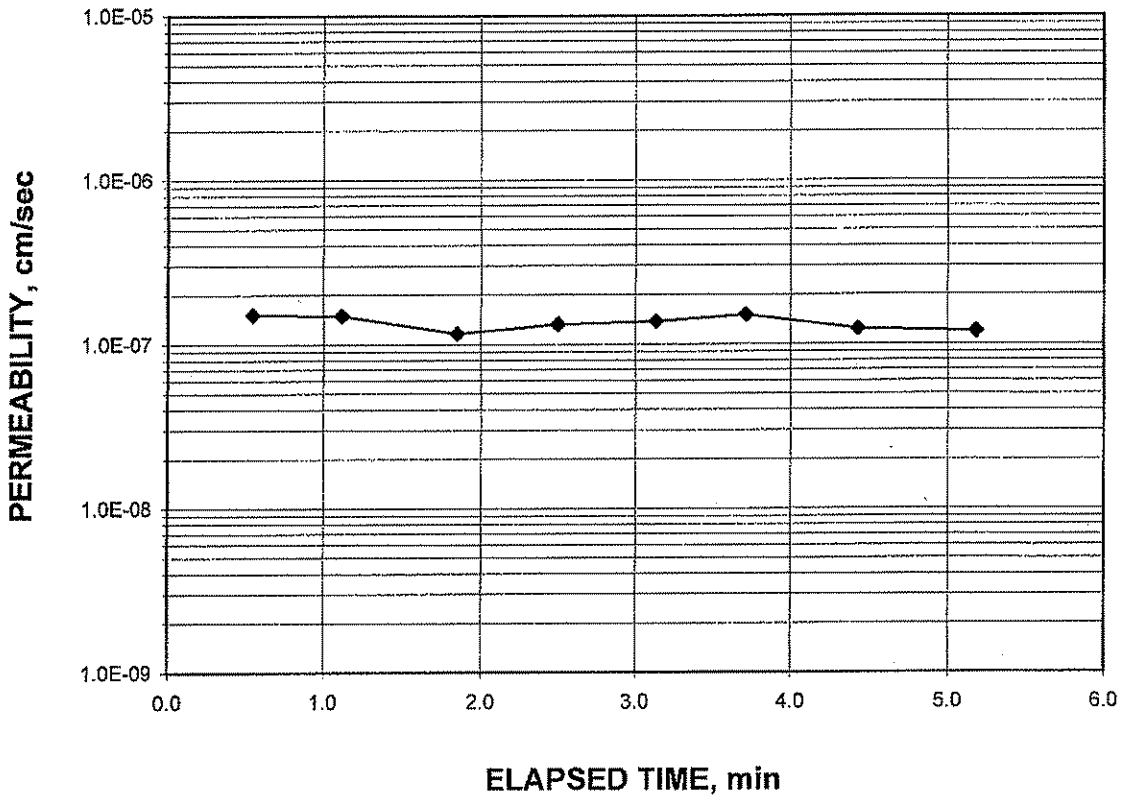
ASTM D 5084-97
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Visual Description: REDDISH BROWN ELASTIC SILT WITH SAND AND MICA

AVERAGE PERMEABILITY = 1.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.3E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: JCM Date: 9/1/2009 Checked By: KB Date: 9-3-09

DCN: CT-22C DATE:12-21-98 REVISION: 4
C:\MSOFFICE\Excel\Perms\September2009\[666P1.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-97
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Specific Gravity	2.70	Assumed
Sample Condition		Remolded

Visual Description: REDDISH BROWN ELASTIC SILT WITH SAND AND MICA

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	729	1128
Wt. of Tare & WS (gm.)	173.22	173.56
Wt. of Tare & DS (gm.)	153.09	150.7
Wt. of Tare (gm.)	86.51	83.97
Wt. of Water (gm.)	20.13	22.86
Wt. of DS (gm.)	66.58	66.73
Moisture Content (%)	**30.2**	**34.3**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	2114.88	NA
Wt. of Tube (gm.)	1344.00	NA
Wt. of WS (calc.) (gm.)	770.88	794.69
Length 1 (in.)	3.989	4.045
Length 2 (in.)	3.989	4.038
Length 3 (in.)	3.989	4.038
Top Diameter (in.)	2.870	2.992
Middle Diameter (in.)	2.870	2.996
Bottom Diameter (in.)	2.870	2.993
Average Length (in.)	3.99	4.04
Average Area (in.^{2})	6.47	7.04
Sample Volume (cm^3)	422.93	466.03
Unit Wet Wt. (gm./ cm^3)	1.823	1.705
Unit Wet Wt. (pcf)	113.8	106.4
Unit Dry Wt. (pcf)	87.4	79.3
Unit Dry Wt. (gm./ cm^3)	1.400	1.270
Void Ratio, e	0.929	1.126
Porosity, n	0.482	0.530
Pore Volume (cm^3)	203.7	246.8
Total Wgt. Of Sample After Test		801.5

Tested By: JCM Date: 9/1/2009 Checked By: KB Date: 9-3-09

DCN: CT-22C DATE:12-21-98 REVISION: 4 C:\MSOFFICE\Excel\Perms\September2009\[666P1.xls]Sheet1
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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-97
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-04	Sample No.	CCL8
Lab ID No.	2009-666-04-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	85.0	Sample Length (cm), L	10.26
Back Pressure(psi)	60.0	Sample Area (cm^2), A	45.41
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	96	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.1

AVERAGE PERMEABILITY = 1.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.3E-09 m/sec @ 20°C

DATE	TIME		ELAPSED TIME t	PIPETTE READI NG R_p	INCREMENT GRADIENT i	FLOW CONDITION (0 flow)	TEMP.	INCREMENTAL PERMEABILITY @ 20°C
(mm/dd/yy)	(hr)	(min)	(min)	(cm)	(cm/cm)	(1 stop)	(°C)	(cm/sec)
9/1/2009	11	37.3	0.00	11.5	13.2	0	22.0	NA
9/1/2009	11	37.9	0.55	11.4	13.1	0	22.0	1.5E-07
9/1/2009	11	38.4	1.12	11.3	13.0	0	22.0	1.5E-07
9/1/2009	11	39.2	1.85	11.2	12.9	0	22.0	1.2E-07
9/1/2009	11	39.8	2.50	11.1	12.7	0	22.0	1.3E-07
9/1/2009	11	40.4	3.13	11.0	12.6	0	22.0	1.4E-07
9/1/2009	11	41.0	3.72	10.9	12.5	0	22.0	1.5E-07
9/1/2009	11	41.7	4.43	10.8	12.3	0	22.0	1.2E-07
9/1/2009	11	42.5	5.18	10.7	12.2	1	22.0	1.2E-07

Tested By: JCM Date: 9/1/2009 Checked By: KR Date: 9-3-09

DCN: CT-22C DATE:12-21-98 REVISION: 4 C:\MSOFFICE\Excel\Perms\September2009\[666P1.xls]Sheet1

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INTEGRITY IN TESTING

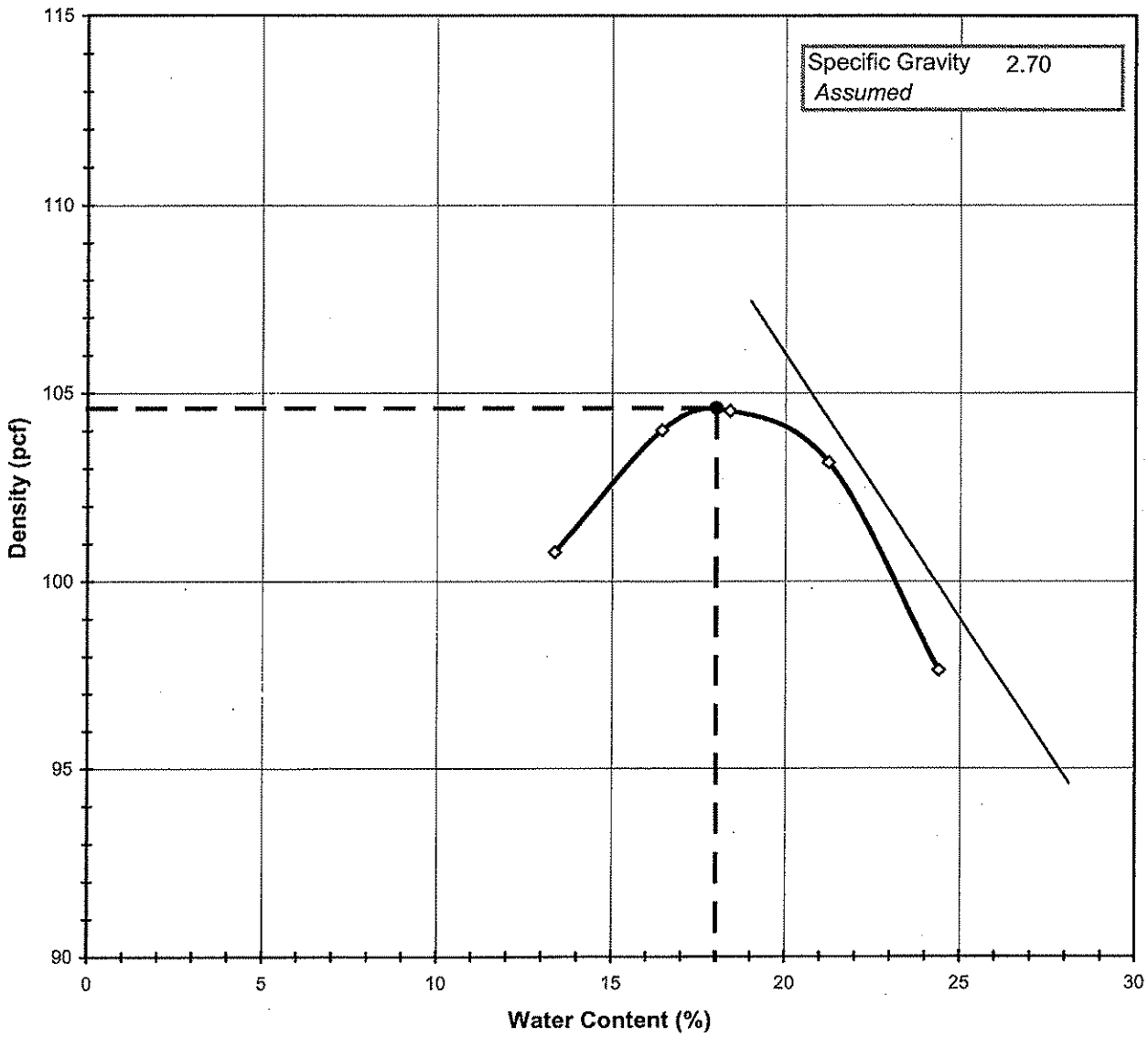
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-05	Sample No.	CCL9
Lab ID	2009-666-05-01	Test Method	**STANDARD**

Visual Description BROWN SILT

Optimum Water Content **18.0**
Maximum Dry Density **104.6**



Tested By *SD* *Date* *9/7/2009* *Checked By* GEM *Date* 9-9-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-01 Proctor.XLS]Sheet1*

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INTEGRITY IN TESTING

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-05	Sample No.	CCL9
Lab ID	2009-666-05-01		

Visual Description BROWN SILT

Total Weight of the Sample (gm)	21089
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4315
Volume of the Mold(cc)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6040	6143	6183	6203	6148
Wt.of Mold (gm)	4315	4315	4315	4315	4315
Wt. of WS	1725	1828	1868	1888	1833
Mold Volume (cc)	942	942	942	942	942

Moisture Content / Density

Tare Number	301	306	303	305	317
Wt. of Tare & WS (gm)	537.40	521.70	516.40	491.50	494.10
Wt. of Tare & DS (gm)	483.92	460.53	453.40	420.18	413.68
Wt. of Tare (gm)	84.10	88.30	110.90	84.40	84.10
Wt. of Water (gm)	53.48	61.17	63.00	71.32	80.42
Wt. of DS (gm)	399.82	372.23	342.50	335.78	329.58

Wet Density (gm/cc)	1.83	1.94	1.98	2.00	1.95
Wet Density (pcf)	114.3	121.1	123.8	125.1	121.4
Moisture Content (%)	**13.4**	**16.4**	**18.4**	**21.2**	**24.4**
Dry Density (pcf)	**100.8**	**104.0**	**104.5**	**103.2**	**97.6**

Zero Air Voids

Moisture Content (%)	19.0	22.7	28.1
Dry Unit Weight (pcf)	107.4	102.2	94.6

Tested By SD *Date* 9/4/2009 *Checked By* GM *Date* 9-9-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-01 Proctor.XLS]Sheet1*

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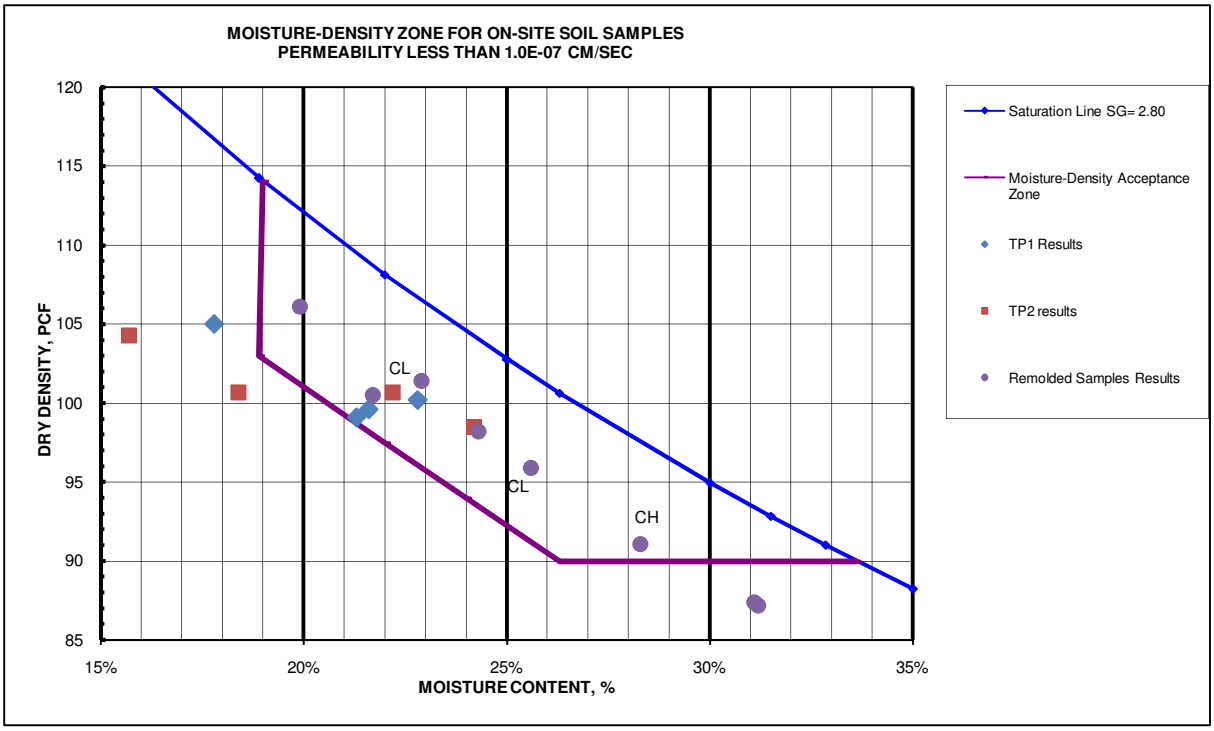
White Oak Landfill Phase 3 Expansion - Haywood County, NC
JEI Project 801.00, Task 01

SUMMARY OF PERMEABILITY TESTS FOR PHASE 3 SOIL LINER



				Standard Proctor		Remolded				Perm
Sample ID	Remold	Sample Description	USCS	OMC	MDD	MC	OMC-MC	DD	DD/MDD	(cm/sec)
CCL1	Remold	Red-brn elastic Silt	MH	27.5%	89.7	31.2%	3.7%	87.2	97.2%	3.4E-07
CCL2	Remold	Brown fat Clay	CH	18.5%	103.5	21.7%	3.2%	100.5	97.1%	6.3E-07
CCL3	Remold	Brown Silt	ML	19.0%	104.1	22.9%	3.9%	101.4	97.4%	5.0E-07
CCL4	Remold	Brown lean Clay	CL	16.0%	109.8	19.9%	3.9%	106.1	96.6%	3.8E-07
CCL5	Remold	Brown fat Clay	CH	26.0%	94.2	28.3%	2.3%	91.1	96.7%	2.6E-07
CCL6	Remold	Red-brn fat Clay	CH	22.0%	98.8	25.6%	3.6%	95.9	97.1%	7.4E-07
CCL7	Remold	Red-brn Silt	ML	21.3%	100.5	24.3%	3.0%	98.2	97.7%	2.9E-06
CCL8	Remold	Red-brn elastic Silt	MH	28.6%	89.5	31.1%	2.5%	87.4	97.7%	4.0E-07

TEST PAD Constructed on September 1, 2009

Lab ID	Test Pad	LIFT	ST	Standard Proctor		Undisturbed Shelby Tube				Perm
2009-666-05-02	TP-1	LIFT 1	ST1	16.0%	109.8	17.8%	1.8%	105.0	95.6%	2.30E-07
2009-666-05-04	TP-1	LIFT 2	ST3	21.3%	100.5	21.3%	0.0%	99.1	98.6%	4.40E-07
2009-666-05-06	TP-1	LIFT 3	ST5	21.3%	100.5	22.8%	1.5%	100.2	99.7%	3.00E-07
2009-666-05-08	TP-1	LIFT 4	ST7	21.3%	100.5	21.6%	0.3%	99.6	99.1%	3.10E-07
2009-666-05-03	TP-2	LIFT 1	ST2	18.5%	103.5	18.4%	-0.1%	100.7	97.3%	3.40E-07
2009-666-05-05	TP-2	LIFT 2	ST4	22.0%	98.8	24.2%	2.2%	98.5	99.7%	2.30E-07
2009-666-05-07	TP-2	LIFT 3	ST6	18.5%	103.5	22.2%	3.7%	100.7	97.3%	5.20E-07
2009-666-05-09	TP-2	LIFT 4	ST8	16.0%	109.8	15.7%	-0.3%	104.3	95.0%	6.30E-07

Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-01**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **09.01.09**	Reviewed By : [illegible]	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment :	CP 56 Caterpiller Sheepsfoot roller and CS563 Smoothdrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
CLTP01 1	Test Pad 01	Lift 1	6"	666-04-01	100.5	21.3	**123.2**	**26.9**	**97.1**	**96.6%**	**95.0%**	Test Pad 01 L1
CLTPO1 2	Test Pad 01	Lift 1	6"	666-04-01	100.5	21.3	**124.5**	**25.2**	**99.4**	**98.9%**	**95.0%**	ST 01 & DC 01
CLTPO1 3	Test Pad 01	Lift 2	6"	666-04-01	100.5	21.3	**124.8**	**26.3**	**98.8**	**98.3%**	**95.0%**	ST 03
CLTPO1 4	Test Pad 01	Lift 2	6"	666-04-01	100.5	21.3	**123.0**	**27.0**	**96.9**	**96.4%**	**95.0%**	Test Pad 01 L2
CLTPO1 5	Test Pad 01	Lift 3	6"	666-04-01	100.5	21.3	**122.8**	**26.7**	**96.9**	**96.4%**	**95.0%**	Test Pad 01 L3
CLTP01 6	Test Pad 01	Lift 3	6"	666-04-01	100.5	21.3	**120.4**	**23.0**	**97.9**	**97.4%**	**95.0%**	ST 05 & DC 03
CLTP01 7	Test Pad 01	Lift 4	6"	666-04-01	100.5	21.3	**124.5**	**21.9**	**102.1**	**101.6%**	**95.0%**	ST 07
CLTP01 8	Test Pad 01	Lift 4	6"	666-04-01	100.5	21.3	**124.4**	**24.6**	**99.8**	**99.3%**	**95.0%**	Test Pad 01 L4
CLTPO2 1	Test Pad 02	Lift 1	6"	666-04-01	100.5	21.3	**125.7**	**25.4**	**100.2**	**99.7%**	**95.0%**	ST 02 & DC 02
CLTPO2 2	Test Pad 02	Lift 1	6"	666-04-01	100.5	21.3	**122.7**	**26.5**	**97.0**	**96.5%**	**95.0%**	Test Pad 02 L1
CLTPO2 3	Test Pad 02	Lift 2	6"	666-04-01	100.5	21.3	**123.6**	**26.9**	**97.4**	**96.9%**	**95.0%**	Test Pad 02 L2
CLTPO2 4	Test Pad 02	Lift 2	6"	666-04-01	100.5	21.3	**124.9**	**26.9**	**98.4**	**97.9%**	**95.0%**	ST 04
CLTPO2 5	Test Pad 02	Lift 3	6"	666-04-01	100.5	21.3	**124.2**	**23.5**	**100.6**	**100.1%**	**95.0%**	ST 06 & DC 04
CLTPO2 6	Test Pad 02	Lift 3	6"	666-04-01	100.5	21.3	**121.8**	**25.3**	**97.2**	**96.7%**	**95.0%**	Test Pad 02 L3
CLTPO2 7	Test Pad 02	Lift 4	6"	666-04-01	100.5	21.3	**121.7**	**25.3**	**97.1**	**96.6%**	**95.0%**	Test Pad 02 L4
CLTPO2 8	Test Pad 02	Lift 4	6"	666-04-01	100.5	21.3	**122.4**	**24.5**	**98.3**	**97.8%**	**95.0%**	ST 08

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Report Number : **CCL-01**
Date (s) : 09.01.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-01	DC-02	DC-03	DC-04
Nuclear Test Number :	CLTP01	CLTP02	CLTP01	CLTP02
Location:	Test Pad 01	Test Pad 02	Test Pad 01	Test Pad 02
Depth (ft):	Lift 1	Lift 1	Lift 3	Lift 3
Date :	09.01.09	09.01.09	09.01.09	09.01.09
Mold				
Cylinder ID	1	1	1	1
Weight of Cylinder (lbs.)	1.33	1.33	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.47	5.49	5.33	5.45
Wt. of Cylinder (lbs.)	1.33	1.33	1.33	1.33
Wt. of WS	4.14	4.16	4.00	4.12
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	JB10	JB-04	JB-06	JB-07
Wt. of Tare & WS (gm)	285.94	257.70	273.68	272.17
Wt. of Tare & DS (gm)	230.41	207.84	224.27	224.14
Wt. of Tare (gm)	6.80	6.80	6.80	6.80
Wt. of Water (gm)	55.53	49.86	49.41	48.03
Wt. of DS (gm)	223.61	201.04	217.47	217.34
Wet Density (pcf):	125.5	126.0	121.2	124.8
Moisture Content (%):	**24.8**	**24.8**	**22.7**	**22.1**
Dry Density (pcf):	**100.5**	**101.0**	**98.8**	**102.2**

Geotechnics Representative : Al Lambeth

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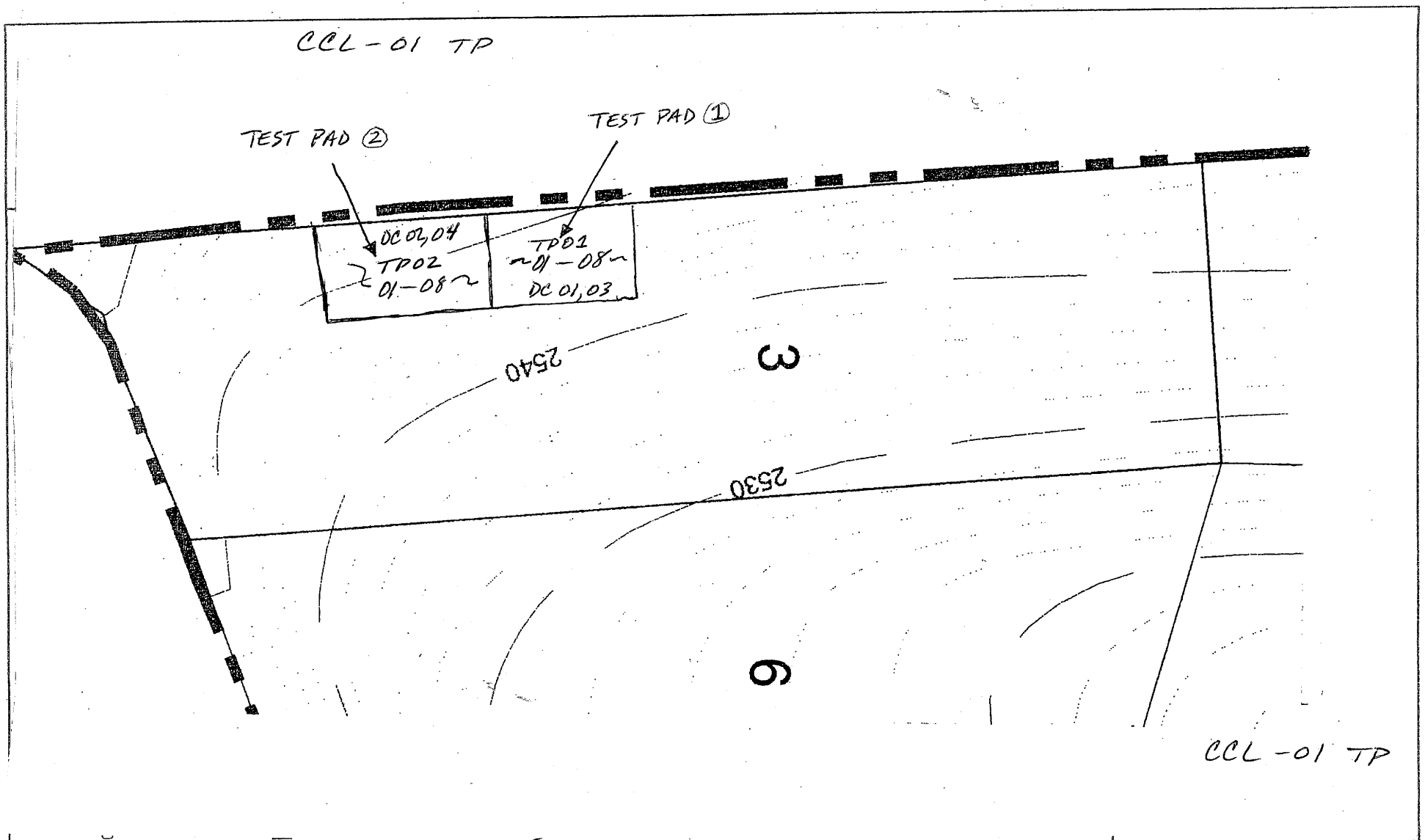

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-02**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **09.11,09.14,09.15.09**	Reviewed By : [illegible]	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 1	ACRE 1	1	6"	666-05-01	104.6	18.0	**123.2**	**23.8**	**99.5**	**95.1%**	**95.0%**	
NDCL 2	ACRE 1	1	6"	666-05-01	104.6	18.0	**128.5**	**25.6**	**102.3**	**97.8%**	**95.0%**	
NDCL 3	ACRE 1	1	6"	666-05-01	104.6	18.0	**122.0**	**20.0**	**101.7**	**97.2%**	**95.0%**	
NDCL 4	ACRE 1	1	6"	666-05-01	104.6	18.0	**127.4**	**23.6**	**103.1**	**98.5%**	**95.0%**	DC-05 & ST-09
NDCL 5	ACRE 1	1	6"	666-05-01	104.6	18.0	**127.7**	**27.2**	**100.4**	**96.0%**	**95.0%**	
NDCL 6	ACRE 1	1	6"	666-05-01	104.6	18.0	**121.1**	**18.5**	**102.2**	**97.7%**	**95.0%**	
NDCL 7	ACRE 1	2	6"	666-05-01	104.6	18.0	**123.7**	**22.0**	**101.4**	**96.9%**	**95.0%**	
NDCL 8	ACRE 1	2	6"	666-05-01	104.6	18.0	**127.0**	**21.3**	**104.7**	**100.1%**	**95.0%**	DC-06 & ST-10
NDCL 9	ACRE 1	2	6"	666-05-01	104.6	18.0	**123.9**	**22.9**	**100.8**	**96.4%**	**95.0%**	
NDCL 10	ACRE 1	2	6"	666-05-01	104.6	18.0	**121.6**	**21.0**	**100.5**	**96.1%**	**95.0%**	
NDCL 11	ACRE 1	2	6"	666-05-01	104.6	18.0	**119.7**	**20.2**	**99.6**	**95.2%**	**95.0%**	
NDCL 12	ACRE 1	2	6"	666-05-01	104.6	18.0	**123.7**	**22.0**	**101.4**	**96.9%**	**95.0%**	
NDCL 13	ACRE 2	1	6"	666-02-05	98.8	22.0	**114.6**	**21.9**	**94.0**	**95.2%**	**95.0%**	
NDCL 14	ACRE 2	1	6"	666-02-05	98.8	22.0	**113.6**	**20.0**	**94.7**	**95.8%**	**95.0%**	
NDCL 15	ACRE 2	1	6"	666-02-05	98.8	22.0	**113.6**	**21.0**	**93.9**	**95.0%**	**95.0%**	
NDCL 16	ACRE 2	1	6"	666-02-05	98.8	22.0	**114.7**	**20.2**	**95.4**	**96.6%**	**95.0%**	
NDCL 17	ACRE 2	1	6"	666-02-05	98.8	22.0	**117.0**	**23.2**	**95.0**	**96.1%**	**95.0%**	
NDCL 18	ACRE 2	1	6"	666-02-05	98.8	22.0	**114.9**	**19.1**	**96.5**	**97.6%**	**95.0%**	DC-07 & ST-11

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Geotechnics
INTEGRITY IN TESTING

Report Number : **CCL-02**
Date (s) : 09.11.09-09.15.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-05	DC-06	DC-07
Nuclear Test Number :	NDCL-04	NDCL-08	NDCL-18
Location:	ACRE 1	ACRE 1	ACRE 2
Depth (ft):	Lift 1	LIFT 2	LIFT 1
Date :	09.11.09	09.14.09	09.15.09

Mold

Cylinder ID	1	2	2
Weight of Cylinder (lbs.)	1.33	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.46	5.44	5.10
Wt. of Cylinder (lbs.)	1.33	1.33	1.33
Wt. of WS	4.13	4.11	3.77
Cylinder Volume (ft^3)	0.033	0.033	0.033

Moisture / Density

Tare Number	JB10	JB-06	JB-06
Wt. of Tare & WS (gm)	371.80	353.40	306.40
Wt. of Tare & DS (gm)	303.00	292.20	257.20
Wt. of Tare (gm)	6.80	6.80	6.80
Wt. of Water (gm)	68.80	61.20	49.20
Wt. of DS (gm)	296.20	285.40	250.40
Wet Density (pcf):	125.2	124.5	114.2
Moisture Content (%):	**23.2**	**21.4**	**19.6**
Dry Density (pcf):	**101.6**	**102.6**	**95.4**

Geotechnics Representative : Al Lambeth

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3
Project Number :	2009-666

Geotechnics
INTEGRITY IN TESTING

Report Number :	**CCL-02**
Date (s) :	09.15.09

ONE POINT PROCTOR - Method for Soil Identification ASTM D698

Visual Descrpiton : Reddish brown Silty Clay (2009-666-02-05 Lab Sample Number)

Test Information

Test Number :	1pt.-02
Location:	ACRE 2
Depth (ft):	LIFT 1
Date :	09.15.09

Mold

Weight of Mold (lbs.)	4.51
Volume of Mold (ft^3)	0.033

Specimen

Weight of Mold & WS (lbs)	8.35
Weight of Mold (lbs)	4.51
Weight of WS (lbs)	3.84
Volume OF Mold (ft^3)	0.033

Moisture / Density

Tare Number	JB-10
Wt. of Tare & WS (gm)	229.40
Wt. of Tare & DS (gm)	193.80
Wt. of Tare (gm)	6.60
Wt. of Water (gm)	35.60
Wt. of DS (gm)	187.20
Wet Density (pcf)	116.4
Moisture Content %	**19.0**
Dry Density (pcf)	**97.8**

Geotechnics Represenative : Al Lambeth

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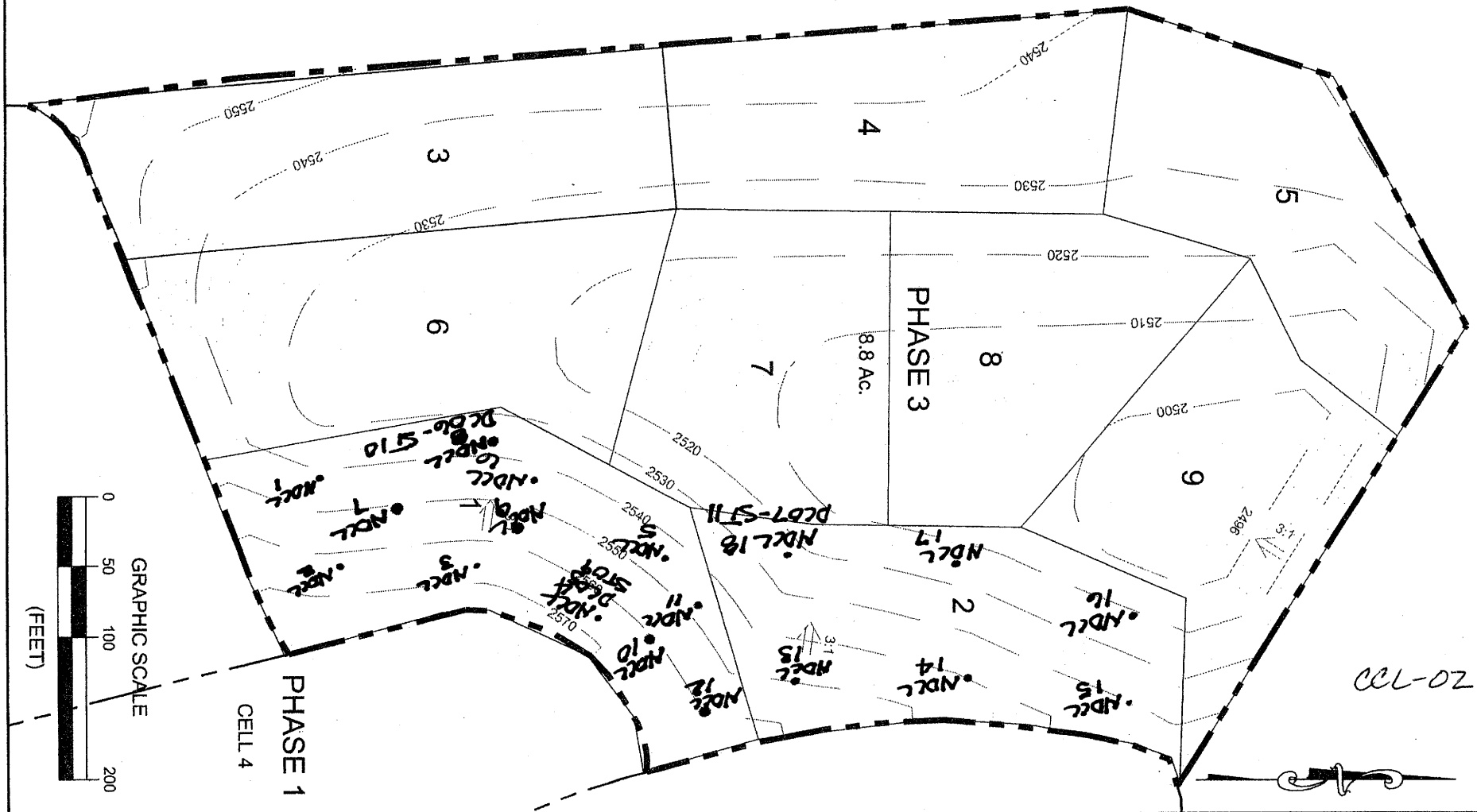
CCL-02



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DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP
			PHASE 3-ACRE MAP								

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number :	**CCL-03**	Geotechnics Representative :	Al Lambeth	Page :	1 of 1
Date (s) :	**9.24.09**	Reviewed By :	MMS	Date :	2-5-10

Contractor :	Thalle	Borrow Source :	On-site stockpiled material from cell excavation

Compaction Equipment :	CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 19	ACRE 9A	1	6"	666-02-05	94.2	26.0	**118.8**	**28.3**	**92.6**	**98.3%**	**95.0%**	
NDCL 20	ACRE 9A	1	6"	666-02-05	94.2	26.0	**120.4**	**28.6**	**93.6**	**99.4%**	**95.0%**	DC-08 & ST-12
NDCL 21	ACRE9A	1	6"	666-02-05	94.2	26.0	**119.4**	**28.4**	**93.0**	**98.7%**	**95.0%**	
NDCL 22	ACRE 9A	1	6"	666-02-05	94.2	26.0	**119.7**	**28.4**	**93.2**	**99.0%**	**95.0%**	
NDCL 23	ACRE 9A	1	6"	666-02-05	94.2	26.0	**123.7**	**33.3**	**92.8**	**98.5%**	**95.0%**	
NDCL 24	ACRE 2	2	6"	666-02-05	94.2	26.0	**120.6**	**32.3**	**91.2**	**96.8%**	**95.0%**	
NDCL 25	ACRE 2	2	6"	666-02-05	94.2	26.0	**115.9**	**32.8**	**87.3**	**92.6%**	**95.0%**	see retest
NDCL 26	ACRE 2	2	6"	666-02-05	94.2	26.0	**113.1**	**33.9**	**84.5**	**89.7%**	**95.0%**	see retest
NDCL 27	ACRE 2	2	6"	666-02-05	94.2	26.0	**117.5**	**28.9**	**91.2**	**96.8%**	**95.0%**	
NDCL 28	ACRE 2	2	6"	666-02-05	94.2	26.0	**119.8**	**31.7**	**91.0**	**96.6%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

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INTEGRITY IN TESTING

Report Number :	**CCL-03**
Date (s) :	9.24.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-08
Nuclear Test Number :	NDCL-20
Location:	ACRE 9A
Depth (ft):	LIFT 1
Date :	09.24.09

Mold

Cylinder ID	1
Weight of Cylinder (lbs.)	1.33
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.30
Wt. of Cylinder (lbs.)	1.33
Wt. of WS	3.98
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB-06
Wt. of Tare & WS (gm)	387.00
Wt. of Tare & DS (gm)	304.80
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	82.20
Wt. of DS (gm)	298.00
Wet Density (pcf):	120.6
Moisture Content (%):	**27.6**
Dry Density (pcf):	**94.5**

Geotechnics Representative : Al Lambeth MAPS

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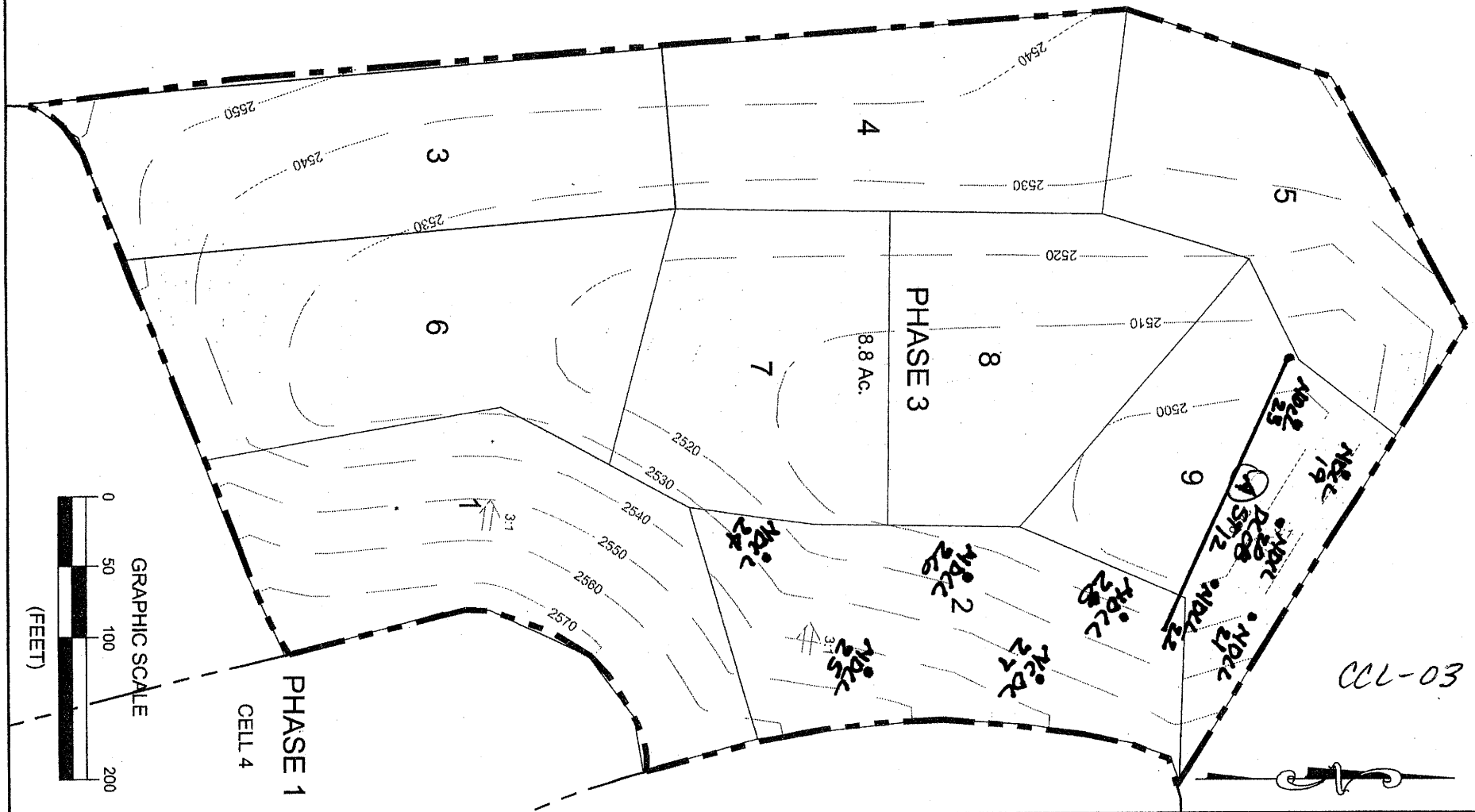
CCL-03



DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA
			PHASE 3-ACRE MAP

JOYCE ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE: (336) 323-0092

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DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-04**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **10.01,10.02.09**	Reviewed By : MPS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 29	ACRE 2	2	6"	666-02-05	94.2	26.0	**119.3**	**28.8**	**92.6**	**98.3%**	**95.0%**	
NDCL 30	ACRE 2	2	6"	666-02-05	94.2	26.0	**119.3**	**26.7**	**94.2**	**100.0%**	**95.0%**	
NDCL 31	ACRE 2	2	6"	666-02-05	94.2	26.0	**120.0**	**22.5**	**98.0**	**104.0%**	**95.0%**	RETSET # 25
NDCL 32	ACRE 2	2	6"	666-02-05	94.2	26.0	**120.6**	**28.6**	**93.8**	**99.6%**	**95.0%**	RETEST #26
NDCL 33	ACRE 2	2	6"	666-02-05	94.2	26.0	**119.1**	**27.6**	**93.3**	**99.1%**	**95.0%**	
NDCL 34	ACRE 2	2	6"	666-02-05	94.2	26.0	**120.7**	**26.1**	**95.7**	**101.6%**	**95.0%**	DC-09 & ST-13
NDCL 35	ACRE 2	2	6"	666-02-05	94.2	26.0	**118.9**	**28.4**	**92.6**	**98.3%**	**95.0%**	
NDCL 36	ACRE 9A	2	6"	666-02-05	94.2	26.0	**119.9**	**29.3**	**92.7**	**98.4%**	**95.0%**	
NDCL 37	ACRE 9A	2	6"	666-02-05	94.2	26.0	**119.5**	**28.8**	**92.8**	**98.5%**	**95.0%**	
NDCL 38	ACRE 9A	2	6"	666-02-05	94.2	26.0	**116.4**	**25.7**	**92.6**	**98.3%**	**95.0%**	
NDCL 39	ACRE 9A	2	6"	666-02-05	94.2	26.0	**117.7**	**25.5**	**93.8**	**99.6%**	**95.0%**	DC-10 & ST-14
NDCL 40	ACRE 1	3	6"	666-02-05	94.2	26.0	**118.5**	**26.6**	**93.6**	**99.4%**	**95.0%**	DC-11 & ST-15
NDCL 41	ACRE 1	3	6"	666-02-05	94.2	26.0	**117.9**	**26.8**	**93.0**	**98.7%**	**95.0%**	
NDCL 42	ACRE 1	3	6"	666-02-05	94.2	26.0	**118.1**	**24.8**	**94.6**	**100.5%**	**95.0%**	
NDCL 43	ACRE 1	3	6"	666-02-05	94.2	26.0	**120.2**	**27.3**	**94.4**	**100.2%**	**95.0%**	
NDCL 44	ACRE 1	3	6"	666-02-05	94.2	26.0	**118.7**	**27.4**	**93.2**	**98.9%**	**95.0%**	
NDCL 45	ACRE 1	3	6"	666-02-05	94.2	26.0	**123.2**	**28.1**	**96.2**	**102.1%**	**95.0%**	
NDCL 46	ACRE 2	3	6"	666-02-05	94.2	26.0	**120.2**	**27.2**	**94.5**	**100.3%**	**95.0%**	DC-12 & ST-16
NDCL 47	ACRE 2	3	6"	666-02-05	94.2	26.0	**116.4**	**24.5**	**93.5**	**99.3%**	**95.0%**	
NDCL 48	ACRE 2	3	6"	666-02-05	94.2	26.0	**114.5**	**23.3**	**92.9**	**98.6%**	**95.0%**	
NDCL 49	ACRE 2	3	6"	666-02-05	94.2	26.0	**118.2**	**27.6**	**92.6**	**98.3%**	**95.0%**	
NDCL 50	ACRE 2	3	6"	666-02-05	94.2	26.0	**117.8**	**26.8**	**92.9**	**98.6%**	**95.0%**	
NDCL 51	ACRE 2	3	6"	666-02-05	94.2	26.0	**121.4**	**26.3**	**96.1**	**102.0%**	**95.0%**	
NDCL 52	ACRE 9A	3	6"	666-02-06	98.8	22.0	**123.6**	**26.1**	**98.0**	**99.2%**	**95.0%**	DC-13 & ST-17
NDCL 53	ACRE 9A	3	6"	666-02-06	98.8	22.0	**124.0**	**24.9**	**99.3**	**100.5%**	**95.0%**	
NDCL 54	ACRE 9A	3	6"	666-02-06	98.8	22.0	**121.2**	**26.6**	**95.7**	**96.9%**	**95.0%**	
NDCL 55	ACRE 9A	3	6"	666-02-06	98.8	22.0	**122.1**	**28.8**	**94.8**	**95.9%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Report Number : **CCL-04**
Date (s) : 10.01-10.02.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-09	DC-10	DC-11	DC-12
Nuclear Test Number :	NDCL-34	NDCL-39	NDCL-40	NDCL-46
Location:	ACRE 2	ACRE 9A	ACRE 1	ACRE 2
Depth (ft):	LIFT 2	LIFT 2	LIFT 3	LIFT 3
Date :	10.01.09	10.01.09	10.02.09	10.02.09
Mold				
Cylinder ID	2	3	2	3
Weight of Cylinder (lbs.)	1.33	1.32	1.33	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.30	5.21	5.25	5.24
Wt. of Cylinder (lbs.)	1.33	1.32	1.33	1.32
Wt. of WS	3.97	3.89	3.92	3.92
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	JB-09	JB-06	JB-06	JB-09
Wt. of Tare & WS (gm)	310.20	326.40	323.80	413.00
Wt. of Tare & DS (gm)	247.80	259.20	258.60	329.80
Wt. of Tare (gm)	6.80	6.80	6.80	6.80
Wt. of Water (gm)	62.40	67.20	65.20	83.20
Wt. of DS (gm)	241.00	252.40	251.80	323.00
Wet Density (pcf):	120.3	117.9	118.7	118.7
Moisture Content (%):	**25.9**	**26.6**	**25.9**	**25.8**
Dry Density (pcf):	**95.6**	**93.1**	**94.3**	**94.4**

Geotechnics Representative : Al Lambeth

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

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Report Number :	**CCL-04**
Date (s) :	10.02.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-13
Nuclear Test Number :	NDCL-52
Location:	ACRE 9A
Depth (ft):	LIFT 3
Date :	10.02.09

Mold

Cylinder ID	4
Weight of Cylinder (lbs.)	1.32
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.35
Wt. of Cylinder (lbs.)	1.32
Wt. of WS	4.03
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB-10
Wt. of Tare & WS (gm)	341.60
Wt. of Tare & DS (gm)	274.40
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	67.20
Wt. of DS (gm)	267.60
Wet Density (pcf):	122.1
Moisture Content (%):	**25.1**
Dry Density (pcf):	**97.6**

Geotechnics Representative : Al Lambeth

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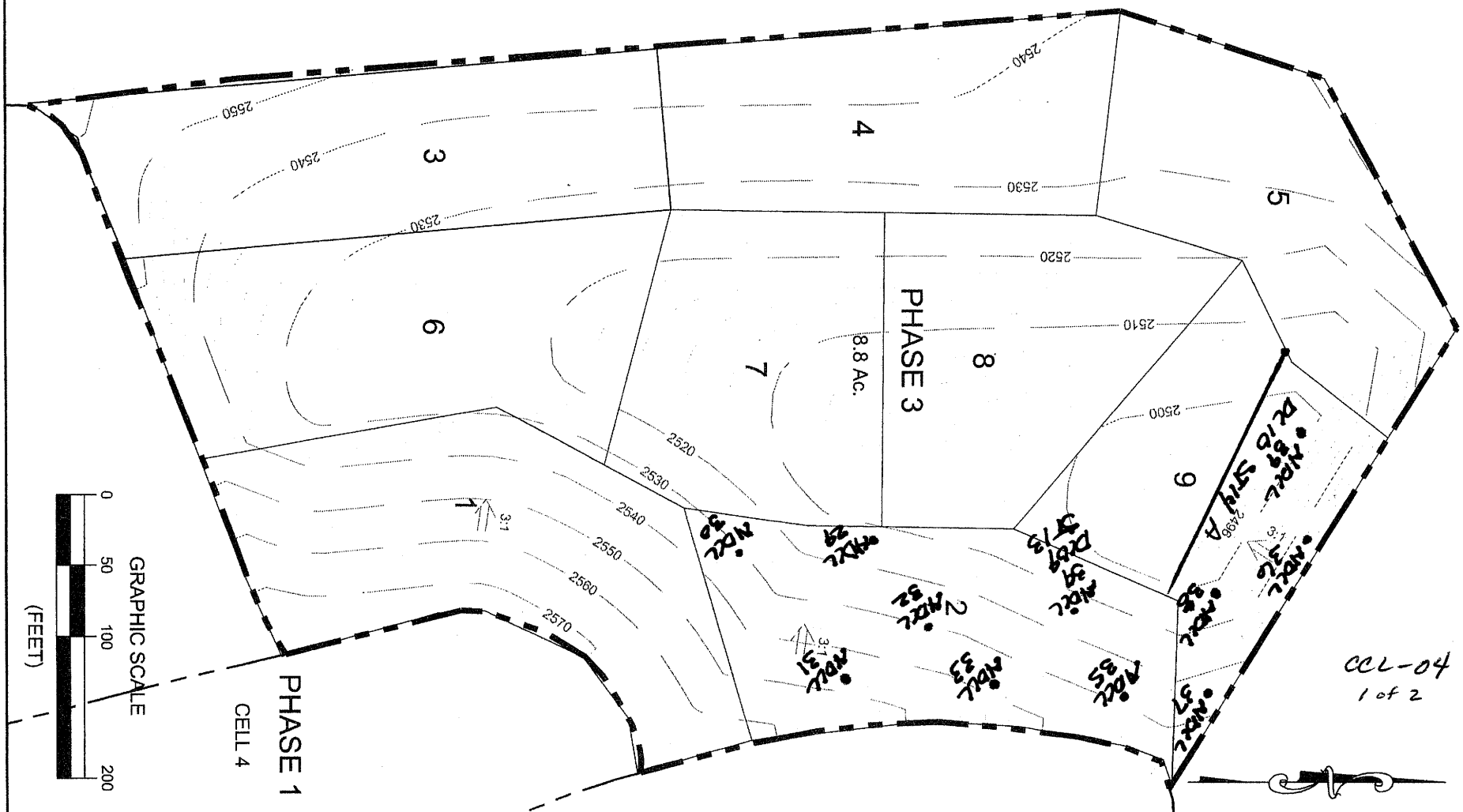

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DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP

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PHONE: (336) 323-0092

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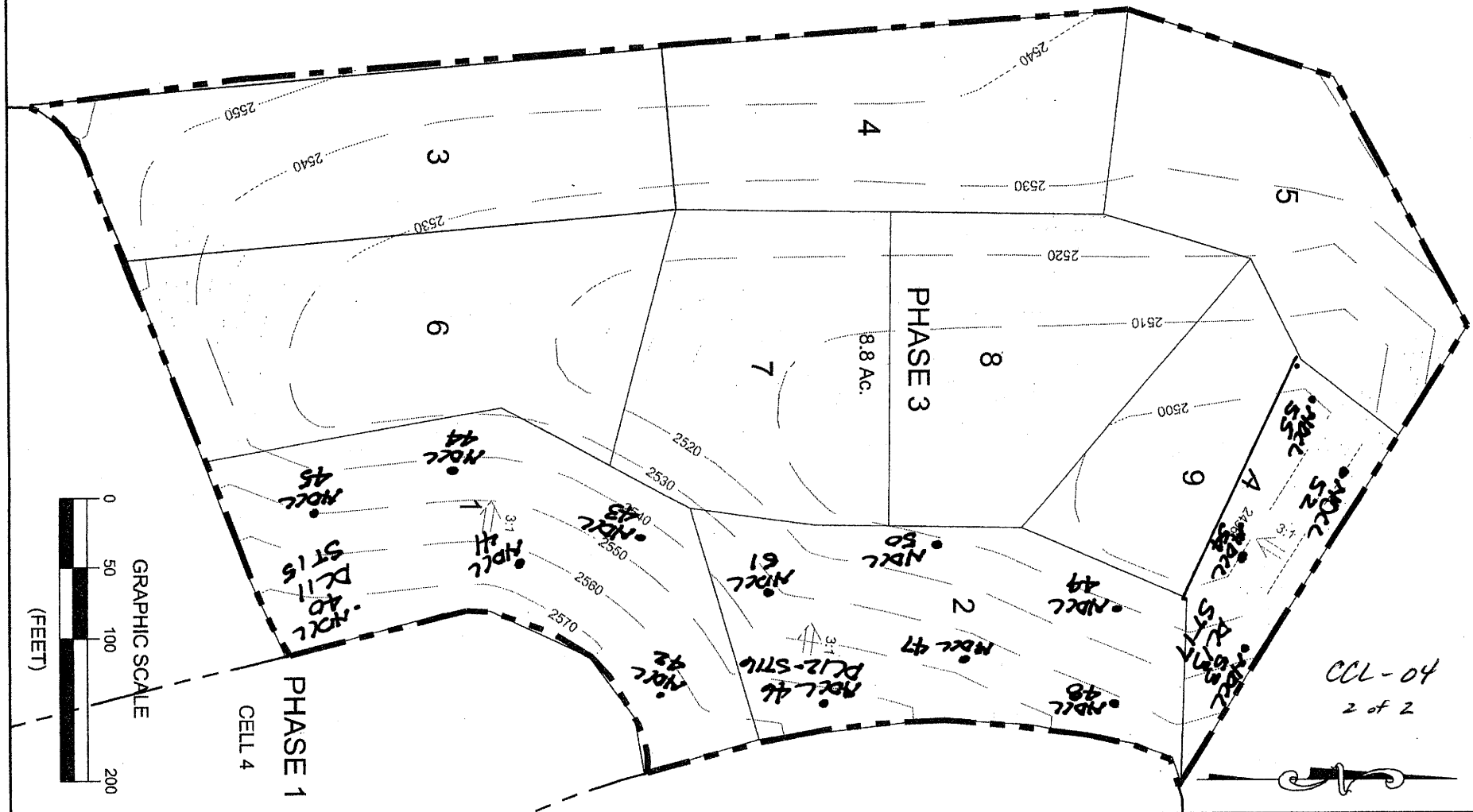

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA
			PHASE 3-ACRE MAP

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-05**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **10.08-10.09.09**	Reviewed By : MPS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 56	ACRE 3	1	6"	666-02-06	98.8	22.0	**119.5**	**26.3**	**94.6**	**95.8%**	**95.0%**	
NDCL 57	ACRE 3	1	6"	666-02-06	98.8	22.0	**123.5**	**26.0**	**98.0**	**99.2%**	**95.0%**	DC-14 & ST-18
NDCL 58	ACRE 3	1	6"	666-02-06	98.8	22.0	**121.5**	**29.9**	**93.5**	**94.7%**	**95.0%**	
NDCL 59	ACRE 3	1	6"	666-02-06	98.8	22.0	**119.2**	**28.3**	**92.9**	**94.0%**	**95.0%**	
NDCL 60	ACRE 3	1	6"	666-02-06	98.8	22.0	**122.0**	**25.5**	**97.2**	**98.4%**	**95.0%**	
NDCL 61	ACRE 3	1	6"	666-02-06	98.8	22.0	**123.4**	**25.3**	**98.5**	**99.7%**	**95.0%**	
NDCL 62	ACRE 3	2	6"	666-02-06	98.8	22.0	**118.0**	**24.7**	**94.6**	**95.8%**	**95.0%**	
NDCL 63	ACRE 3	2	6"	666-02-06	98.8	22.0	**122.6**	**27.4**	**96.2**	**97.4%**	**95.0%**	DC-15 & ST-19
NDCL 64	ACRE 3	2	6"	666-02-06	98.8	22.0	**122.4**	**28.3**	**95.4**	**96.6%**	**95.0%**	
NDCL 65	ACRE 3	2	6"	666-02-06	98.8	22.0	**125.1**	**26.5**	**98.9**	**100.1%**	**95.0%**	
NDCL 66	ACRE 3	2	6"	666-02-06	98.8	22.0	**121.5**	**23.6**	**98.3**	**99.5%**	**95.0%**	
NDCL 67	ACRE 3	2	6"	666-02-06	98.8	22.0	**121.9**	**23.0**	**99.1**	**100.3%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client: Joyce Engineering
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-05**
Date (s) : 10.08.09-10.09.09

Drive Cylinder - ASTM D 2937

Test Information		
Test Number :	DC-14	DC-15
Nuclear Test Number :	NDCL-57	NDCL-63
Location:	ACRE 3	ACRE 3
Depth (ft):	LIFT 1	LIFT 2
Date :	10.08.09	10.08.09
Mold		
Cylinder ID	2	2
Weight of Cylinder (lbs.)	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033
Specimen		
Wt. of Cylinder & WS (lbs.)	5.32	5.34
Wt. of Cylinder (lbs.)	1.33	1.33
Wt. of WS	3.99	4.01
Cylinder Volume (ft^3)	0.033	0.033
Moisture / Density		
Tare Number	JB-10	JB-06
Wt. of Tare & WS (gm)	361.80	355.60
Wt. of Tare & DS (gm)	284.80	289.00
Wt. of Tare (gm)	6.80	6.80
Wt. of Water (gm)	77.00	66.60
Wt. of DS (gm)	278.00	282.20
Wet Density (pcf):	120.9	121.5
Moisture Content (%):	**27.7**	**23.6**
Dry Density (pcf):	**94.7**	**98.5**

Geotechnics Representative : Al Lambeth

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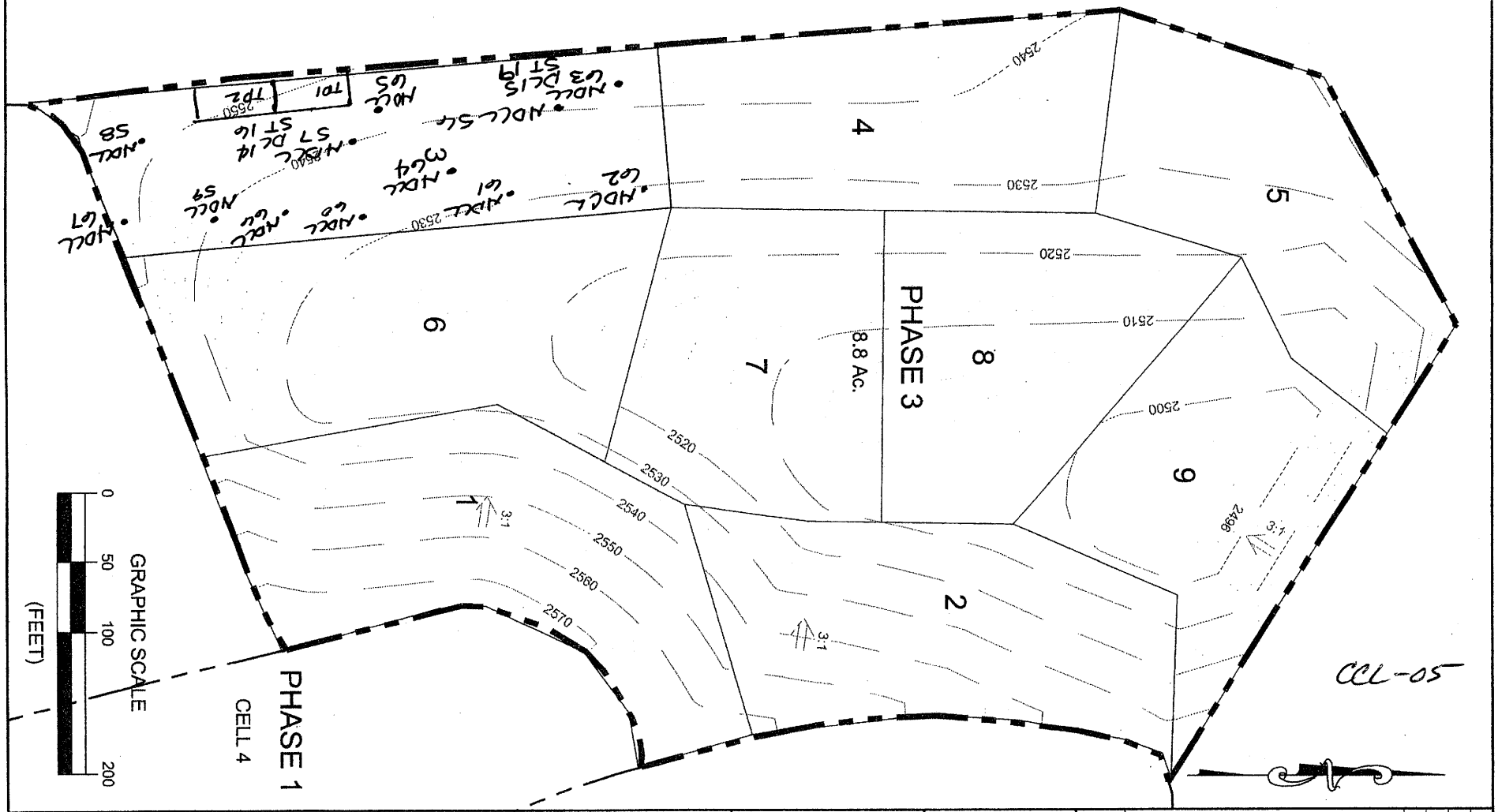
CCL-05



DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-06**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **10.26.09, 10.30.09**	Reviewed By : NAPS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 68	ACRE 3	3	6"	666-02-06	98.8	22.0	**126.1**	**28.0**	**98.5**	**99.7%**	**95.0%**	DC-16 & ST-20
NDCL 69	ACRE 3	3	6"	666-02-06	98.8	22.0	**126.9**	**29.9**	**97.7**	**98.9%**	**95.0%**	
NDCL 70	ACRE 3	3	6"	666-02-06	98.8	22.0	**128.1**	**29.9**	**98.6**	**99.8%**	**95.0%**	
NDCL 71	ACRE 3	3	6"	666-02-06	98.8	22.0	**128.5**	**29.6**	**99.2**	**100.4%**	**95.0%**	
NDCL 72	ACRE 3	3	6"	666-02-06	98.8	22.0	**122.1**	**28.8**	**94.8**	**95.9%**	**95.0%**	
NDCL 73	ACRE 3	3	6"	666-02-06	98.8	22.0	**122.8**	**30.8**	**93.9**	**95.0%**	**95.0%**	
NDCL 74	ACRE 6	1	6"	666-02-06	98.8	22.0	**123.8**	**28.7**	**96.2**	**97.4%**	**95.0%**	
NDCL 75	ACRE 6	1	6"	666-02-06	98.8	22.0	**121.5**	**28.9**	**94.3**	**95.4%**	**95.0%**	
NDCL 76	ACRE 6	1	6"	666-02-06	98.8	22.0	**125.3**	**29.5**	**96.8**	**97.9%**	**95.0%**	
NDCL 77	ACRE 6	1	6"	666-02-05	94.2	26.0	**121.1**	**30.3**	**92.9**	**98.7%**	**95.0%**	
NDCL 78	ACRE 6	1	6"	666-02-05	94.2	26.0	**121.2**	**30.5**	**92.9**	**98.6%**	**95.0%**	
NDCL 79	ACRE 6	1	6"	666-02-06	98.8	22.0	**124.6**	**28.5**	**97.0**	**98.1%**	**95.0%**	DC-17 & ST-21
NDCL 80	ACRE 6	2	6"	666-02-06	98.8	22.0	**124.7**	**26.7**	**98.4**	**99.6%**	**95.0%**	
NDCL 81	ACRE 6	2	6"	666-02-05	94.2	26.0	**117.0**	**25.8**	**93.0**	**98.7%**	**95.0%**	
NDCL 82	ACRE 6	2	6"	666-02-06	98.8	22.0	**123.7**	**30.1**	**95.1**	**96.2%**	**95.0%**	
NDCL 83	ACRE 6	2	6"	666-02-06	98.8	22.0	**124.1**	**30.7**	**95.0**	**96.1%**	**95.0%**	
NDCL 84	ACRE 6	2	6"	666-02-06	98.8	22.0	**124.8**	**27.5**	**97.9**	**99.1%**	**95.0%**	
NDCL 85	ACRE 6	2	6"	666-02-06	98.8	22.0	**120.4**	**27.3**	**94.6**	**95.7%**	**95.0%**	DC-18 & ST-22

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-06**
Date (s) : 10.26.09, 10.30.09

Drive Cylinder - ASTM D 2937

Test Information			
Test Number :	DC-16	DC-17	DC-18
Nuclear Test Number :	NDCL-68	NDCL-79	NDCL-85
Location:	ACRE 3	ACRE 6	ACRE 6
Depth (ft):	LIFT 3	LIFT 1	LIFT 2
Date :	10.26.09	10.26.09	10.30.09
Mold			
Cylinder ID	2	3	2
Weight of Cylinder (lbs.)	1.33	1.32	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033
Specimen			
Wt. of Cylinder & WS (lbs.)	5.40	5.34	5.25
Wt. of Cylinder (lbs.)	1.33	1.32	1.33
Wt. of WS	4.07	4.02	3.92
Cylinder Volume (ft^3)	0.033	0.033	0.033
Moisture / Density			
Tare Number	JB-06	JB-10	JB-07
Wt. of Tare & WS (gm)	447.60	398.60	421.80
Wt. of Tare & DS (gm)	358.20	321.40	339.80
Wt. of Tare (gm)	6.80	6.80	6.60
Wt. of Water (gm)	89.40	77.20	82.00
Wt. of DS (gm)	351.40	314.20	333.20
Wet Density (pcf):	123.3	121.8	119.1
Moisture Content (%):	**25.4**	**24.0**	**24.6**
Dry Density (pcf):	**98.3**	**97.8**	**95.6**

Geotechnics Representative : Al Lambeth

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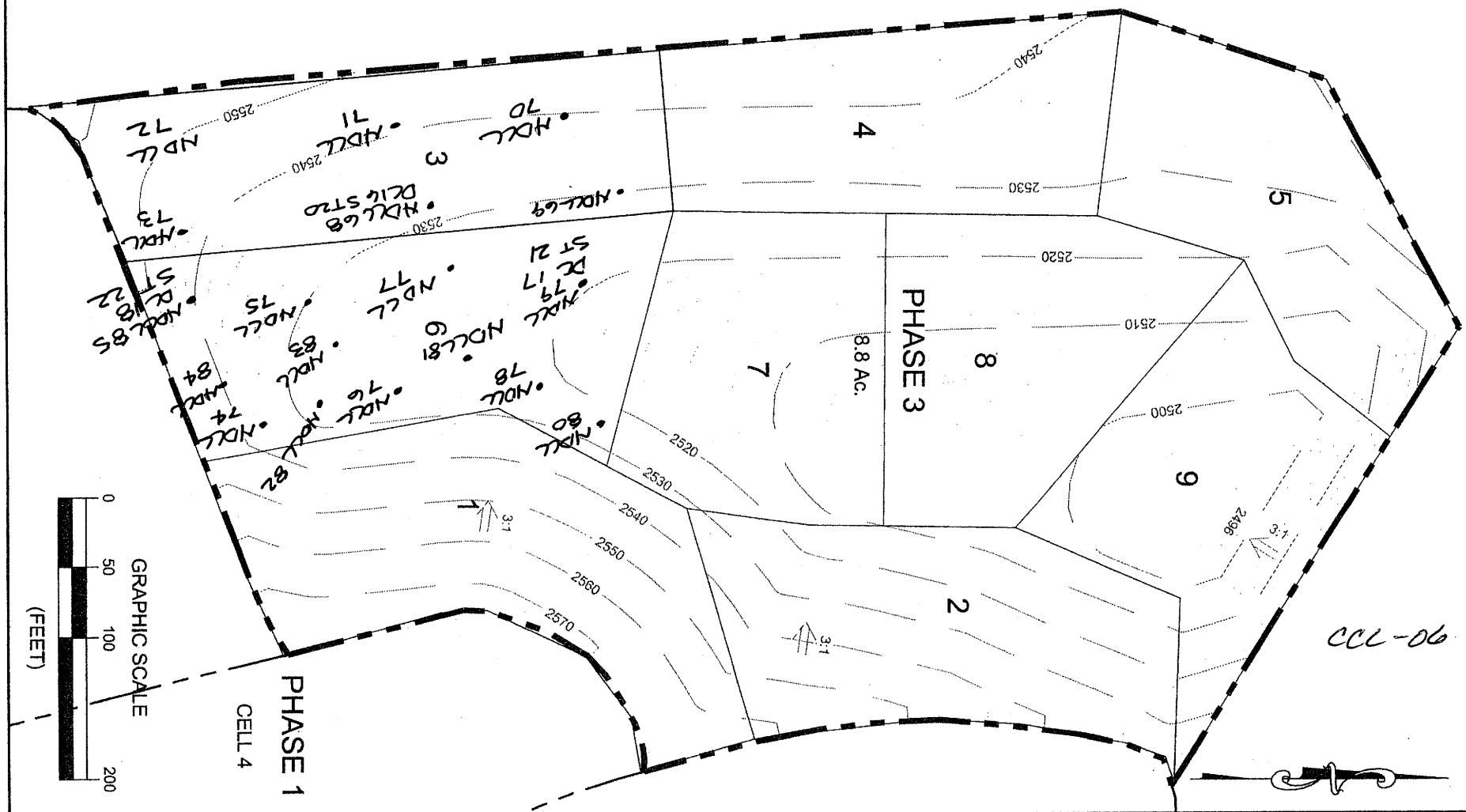
CCL-04



CCL-06

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA
			PHASE 3-ACRE MAP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-07**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.05.09, 11.06.09**	Reviewed By : MMS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 86	ACRE 6	3	6"	666-04-02	91.2	27.6	**120.1**	**32.4**	**90.7**	**99.5%**	**95.0%**	
NDCL 87	ACRE 6	3	6"	666-02-01	89.7	27.5	**114.5**	**29.2**	**88.6**	**98.8%**	**95.0%**	
NDCL 88	ACRE 6	3	6"	666-02-01	89.7	27.5	**116.9**	**33.0**	**87.9**	**98.0%**	**95.0%**	
NDCL 89	ACRE 6	3	6"	666-02-01	89.7	27.5	**113.9**	**33.1**	**85.6**	**95.4%**	**95.0%**	
NDCL 90	ACRE 6	3	6"	666-02-01	89.7	27.5	**113.9**	**32.9**	**85.7**	**95.5%**	**95.0%**	
NDCL 91	ACRE 6	3	6"	666-02-01	89.7	27.5	**115.6**	**33.0**	**86.9**	**96.9%**	**95.0%**	DC-19 & ST-23
NDCL 92	ACRE 5	1	6"	666-04-02	91.2	27.6	**111.9**	**29.0**	**86.7**	**95.1%**	**95.0%**	
NDCL 93	ACRE 5	1	6"	666-04-02	91.2	27.6	**118.3**	**32.2**	**89.5**	**98.1%**	**95.0%**	DC-20 & ST-24
NDCL 94	ACRE 5	1	6"	666-04-02	91.2	27.6	**118.8**	**31.1**	**90.6**	**99.4%**	**95.0%**	
NDCL 95	ACRE 5	1	6"	666-04-02	91.2	27.6	**118.9**	**30.8**	**90.9**	**99.7%**	**95.0%**	
NDCL 96	ACRE 5	1	6"	666-04-02	91.2	27.6	**117.2**	**29.1**	**90.8**	**99.5%**	**95.0%**	
NDCL 97	ACRE 5	1	6"	666-04-02	91.2	27.6	**118.3**	**31.3**	**90.1**	**98.8%**	**95.0%**	
NDCL 98	ACRE 7	1	6"	666-04-02	91.2	27.6	**116.6**	**32.1**	**88.3**	**96.8%**	**95.0%**	
NDCL 99	ACRE 7	1	6"	666-04-02	91.2	27.6	**117.2**	**30.9**	**89.5**	**98.2%**	**95.0%**	DC-21 & ST-25
NDCL 100	ACRE 7	1	6"	666-04-02	91.2	27.6	**117.3**	**29.3**	**90.7**	**99.5%**	**95.0%**	
NDCL 101	ACRE 7	1	6"	666-04-02	91.2	27.6	**118.9**	**30.9**	**90.8**	**99.6%**	**95.0%**	
NDCL 102	ACRE 8	1	6"	666-04-02	91.2	27.6	**119.4**	**30.6**	**91.4**	**100.2%**	**95.0%**	DC-22 & ST-26
NDCL 103	ACRE 7	1	6"	666-04-02	91.2	27.6	**119.0**	**30.6**	**91.1**	**99.9%**	**95.0%**	
NDCL 104	ACRE 8	1	6"	666-04-02	91.2	27.6	**119.8**	**31.7**	**91.0**	**99.7%**	**95.0%**	
NDCL 105	ACRE 8	1	6"	666-04-02	91.2	27.6	**116.6**	**29.3**	**90.2**	**98.9%**	**95.0%**	
NDCL 106	ACRE 8	1	6"	666-04-02	91.2	27.6	**117.4**	**30.4**	**90.0**	**98.7%**	**95.0%**	
NDCL 107	ACRE 8	1	6"	666-04-02	91.2	27.6	**118.1**	**31.1**	**90.1**	**98.8%**	**95.0%**	
NDCL 108	ACRE 7	2	6"	666-04-02	91.2	27.6	**115.5**	**28.3**	**90.0**	**98.7%**	**95.0%**	DC-23 & ST-27
NDCL 109	ACRE 7	2	6"	666-04-02	91.2	27.6	**115.1**	**28.0**	**89.9**	**98.6%**	**95.0%**	
NDCL 110	ACRE 7	2	6"	666-04-02	91.2	27.6	**119.5**	**32.6**	**90.1**	**98.8%**	**95.0%**	
NDCL 111	ACRE 7	2	6"	666-04-02	91.2	27.6	**115.3**	**32.2**	**87.2**	**95.6%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number :	**CCL-07**	Geotechnics Representative :	Al Lambeth	Page :	1 of 1
Date (s) :	**11.06.09, 11.07.09**	Reviewed By :	MMS	Date :	2-5-10

Contractor :	Thalle	Borrow Source :	On-site stockpiled material from cell excavation

Compaction Equipment :	CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 112	ACRE 8	2	6"	666-02-01	89.7	37.5	**112.9**	**31.0**	**86.2**	**96.1%**	**95.0%**	
NDCL 113	ACRE 8	2	6"	666-02-01	89.7	27.5	**118.7**	**30.9**	**90.7**	**101.1%**	**95.0%**	
NDCL 114	ACRE 8	2	6"	666-02-01	89.7	27.5	**111.0**	**24.5**	**89.2**	**99.4%**	**95.0%**	
NDCL 115	ACRE 8	2	6"	666-02-01	89.7	27.5	**115.9**	**28.6**	**90.1**	**100.5%**	**95.0%**	DC-24 & ST-28
NDCL 116	ACRE 8	2	6"	666-02-01	89.7	27.5	**116.2**	**29.1**	**90.0**	**100.3%**	**95.0%**	
NDCL 117	ACRE 8	2	6"	666-02-01	89.7	27.5	**116.9**	**30.1**	**89.9**	**100.2%**	**95.0%**	
NDCL 118	ACRE 5	2	6"	666-02-01	89.7	27.5	**118.2**	**32.6**	**89.1**	**99.4%**	**95.0%**	
NDCL 119	ACRE 5	2	6"	666-02-01	89.7	27.5	**116.0**	**28.3**	**90.4**	**100.8%**	**95.0%**	
NDCL 120	ACRE 5	2	6"	666-02-01	89.7	27.5	**115.2**	**30.1**	**88.5**	**98.7%**	**95.0%**	DC-25 & ST-29
NDCL 121	ACRE 5	2	6"	666-02-01	89.7	27.5	**112.0**	**30.1**	**86.1**	**96.0%**	**95.0%**	
NDCL 122	ACRE 5	2	6"	666-02-01	89.7	27.5	**112.0**	**26.8**	**88.3**	**98.5%**	**95.0%**	
NDCL 123	ACRE 5	2	6"	666-02-01	89.7	27.5	**114.1**	**29.4**	**88.2**	**98.3%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Report Number : **CCL-07**
Date (s) : 11.05.09, 11.06.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-19	DC-20	DC-21	DC-22
Nuclear Test Number :	NDCL-91	NDCL-93	NDCL-99	NDCL-102
Location:	ACRE 6	ACRE 5	ACRE 7	ACRE 8
Depth (ft):	LIFT 3	LIFT 1	LIFT 1	LIFT 1
Date :	11.05.09	11.06.09	11.06.09	11.06.09
Mold				
Cylinder ID	3	3	3	1
Weight of Cylinder (lbs.)	1.32	1.32	1.32	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.23	5.21	5.15	5.21
Wt. of Cylinder (lbs.)	1.32	1.32	1.32	1.33
Wt. of WS	3.91	3.89	3.83	3.88
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	JB-07	A-5	A-4	A-3
Wt. of Tare & WS (gm)	374.60	404.00	328.00	405.00
Wt. of Tare & DS (gm)	292.40	318.60	263.20	319.80
Wt. of Tare (gm)	6.60	8.80	9.00	9.00
Wt. of Water (gm)	82.20	85.40	64.80	85.20
Wt. of DS (gm)	285.80	309.80	254.20	310.80
Wet Density (pcf):	118.5	117.9	116.1	117.8
Moisture Content (%):	**28.8**	**27.6**	**25.5**	**27.3**
Dry Density (pcf):	**92.0**	**92.4**	**92.6**	**92.5**

Geotechnics Representative : Al Lambeth

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Report Number : **CCL-07**
Date (s) : 11.06.09, 11.07.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-23	DC-24	DC-25
Nuclear Test Number :	NDCL-108	NDCL-115	NDCL-120
Location:	ACR 7	ACRE 8	ACRE 5
Depth (ft):	LIFT 2	LIFT 2	LIFT 2
Date :	11.06.09	11.06.09	11.07.09

Mold

Cylinder ID	1	3	4
Weight of Cylinder (lbs.)	1.33	1.32	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.10	5.12	5.00
Wt. of Cylinder (lbs.)	1.33	1.32	1.32
Wt. of WS	3.80	3.80	3.68
Cylinder Volume (ft^3)	0.033	0.033	0.033

Moisture / Density

Tare Number	A-2	A-1	JB-10
Wt. of Tare & WS (gm)	343.40	346.20	319.80
Wt. of Tare & DS (gm)	280.20	286.00	255.40
Wt. of Tare (gm)	9.00	9.00	9.00
Wt. of Water (gm)	63.20	60.20	84.40
Wt. of DS (gm)	2711.20	277.00	246.40
Wet Density (pcf):	115.2	115.2	111.5
Moisture Content (%):	**23.3**	**21.7**	**26.1**
Dry Density (pcf):	**93.4**	**94.6**	**88.4**

Geotechnics Representative : Al Lambeth

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3
Project Number :	2009-666

geotechnics
INTEGRITY IN TESTING

Report Number :	**CCL-07**
Date (s) :	11.06.09

ONE POINT PROCTOR - Method for Soil Identifica ASTM D698

Visual Descrpiton : Reddish Brown Sandy Silt

Test Information

Test Number :	NDCL-91
Location:	ACRE 6
Depth (ft):	LIFT 3
Date :	11.05.09

Mold

Weight of Mold (lbs.)	4.52
Volume OF Mold (ft^3)	0.033

Specimen

Weight of Mold & WS (lbs)	8.18
Weight of Mold (lbs)	4.52
Weight of WS (lbs)	3.66
Volume OF Mold (ft^3)	0.033

Moisture / Density

Tare Number	A-1
Wt. of Tare & WS (gm)	278.90
Wt. of Tare & DS (gm)	223.90
Wt. of Tare (gm)	9.00
Wt. of Water (gm)	55.00
Wt. of DS (gm)	214.90
Wet Density (pcf)	110.9
Moisture Content %	**25.6**
Dry Density (pcf)	**88.3**

Geotechnics Represenative : Al Lambeth

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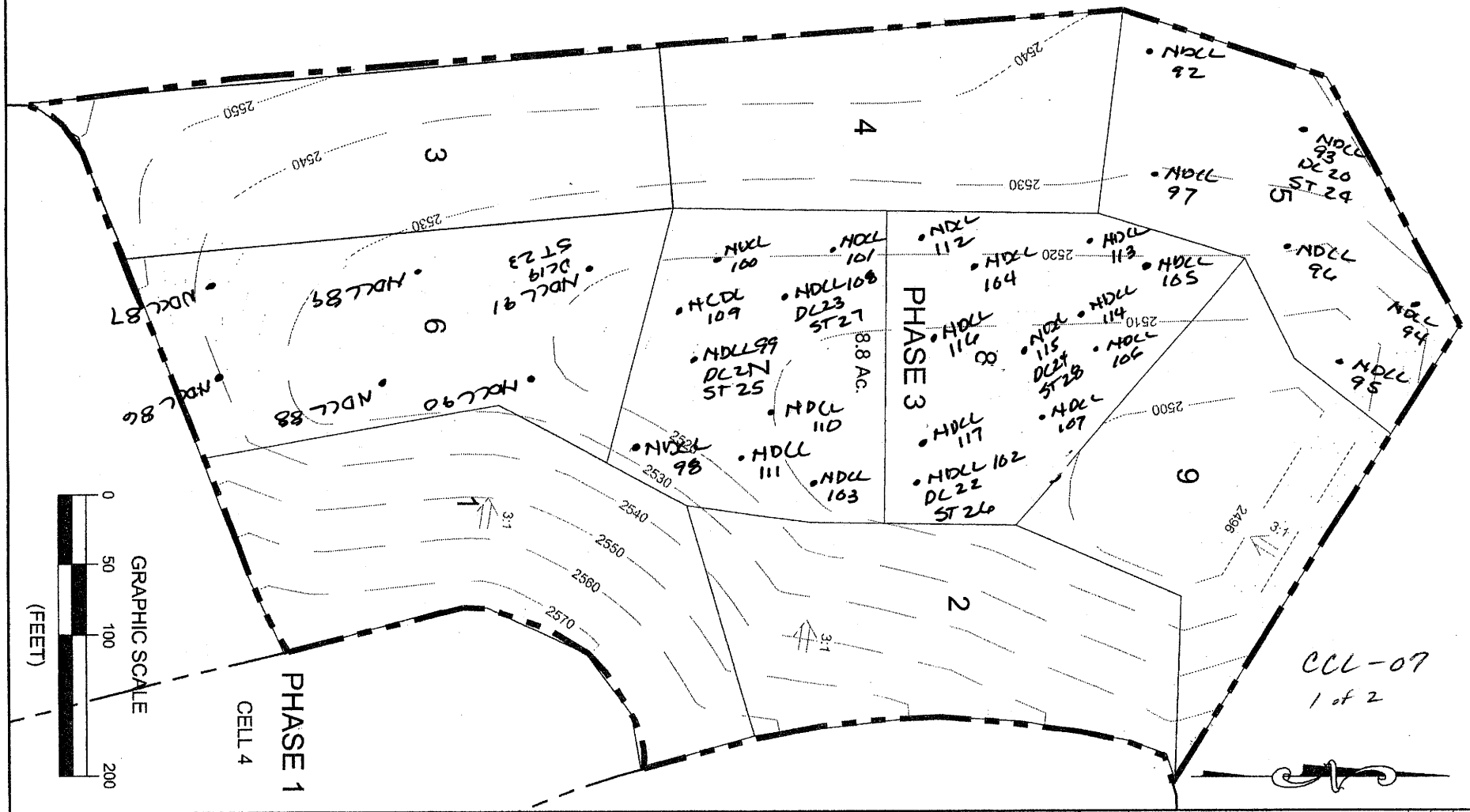

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1 of 2

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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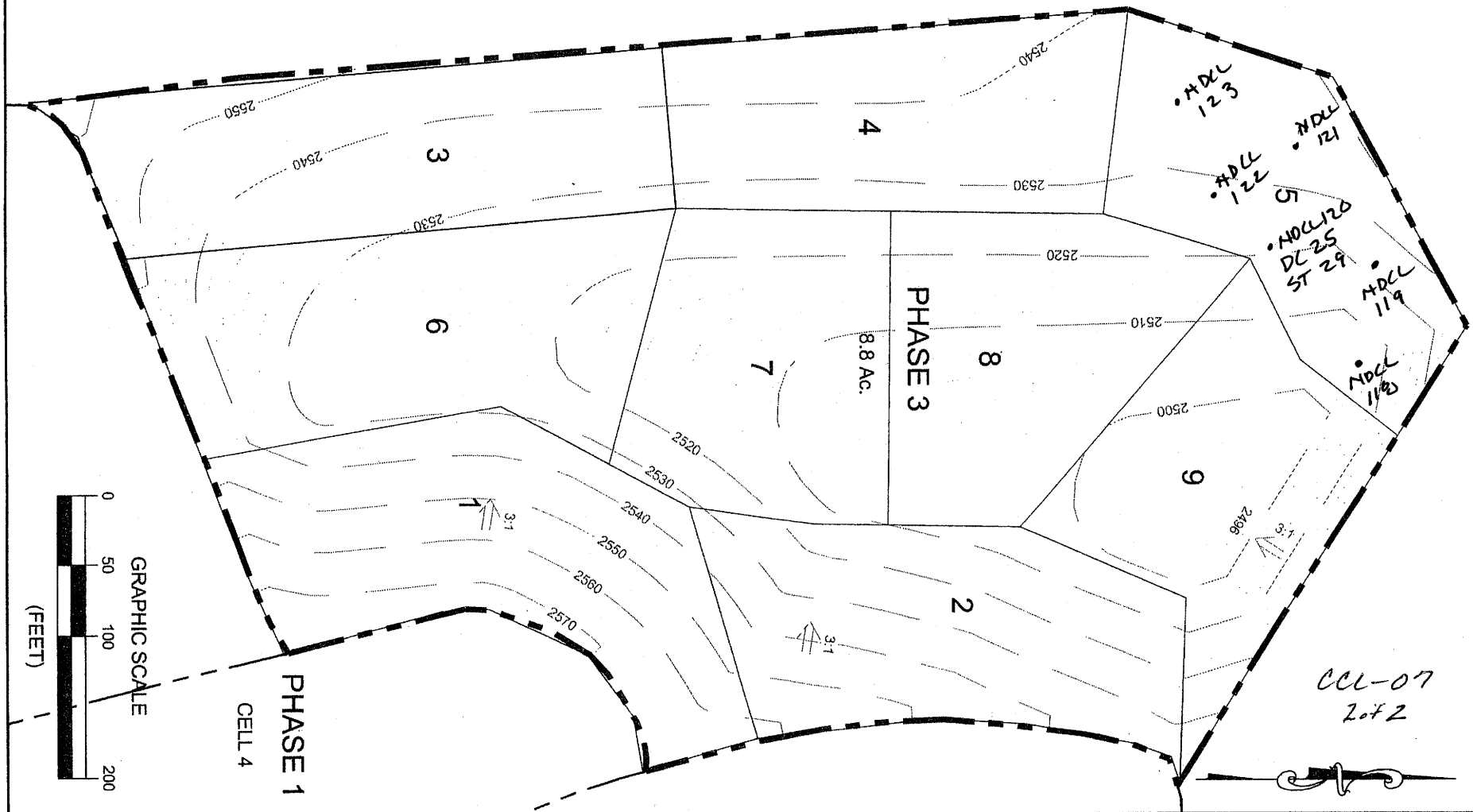
CCL-07 2 of 2



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2 of 2

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA
			PHASE 3-ACRE MAP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-08**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.09.09**	Reviewed By : MMS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 124	ACRE 5	3	6"	666-02-01	89.7	27.5	**114.1**	**29.4**	**88.2**	**98.3%**	**95.0%**	
NDCL 125	ACRE 5	3	6"	666-02-01	89.7	27.5	**115.6**	**31.8**	**87.7**	**97.8%**	**95.0%**	
NDCL 126	ACRE 5	3	6"	666-02-01	89.7	27.5	**110.6**	**26.2**	**87.6**	**97.7%**	**95.0%**	
NDCL 127	ACRE 5	3	6"	666-02-01	89.7	27.5	**111.7**	**24.3**	**89.9**	**100.2%**	**95.0%**	
NDCL 128	ACRE 5	3	6"	666-02-01	89.7	27.5	**109.1**	**28.0**	**85.2**	**95.0%**	**95.0%**	
NDCL 129	ACRE 5	3	6"	666-02-01	89.7	27.5	**110.9**	**28.3**	**86.4**	**96.4%**	**95.0%**	DC-26 & ST-30
NDCL 130	ACRE 8	3	6"	666-02-01	89.7	27.5	**107.9**	**26.5**	**85.3**	**95.1%**	**95.0%**	
NDCL 131	ACRE 8	3	6"	666-02-01	89.7	27.5	**113.6**	**26.6**	**89.7**	**100.0%**	**95.0%**	
NDCL 132	ACRE 8	3	6"	666-02-01	89.7	27.5	**118.9**	**32.7**	**89.6**	**99.9%**	**95.0%**	
NDCL 133	ACRE 8	3	6"	666-02-01	89.7	27.5	**109.8**	**28.9**	**85.2**	**95.0%**	**95.0%**	
NDCL 134	ACRE 8	3	6"	666-02-01	89.7	27.5	**110.9**	**27.9**	**86.7**	**96.7%**	**95.0%**	DC-27 & ST-31
NDCL 135	ACRE 8	3	6"	666-02-01	89.7	27.5	**108.2**	**27.0**	**85.2**	**95.0%**	**95.0%**	
NDCL 136	ACRE 8	3	6"	666-02-01	89.7	27.5	**111.0**	**26.0**	**88.1**	**98.2%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-08**
Date (s) : 11.09.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-26	DC-27
Nuclear Test Number :	NDCL-129	NDCL-134
Location:	ACRE 5	ACRE 8
Depth (ft):	LIFT 3	LIFT 3
Date :	11.09.09	11.09.09

Mold

Cylinder ID	1	3
Weight of Cylinder (lbs.)	1.33	1.32
Volume of Cylinder (ft^3)	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.03	5.00
Wt. of Cylinder (lbs.)	1.33	1.32
Wt. of WS	3.70	3.68
Cylinder Volume (ft^3)	0.033	0.033

Moisture / Density

Tare Number	A-1	A-2
Wt. of Tare & WS (gm)	306.00	317.00
Wt. of Tare & DS (gm)	251.00	255.60
Wt. of Tare (gm)	9.00	9.00
Wt. of Water (gm)	55.00	61.40
Wt. of DS (gm)	242.00	246.60
Wet Density (pcf):	112.1	111.5
Moisture Content (%):	**22.7**	**24.9**
Dry Density (pcf):	**91.4**	**89.3**

Geotechnics Representative : Al Lambeth

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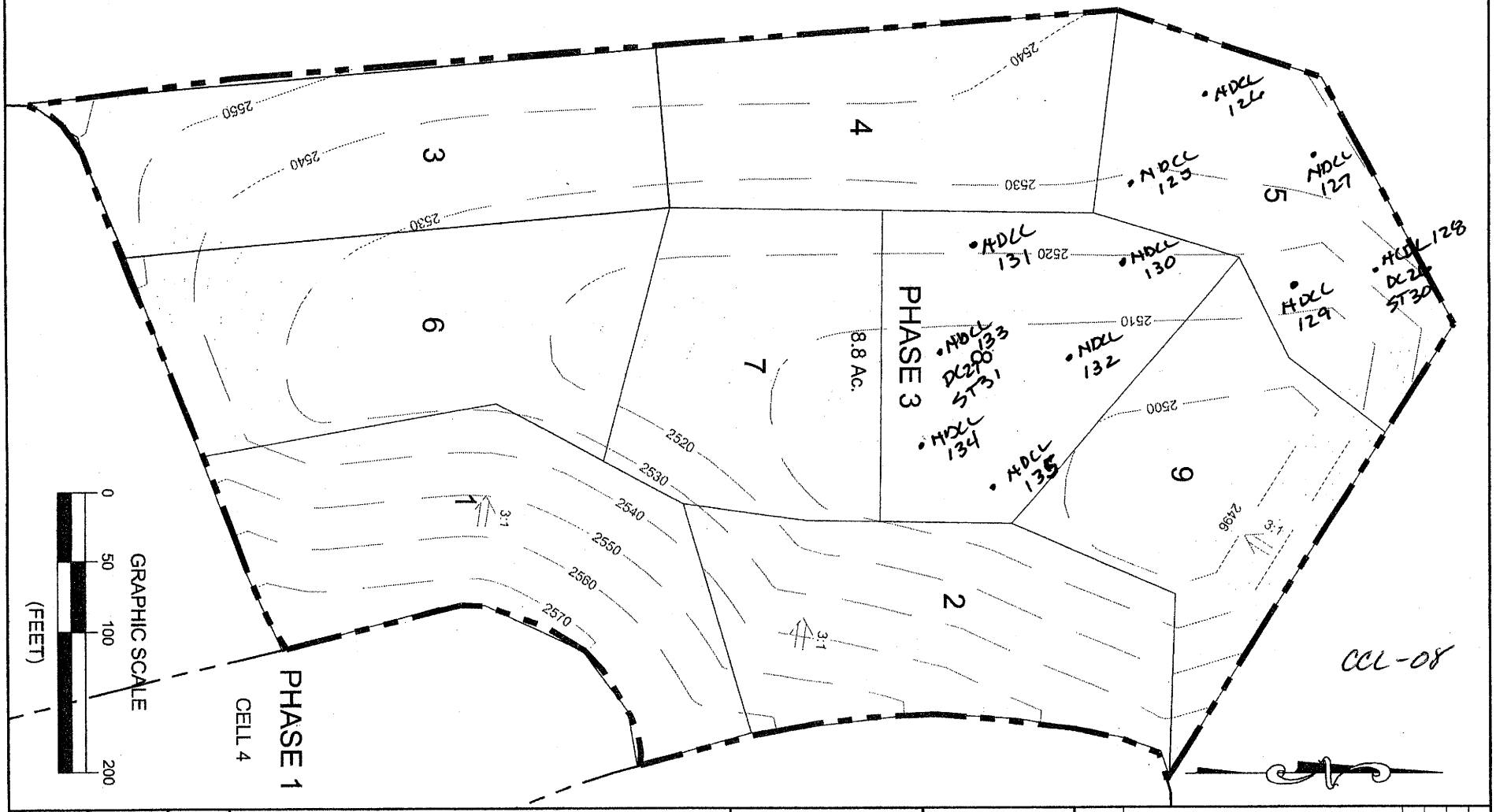
CCL-08



DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE
			PHASE 3-ACRE MAP		

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DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-09**	Geotechnics Representative : Al Lambeth	Page : 1 of 2
Date (s) : **11.16,11.17.09**	Reviewed By : MMS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 137	ACRE 4	1	6"	666-02-01	89.7	27.5	**113.8**	**32.2**	**86.1**	**96.0%**	**95.0%**	
NDCL 138	ACRE 4	1	6"	666-02-01	89.7	27.5	**113.8**	**30.3**	**87.3**	**97.4%**	**95.0%**	DC-28 & ST-32
NDCL 139	ACRE 4	1	6"	666-02-01	89.7	27.5	**116.6**	**29.1**	**90.3**	**100.7%**	**95.0%**	
NDCL 140	ACRE 4	1	6"	666-02-01	89.7	27.5	**116.4**	**29.5**	**89.9**	**100.2%**	**95.0%**	
NDCL 141	ACRE 4	1	6"	666-02-01	89.7	27.5	**114.8**	**28.9**	**89.1**	**99.3%**	**95.0%**	
NDCL 142	ACRE 7	1	6"	666-02-01	89.7	27.5	**113.3**	**29.8**	**87.3**	**97.3%**	**95.0%**	
NDCL 143	ACRE 7	1	6"	666-02-01	89.7	27.5	**116.0**	**28.9**	**90.0**	**100.3%**	**95.0%**	
NDCL 144	ACRE 7	1	6"	666-02-01	89.7	27.5	**113.0**	**29.1**	**87.5**	**97.6%**	**95.0%**	
NDCL 145	ACRE 4	2	6"	666-02-01	89.7	27.5	**112.9**	**28.9**	**87.6**	**97.6%**	**95.0%**	
NDCL 146	ACRE 4	2	6"	666-02-06	98.8	22.0	**122.5**	**24.9**	**98.1**	**99.3%**	**95.0%**	
NDCL 147	ACRE 4	2	6"	666-02-06	98.8	22.0	**121.9**	**24.5**	**97.9**	**99.1%**	**95.0%**	
NDCL 148	ACRE 4	2	6"	666-02-06	98.8	22.0	**123.5**	**25.8**	**98.2**	**99.4%**	**95.0%**	
NDCL 149	ACRE 4	2	6"	666-02-06	98.8	22.0	**120.6**	**26.1**	**95.6**	**96.8%**	**95.0%**	DC-29 & ST-33
NDCL 150	ACRE 4	2	6"	666-02-06	98.8	22.0	**118.9**	**24.2**	**95.7**	**96.9%**	**95.0%**	
NDCL 151	ACRE 7	2	6"	666-02-06	98.8	22.0	**120.9**	**25.4**	**96.4**	**97.6%**	**95.0%**	
NDCL 152	ACRE 7	2	6"	666-02-06	98.8	22.0	**123.6**	**26.2**	**97.9**	**99.1%**	**95.0%**	
NDCL 153	ACRE 7	2	6"	666-02-06	98.8	22.0	**122.0**	**24.6**	**97.9**	**99.1%**	**95.0%**	DC-30 & ST-27A
NDCL 154	ACRE 7	2	6"	666-02-06	98.8	22.0	**120.6**	**23.9**	**97.3**	**98.5%**	**95.0%**	
NDCL 155	ACRE 7	2	6"	666-02-06	98.8	22.0	**122.1**	**25.2**	**97.5**	**98.7%**	**95.0%**	
NDCL 156	ACRE 6	2	6"	666-02-06	98.8	22.0	**119.9**	**25.0**	**95.9**	**97.1%**	**95.0%**	
NDCL 157	ACRE 6	2	6"	666-02-06	98.8	22.0	**119.8**	**24.1**	**96.5**	**97.7%**	**95.0%**	DC-31 & ST-22A
NDCL 158	ACRE 6	2	6"	666-02-06	98.8	22.0	**119.3**	**24.5**	**95.8**	**97.0%**	**95.0%**	
NDCL 159	ACRE 6	2	6"	666-02-06	98.8	22.0	**118.6**	**23.7**	**95.9**	**97.0%**	**95.0%**	
NDCL 160	ACRE 6	2	6"	666-02-06	98.8	22.0	**120.4**	**25.6**	**95.9**	**97.0%**	**95.0%**	
NDCL 161	ACRE 6	2	6"	666-02-06	98.8	22.0	**117.5**	**24.2**	**94.6**	**95.8%**	**95.0%**	
NDCL 162	ACRE 6	3	6"	666-02-06	98.8	22.0	**116.7**	**24.0**	**94.1**	**95.3%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-09**	Geotechnics Representative : Al Lambeth	Page : 2 of 2
Date (s) : **11.16,11.17.09**	Reviewed By : RMS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 163	ACRE 6	3	6"	666-02-06	98.8	22.0	**121.8**	**25.9**	**96.7**	**97.9%**	**95.0%**	DC- 32 & ST-23A
NDCL 164	ACRE 6	3	6"	666-02-06	98.8	22.0	**122.6**	**24.6**	**98.4**	**99.6%**	**95.0%**	
NDCL 165	ACRE 6	3	6"	666-02-06	98.8	22.0	**119.7**	**24.9**	**95.8**	**97.0%**	**95.0%**	
NDCL 166	ACRE 6	3	6"	666-02-06	98.8	22.0	**118.4**	**25.4**	**94.4**	**95.6%**	**95.0%**	
NDCL 167	ACRE 6	3	6"	666-02-06	98.8	22.0	**119.9**	**25.1**	**95.8**	**97.0%**	**95.0%**	
NDCL 168	ACRE 4	3	6"	666-02-06	98.8	22.0	**120.4**	**25.2**	**96.2**	**97.3%**	**95.0%**	
NDCL 169	ACRE 4	3	6"	666-02-06	98.8	22.0	**118.9**	**27.8**	**93.0**	**94.2%**	**95.0%**	
NDCL 170	ACRE 4	3	6"	666-02-06	98.8	22.0	**121.4**	**22.1**	**99.4**	**100.6%**	**95.0%**	
NDCL 171	ACRE 4	3	6"	666-02-06	98.8	22.0	**116.8**	**24.4**	**93.9**	**95.0%**	**95.0%**	
NDCL 172	ACRE 4	3	6"	666-02-06	98.8	22.0	**123.5**	**26.2**	**97.9**	**99.0%**	**95.0%**	DC-33 & ST-34
NDCL 173	ACRE 4	3	6"	666-02-06	98.8	22.0	**123.5**	**25.4**	**98.5**	**99.7%**	**95.0%**	
NDCL 174	ACRE 4	3	6"	666-02-06	98.8	22.0	**124.4**	**29.5**	**96.1**	**97.2%**	**95.0%**	
NDCL 175	ACRE 7	3	6"	666-02-06	98.8	22.0	**119.9**	**24.4**	**96.4**	**97.6%**	**95.0%**	
NDCL 176	ACRE 7	3	6"	666-02-06	98.8	22.0	**118.1**	**26.2**	**93.6**	**94.7%**	**95.0%**	DC-34 & ST-35
NDCL 177	ACRE 7	3	6"	666-02-06	98.8	22.0	**122.6**	**25.1**	**98.0**	**99.2%**	**95.0%**	
NDCL 178	ACRE 7	3	6"	666-02-06	98.8	22.0	**119.8**	**27.2**	**94.2**	**95.3%**	**95.0%**	
NDCL 179	ACRE 7	3	6"	666-02-06	98.8	22.0	**117.9**	**26.1**	**93.5**	**94.6%**	**95.0%**	
NDCL 180	ACRE 8	2	6"	666-02-06	98.8	22.0	**120.2**	**25.1**	**96.1**	**97.3%**	**95.0%**	
NDCL 181	ACRE 8	2	6"	666-02-06	98.8	22.0	**121.4**	**26.2**	**96.2**	**97.4%**	**95.0%**	DC-35 & ST-28A
NDCL 182	ACRE 8	2	6"	666-02-06	98.8	22.0	**122.5**	**26.6**	**96.8**	**97.9%**	**95.0%**	
NDCL 183	ACRE 8	2	6"	666-02-06	98.8	22.0	**120.4**	**26.2**	**95.4**	**96.6%**	**95.0%**	
NDCL 184	ACRE 8	2	6"	666-02-06	98.8	22.0	**122.0**	**27.0**	**96.1**	**97.2%**	**95.0%**	
NDCL 185	ACRE 8	2	6"	666-02-06	98.8	22.0	**119.5**	**25.9**	**94.9**	**96.1%**	**95.0%**	
NDCL												
NDCL												
NDCL												

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-09**
Date (s) : 11.16,11.17.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-28	DC-29	DC-30	DC-31
Nuclear Test Number :	NDCL 138	NDCL 149	NDCL 153	NDCL 157
Location:	ACRE 4	ACRE 4	ACRE 7	ACRE 6
Depth (ft):	LIFT 1	LIFT 2	LFT 2	LIFT 2
Date :	11.16.09	11.17.09	11.17.09	11.17.09
Mold				
Cylinder ID	1	1	3	4
Weight of Cylinder (lbs.)	1.33	1.33	1.32	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.21	5.15	5.16	5.13
Wt. of Cylinder (lbs.)	1.33	1.33	1.32	1.32
Wt. of WS	3.88	3.82	3.84	3.81
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	A-1	A-2	A3	A1
Wt. of Tare & WS (gm)	457.20	341.60	443.20	353.60
Wt. of Tare & DS (gm)	364.00	283.20	363.80	290.20
Wt. of Tare (gm)	9.00	9.00	9.00	9.00
Wt. of Water (gm)	93.20	58.40	79.40	63.40
Wt. of DS (gm)	355.00	274.20	354.80	281.40
Wet Density (pcf):	117.6	116.1	116.4	115.4
Moisture Content (%):	**26.3**	**21.3**	**22.4**	**22.5**
Dry Density (pcf):	**93.1**	**95.7**	**95.1**	**94.2**

Geotechnics Representative : Al Lambeth

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-09**
Date (s) : 11.16,11.17.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-32	DC-33	DC-34	DC-35
Nuclear Test Number :	NDCL 163	NDCL 172	NDCL 176	NDCL 181
Location:	ACRE 6	ACRE 4	ACRE 7	ACRE 8
Depth (ft):	LIFT 3	LIFT 3	LIFT 3	LIFT 2
Date :	11.17.09	11.17.09	11.17.09	11.19.09
Mold				
Cylinder ID	4	1	3	1
Weight of Cylinder (lbs.)	1.32	1.33	1.32	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.22	5.19	5.20	5.30
Wt. of Cylinder (lbs.)	1.32	1.33	1.32	1.33
Wt. of WS	3.90	3.86	3.88	3.98
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	A-2	A-5	A3	A3
Wt. of Tare & WS (gm)	456.80	425.40	425.80	426.30
Wt. of Tare & DS (gm)	364.60	341.00	342.40	342.40
Wt. of Tare (gm)	9.00	9.00	9.00	9.00
Wt. of Water (gm)	92.20	84.40	83.40	83.90
Wt. of DS (gm)	355.60	332.00	333.40	333.40
Wet Density (pcf):	118.2	116.9	117.5	120.6
Moisture Content (%):	**25.9**	**25.4**	**25.0**	**25.2**
Dry Density (pcf):	**93.8**	**93.2**	**94.0**	**96.3**

Geotechnics Representative : Al Lambeth

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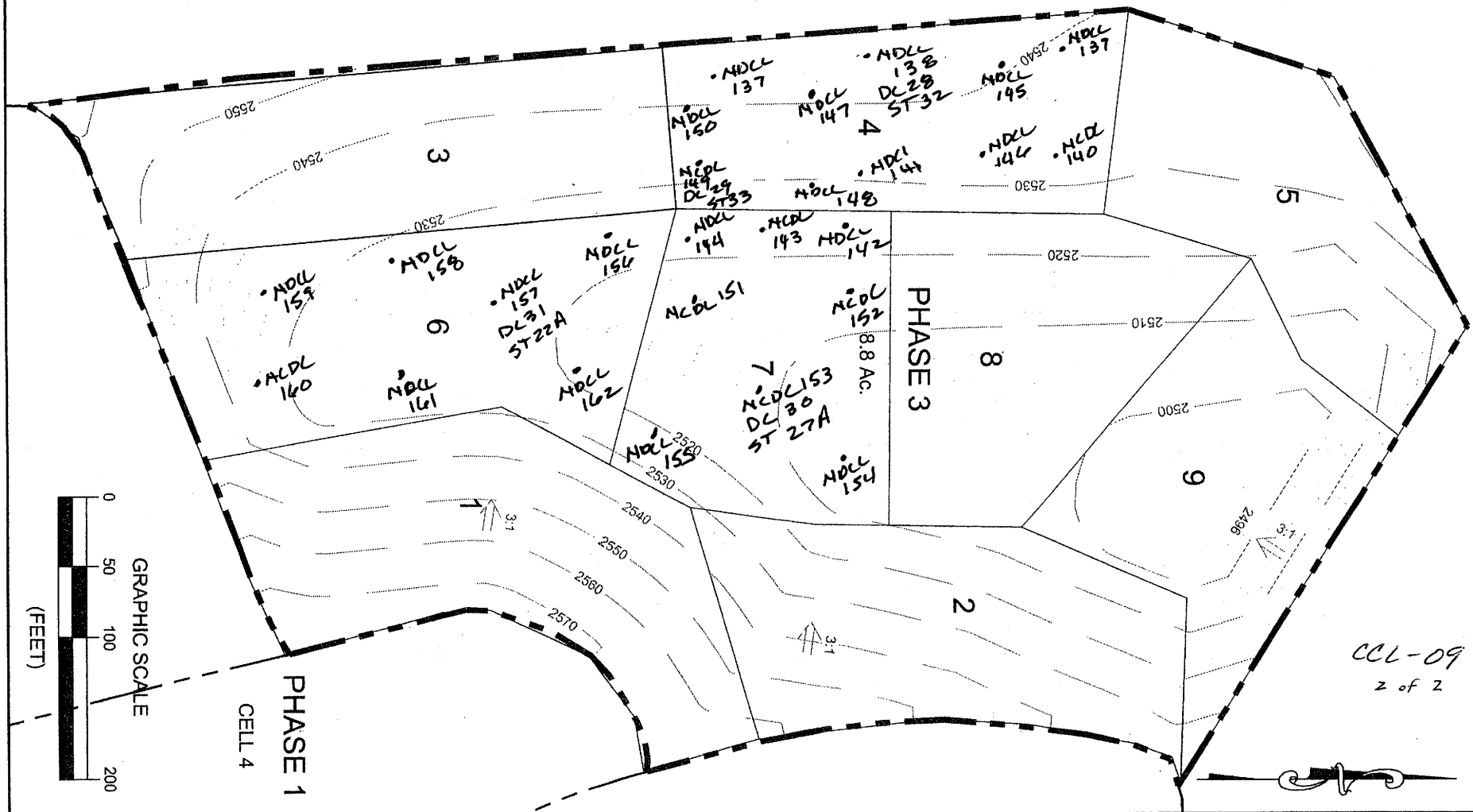

CCL-09
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DRAWING NO.	SCALE	PROJECT NO.				
AM-1	AS NOTED		WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	

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DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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2 of 2

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-10**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.24.09**	Reviewed By : AMS	Date : 2-5-10

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 186	ACRE 9B	1	6"	666-02-05	94.2	26.0	**121.4**	**26.6**	**95.9**	**101.8%**	**95.0%**	
NDCL 187	ACRE 9B	1	6"	666-02-05	94.2	26.0	**121.9**	**30.6**	**93.3**	**99.1%**	**95.0%**	
NDCL 188	ACRE 9B	1	6"	666-02-05	94.2	26.0	**119.9**	**28.5**	**93.3**	**99.1%**	**95.0%**	
NDCL 189	ACRE 9B	1	6"	666-02-01	89.7	27.5	**114.6**	**33.0**	**86.2**	**96.1%**	**95.0%**	DC-36 & ST 36
NDCL 190	ACRE 9B	2	6"	666-02-01	89.7	27.5	**112.5**	**31.0**	**85.9**	**95.7%**	**95.0%**	
NDCL 191	ACRE 9B	2	6"	666-02-01	89.7	27.5	**113.7**	**24.9**	**91.0**	**101.5%**	**95.0%**	DC-37 & ST-38
NDCL 192	ACRE 9B	2	6"	666-02-01	89.7	27.5	**109.3**	**27.8**	**85.5**	**95.3%**	**95.0%**	
NDCL 193	ACRE 9B	2	6"	666-02-01	89.7	27.5	**111.8**	**31.1**	**85.3**	**95.1%**	**95.0%**	
NDCL 194	ACRE 9B	3	6"	666-02-01	89.7	27.5	**112.7**	**32.0**	**85.4**	**95.2%**	**95.0%**	
NDCL 195	ACRE 9B	3	6"	666-02-05	94.2	26.0	**121.4**	**29.5**	**93.7**	**99.5%**	**95.0%**	DC-38 & ST-37
NDCL 196	ACRE 9B	3	6"	666-02-05	94.2	26.0	**121.0**	**32.7**	**91.2**	**96.8%**	**95.0%**	
NDCL 197	ACRE 9B	3	6"	666-02-01	89.7	27.5	**115.3**	**29.8**	**88.8**	**99.0%**	**95.0%**	
NDCL 198	ACRE 9B	3	6"	666-02-01	89.7	27.5	**115.3**	**29.4**	**89.1**	**99.3%**	**95.0%**	
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-10**
Date (s) : 11.24.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-36	DC-37	DC-38
Nuclear Test Number :	NDCL 189	NDCL 191	NDCL 195
Location:	ACRE 9B	ACRE 9B	ACRE 9B
Depth (ft):	LIFT 1	LIFT 2	LIFT 3
Date :	11.24.09	11.24.09	11.24.09

Mold

Cylinder ID	2	3	4
Weight of Cylinder (lbs.)	1.32	1.33	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.18	5.01	5.21
Wt. of Cylinder (lbs.)	1.32	1.33	1.32
Wt. of WS	3.86	3.68	3.89
Cylinder Volume (ft^3)	0.033	0.033	0.033

Moisture / Density

Tare Number	A-1	A-3	A-4
Wt. of Tare & WS (gm)	449.60	458.80	498.20
Wt. of Tare & DS (gm)	360.00	367.20	391.00
Wt. of Tare (gm)	9.00	9.00	9.00
Wt. of Water (gm)	89.60	91.60	107.20
Wt. of DS (gm)	351.00	358.20	382.00
Wet Density (pcf):	117.0	111.5	117.9
Moisture Content (%):	**25.5**	**25.6**	**28.1**
Dry Density (pcf):	**93.2**	**88.8**	**92.0**

Geotechnics Representative : Al Lambeth

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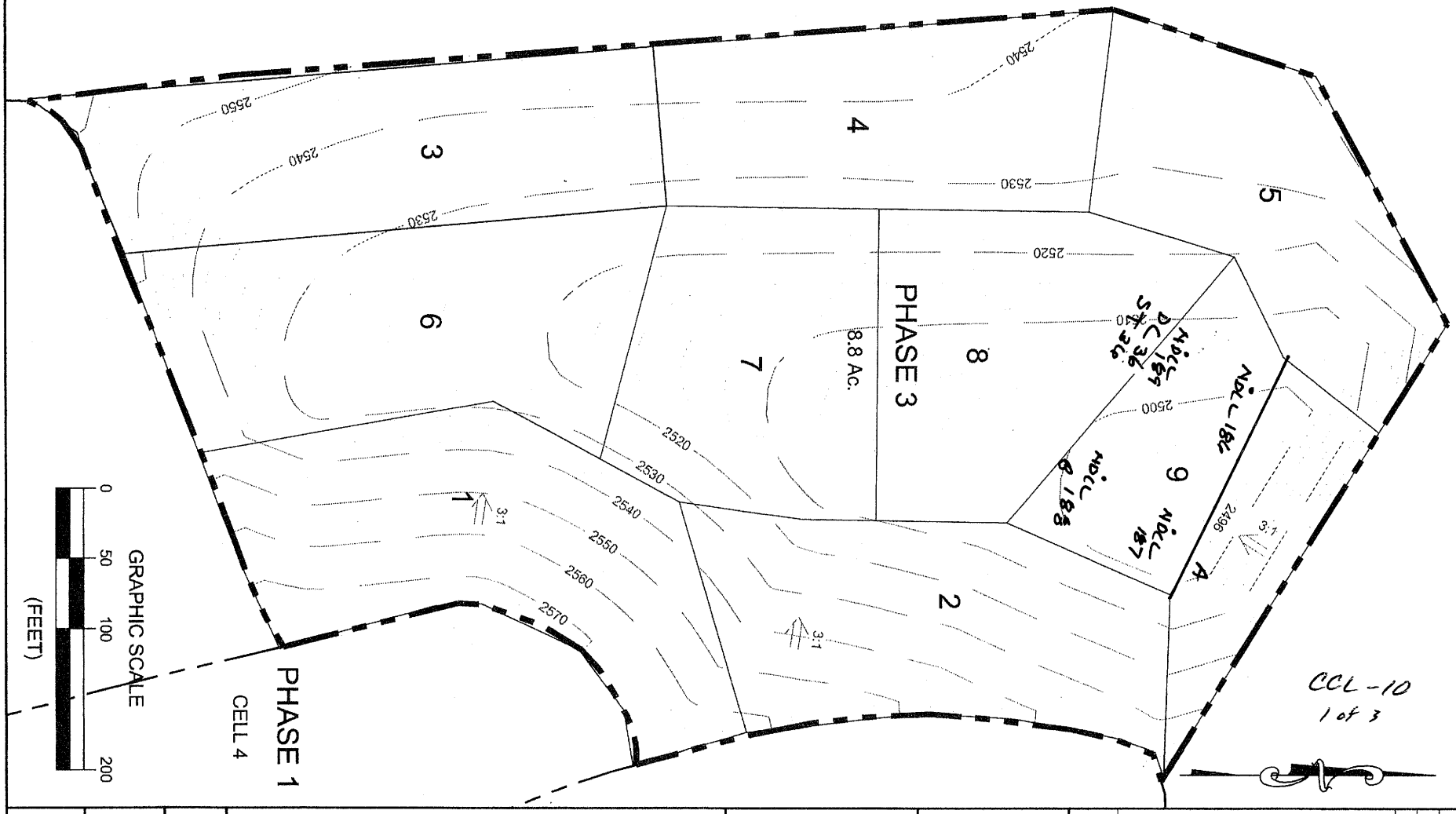

CCL-10
1 of 3

DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP

JOYCE ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE: (336) 323-0092

DESIGNED
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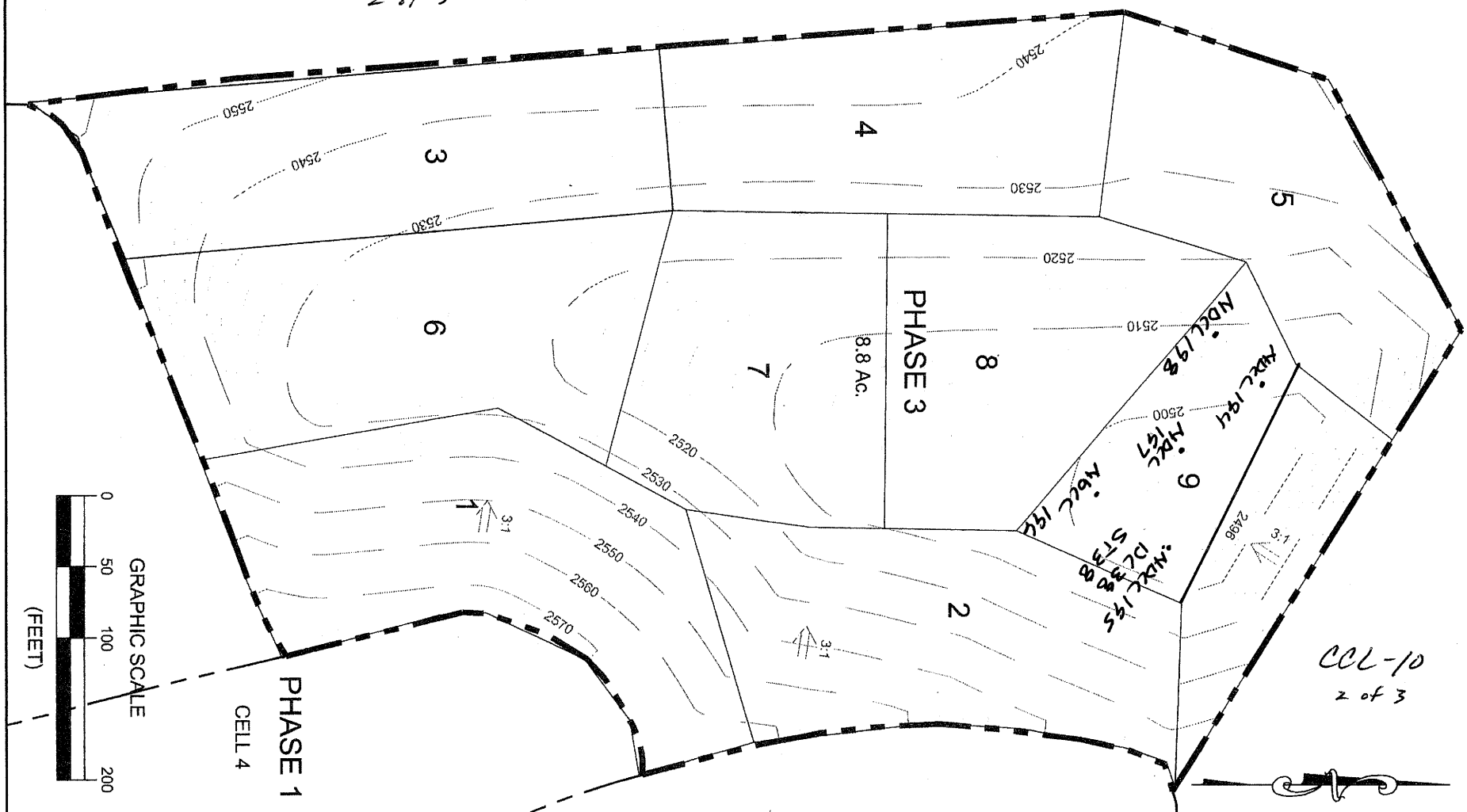

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DRAWING NO. AM-1	SCALE AS NOTED	PROJECT NO.	WHITE OAK LANDFILL CLYDE, NORTH CAROLINA PHASE 3-ACRE MAP	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE © 2009 Joyce Engineering, Inc. All rights reserved.	DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

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WHITE OAK LANDFILL CLYDE, NORTH CAROLINA	JOYCE ENGINEERING, INC. 2211 W. MEADOWVIEW ROAD GREENSBORO, NC 27407 PHONE: (336) 323-0092	DESIGNED DRAWN CADD/ CHECKED APPROVED DATE	
PHASE 3-ACRE MAP		© 2009 Joyce Engineering, Inc. All rights reserved.	

DATE	REVISIONS AND RECORD OF ISSUE	NO	BY	CK	APP

PROJECT NO.

SCALE
AS NOTED

DRAWING NO.
AM-1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

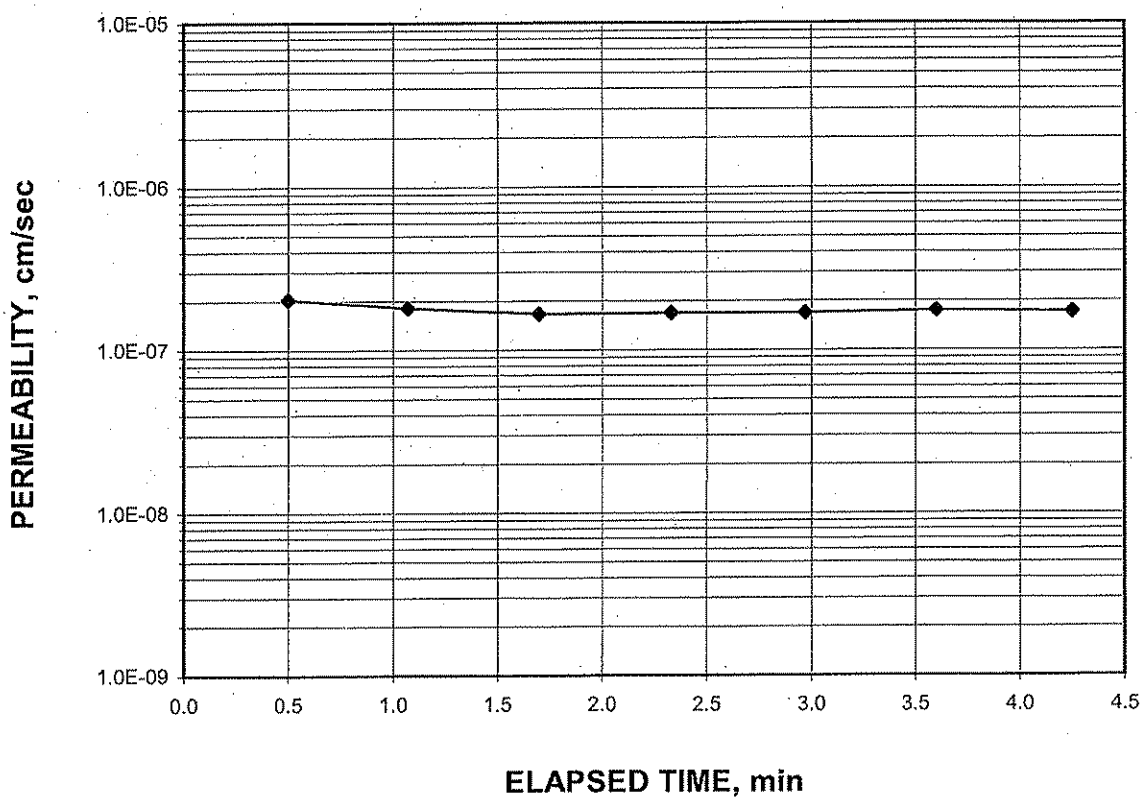
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID No.	2009-666-06-01		

Visual Description: REDDISH BROWN SANDY SILT

AVERAGE PERMEABILITY = 1.7E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.7E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/16/2009 Checked By: GEM Date: 9-18-09

DCN: CT-22C DATE:12-21-08 REVISION: \\Server\Shared Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-01 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID No.	2009-666-06-01		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SANDY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	200	809
Wt. of Tare & WS (gm.)	457.90	274.19
Wt. of Tare & DS (gm.)	409.61	242.48
Wt. of Tare (gm.)	171.80	115.44
Wt. of Water (gm.)	48.29	31.71
Wt. of DS (gm.)	237.81	127.04
Moisture Content (%)	**20.3**	**25.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	700.16	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	700.16	727.25
Length 1 (in.)	3.566	3.489
Length 2 (in.)	3.544	3.496
Length 3 (in.)	3.592	3.484
Top Diameter (in.)	2.823	2.875
Middle Diameter (in.)	2.812	2.839
Bottom Diameter (in.)	2.817	2.811
Average Length (in.)	3.57	3.49
Average Area (in.^{2})	6.23	6.34
Sample Volume (cm^3)	364.43	362.68
Unit Wet Wt. (gm./ cm^3)	1.921	2.005
Unit Wet Wt. (pcf)	119.9	125.2
Unit Dry Wt. (pcf)	99.7	100.2
Unit Dry Wt. (gm./ cm^3)	1.597	1.605
Void Ratio, e	0.691	0.683
Porosity, n	0.409	0.406
Pore Volume (cm^3)	148.9	147.1
Total Wt. Of Sample After Test		705.36

Tested By: TMS Date: 9/16/2009 Checked By: GDM Date: 9/18/09

DCN: CT-22C DATE:12-21-[illegible] \\Server[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-01 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID No.	2009-666-06-01		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.86
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.92
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 1.7E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.7E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/16/2009	12	28.90	0.0	9.5	11.5	0	24.0	NA
9/16/2009	12	29.40	0.5	9.4	11.3	0	24.0	2.0E-07
9/16/2009	12	29.97	1.1	9.3	11.2	0	24.0	1.8E-07
9/16/2009	12	30.60	1.7	9.2	11.1	0	24.0	1.7E-07
9/16/2009	12	31.23	2.3	9.1	10.9	0	24.0	1.7E-07
9/16/2009	12	31.87	3.0	9.0	10.8	0	24.0	1.7E-07
9/16/2009	12	32.50	3.6	8.9	10.6	0	24.0	1.7E-07
9/16/2009	12	33.15	4.3	8.8	10.5	1	24.0	1.7E-07

Tested By: TMS Date: 9/16/2009 Checked By: GBM Date: 9-18-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID	2009-666-06-01	Soil Description	**DARK BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

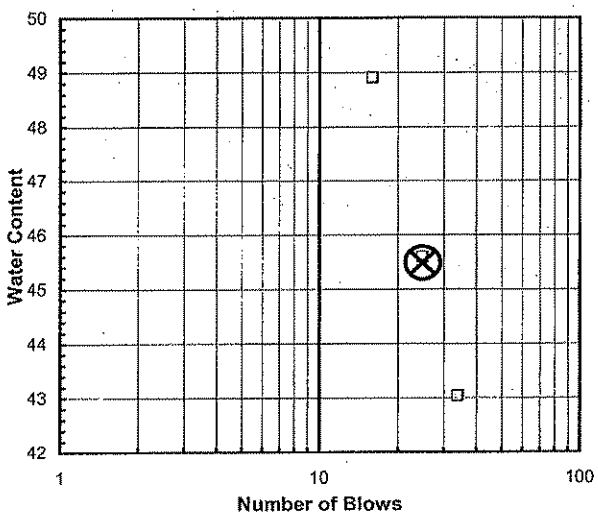
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	G	A-K	A-B	MULTIPOINT
Wt. of Tare & WS (gm)	27.20	29.22	28.38	
Wt. of Tare & DS (gm)	23.20	24.93	24.52	
Wt. of Tare (gm)	15.02	15.52	15.55	
Wt. of Water (gm)	4.0	4.3	3.9	
Wt. of DS (gm)	8.2	9.4	9.0	
Moisture Content (%)	**48.9**	**45.6**	**43.0**	
Number of Blows	**16**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	L	S	
Wt. of Tare & WS (gm)	21.50	21.86	
Wt. of Tare & DS (gm)	20.00	20.28	
Wt. of Tare (gm)	15.22	15.20	
Wt. of Water (gm)	1.5	1.6	
Wt. of DS (gm)	4.8	5.1	
Moisture Content (%)	**31.4**	**31.1**	**0.3**

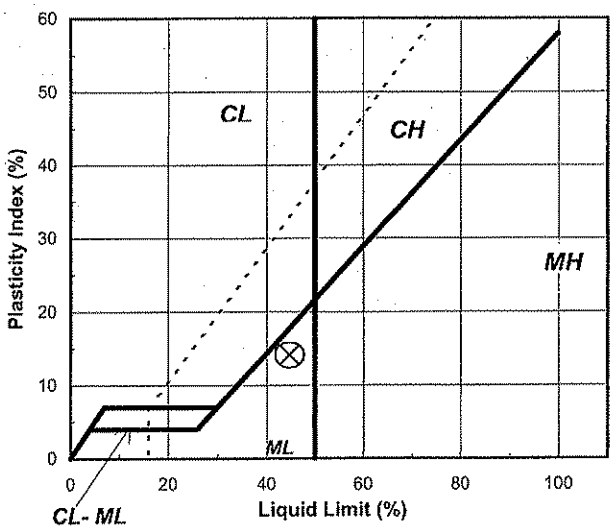
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**31**
Plasticity Index (%)	**14**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 9/17/2009 *Checked By* GEM *Date* 9-18-09

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SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID	2009-666-06-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel		sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200

USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	5.15
#4 To #200	*Sand*	33.21
Finer Than #200	*Silt & Clay*	61.65

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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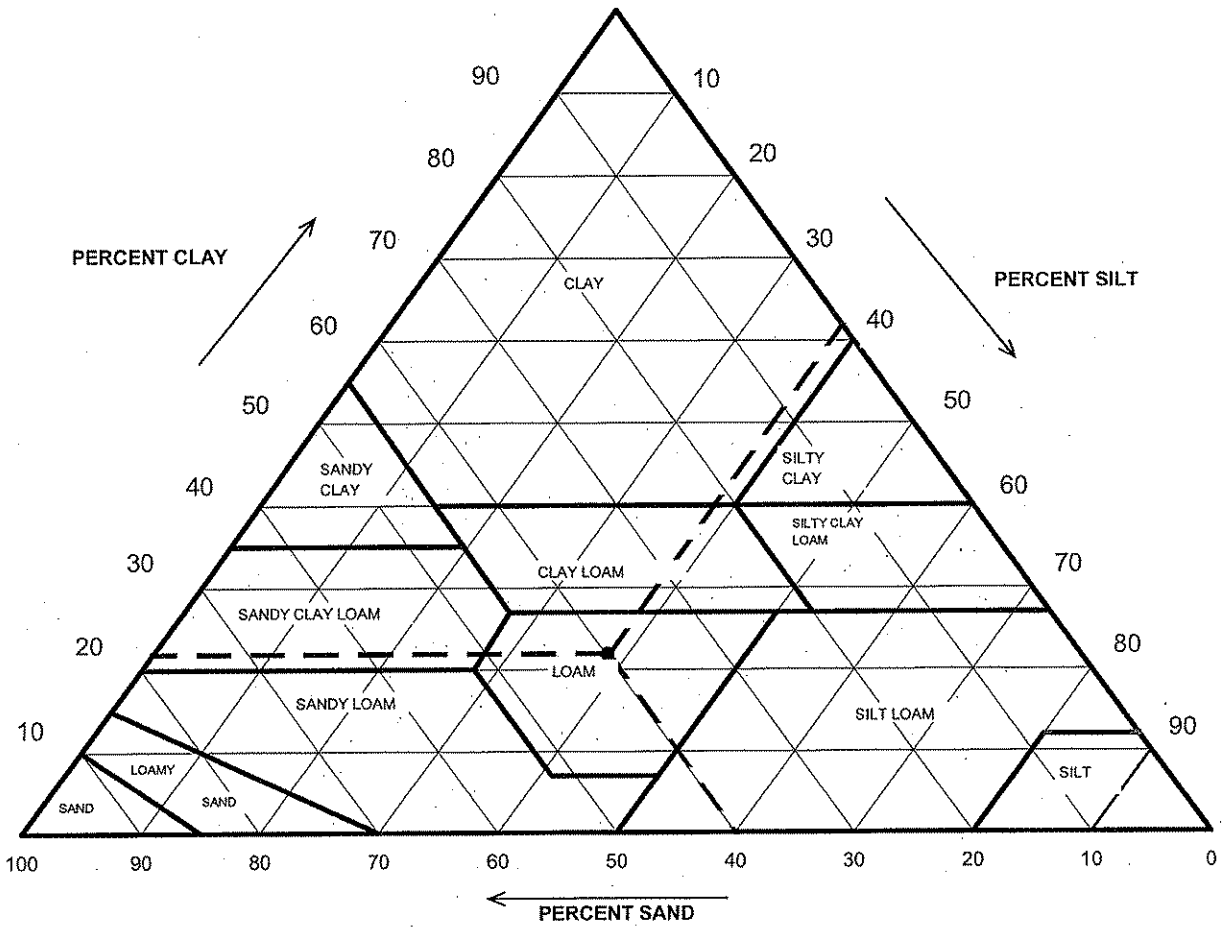
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID	2009-666-06-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	8.05	**0.00**
2	91.95	*Sand*	36.63	**39.83**
0.05	55.32	*Silt*	35.18	**38.26**
0.002	20.14	*Clay*	20.14	**21.91**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID	2009-666-06-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	200	Tare No.	R-1
Wgt.Tare + Wet Soil (gm)	457.90	Wgt.Tare + Wet Soil (gm)	56.23
Wgt.Tare + Dry Soil (gm)	409.61	Wgt.Tare + Dry Soil (gm)	55.54
Weight of Tare (gm)	171.80	Weight of Tare (gm)	15.83
Weight of Water (gm)	48.29	Weight of Water (gm)	0.69
Weight of Dry Soil (gm)	237.81	Weight of Dry Soil (gm)	39.71
Moisture Content (%)	**20.3**	**Moisture Content (%)**	**1.7**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	286.10	Weight of the Dry Sample (gm)	286.97
Dry Weight +#10 Material(gm)	237.8	Weight of minus #200 material (gm)	32.96
Wet Weight Hydro. Material.(gm)	50.01	Weight of plus #200 material (gm)	254.01
Dry Weight Hydro. Material (gm)	49.16		
Total Dry Weight Sample (gm)	286.97	**J-FACTOR (%FINER THAN #10)**	**0.9195**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	3.85	1.34	1.34	98.66	**98.66**
3/4"	19.0	2.18	0.76	2.10	97.90	**97.90**
1/2"	12.5	5.44	2.29	2.29	97.71	**97.71**
3/8"	9.50	2.15	0.90	3.19	96.81	**96.81**
#4	4.75	4.65	1.96	5.15	94.85	**94.85**
#10	2.00	6.90	2.90	8.05	91.95	**91.95**
#20	0.85	2.72	5.53	5.53	94.47	**86.86**
#40	0.425	2.60	5.29	10.82	89.18	**82.00**
#60	0.250	2.45	4.98	15.81	84.19	**77.42**
#140	0.106	5.23	10.64	26.45	73.55	**67.63**
#200	0.075	3.20	6.51	32.96	67.04	**61.65**
Pan	-	32.96	67.04	100.00	-	-

Notes :

Tested By SD Date 9/22/2009 Checked By [illegible] Date 9-22-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-06	Sample No.	ST9
Lab ID	2009-666-06-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	30.0	30.0	24.5	4.31	25.7	51.7	0.01275	0.0304	**47.6**
5		28.0	24.5	4.31	23.7	47.7	0.01275	0.0195	**43.9**
15		26.0	24.5	4.31	21.7	43.7	0.01275	0.0114	**40.2**
30		24.0	24.5	4.31	19.7	39.6	0.01275	0.0082	**36.5**
60		21.0	24.5	4.31	16.7	33.6	0.01275	0.0059	**30.9**
250		17.0	24.6	4.25	12.8	25.7	0.01273	0.0030	**23.6**
1440		13.0	24.5	4.31	8.7	17.5	0.01275	0.0013	**16.1**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	49.16	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	91.95
Weight of Dry Material (gm)	49.16		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 9/19/2009 Checked By [illegible] Date 9-22-09

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-01 #10 Split Hydro rev 9.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

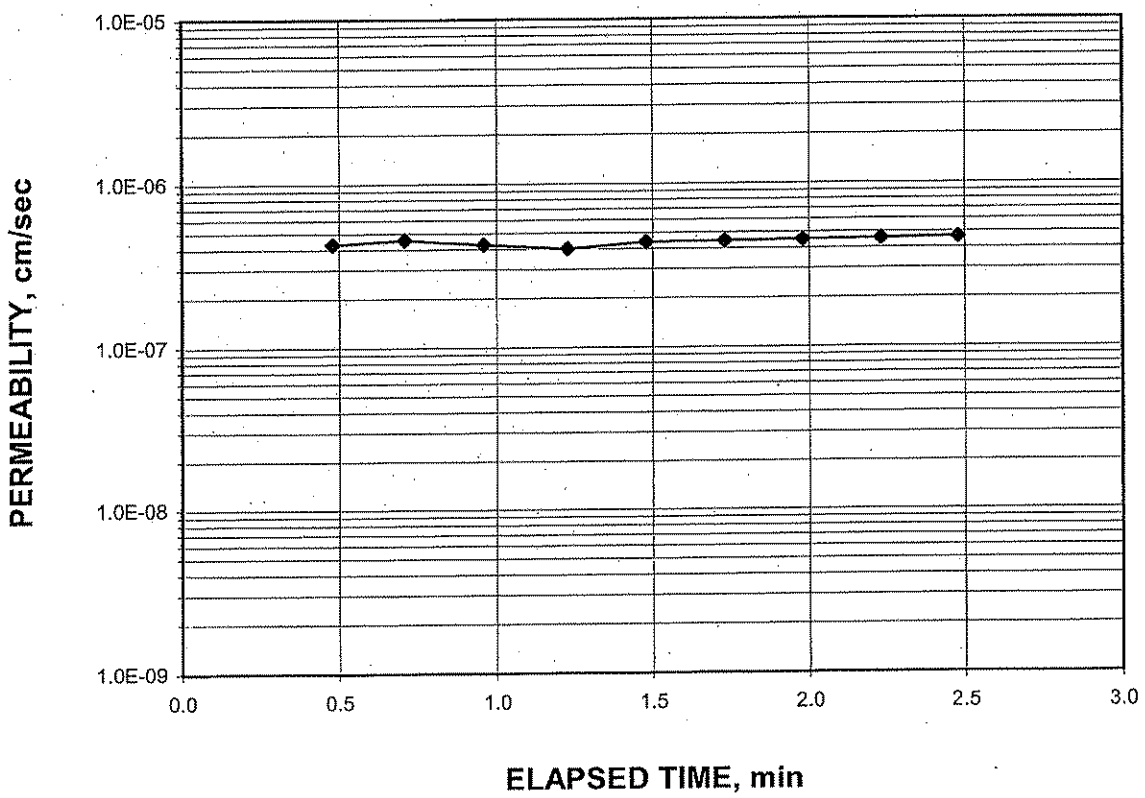
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID No.	2009-666-06-02		

Visual Description: REDDISH BROWN SANDY SILT

AVERAGE PERMEABILITY = 4.5E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.5E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/16/2009 Checked By: GDM Date: 9-18-09

DCN: CT-22C DATE:12-21-98 REVISION: 1 \\Server\Share\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-02 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID No.	2009-666-06-02		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SANDY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	211	811
Wt. of Tare & WS (gm.)	476.33	285.25
Wt. of Tare & DS (gm.)	423.33	248.94
Wt. of Tare (gm.)	171.17	106.87
Wt. of Water (gm.)	53.00	36.31
Wt. of DS (gm.)	252.16	142.07
Moisture Content (%)	**21.0**	**25.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	692.80	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	692.80	718.79
Length 1 (in.)	3.428	3.422
Length 2 (in.)	3.437	3.418
Length 3 (in.)	3.456	3.424
Top Diameter (in.)	2.845	2.842
Middle Diameter (in.)	2.808	2.818
Bottom Diameter (in.)	2.820	2.796
Average Length (in.)	3.44	3.42
Average Area (in.^{2})	6.27	6.24
Sample Volume (cm^3)	353.20	349.84
Unit Wet Wt. (gm./ cm^3)	1.961	2.055
Unit Wet Wt. (pcf)	122.4	128.3
Unit Dry Wt. (pcf)	101.2	102.1
Unit Dry Wt. (gm./ cm^3)	1.621	1.636
Void Ratio, e	0.666	0.650
Porosity, n	0.400	0.394
Pore Volume (cm^3)	141.2	137.8
Total Wt. Of Sample After Test		703.94

Tested By: TMS Date: 9/16/2009 Checked By: GBM Date: 9-18-09

DCN: CT-22C DATE:12-21-[illegible] \\Server[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-02 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID No.	2009-666-06-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.69
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.26
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 4.5E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.5E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/16/2009	12	38.27	0.0	9.5	11.6	0	24.0	NA
9/16/2009	12	38.75	0.5	9.3	11.3	0	24.0	4.3E-07
9/16/2009	12	38.98	0.7	9.2	11.2	0	24.0	4.6E-07
9/16/2009	12	39.23	1.0	9.1	11.0	0	24.0	4.3E-07
9/16/2009	12	39.50	1.2	9.0	10.9	0	24.0	4.0E-07
9/16/2009	12	39.75	1.5	8.9	10.7	0	24.0	4.4E-07
9/16/2009	12	40.00	1.7	8.8	10.6	0	24.0	4.4E-07
9/16/2009	12	40.25	2.0	8.7	10.4	0	24.0	4.5E-07
9/16/2009	12	40.50	2.2	8.6	10.3	0	24.0	4.6E-07
9/16/2009	12	40.75	2.5	8.5	10.1	1	24.0	4.6E-07

Tested By: TMS Date: 9/16/2009 Checked By: GBM Date: 9-18-09

DCN: CT-22C DATE:12-21-[illegible] \\Server\Archive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-02 PERMOM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID	2009-666-06-02	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

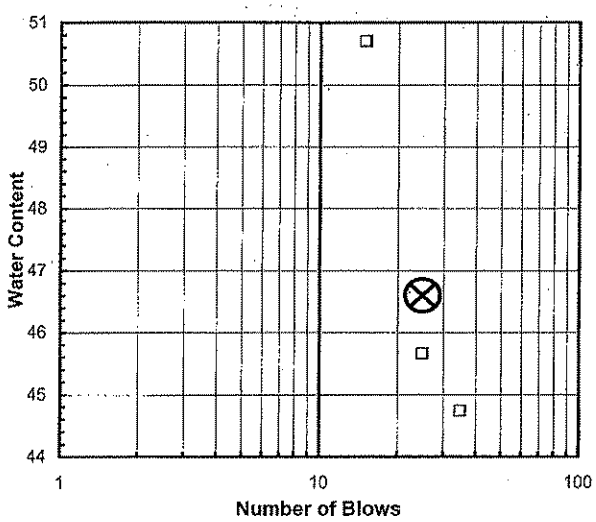
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	L	G	S	MULTIPOINT
Wt. of Tare & WS (gm)	31.57	32.61	30.32	
Wt. of Tare & DS (gm)	26.08	27.10	25.65	
Wt. of Tare (gm)	15.25	15.03	15.21	
Wt. of Water (gm)	5.5	5.5	4.7	
Wt. of DS (gm)	10.8	12.1	10.4	
Moisture Content (%)	**50.7**	**45.7**	**44.7**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-K	A-B	
Wt. of Tare & WS (gm)	23.01	23.20	
Wt. of Tare & DS (gm)	21.06	21.28	
Wt. of Tare (gm)	15.51	15.55	
Wt. of Water (gm)	2.0	1.9	
Wt. of DS (gm)	5.6	5.7	
Moisture Content (%)	**35.1**	**33.5**	**1.6**

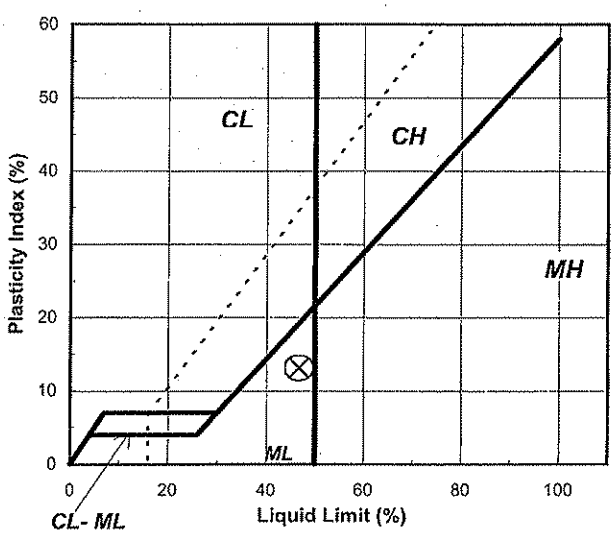
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**34**
Plasticity Index (%)	**13**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



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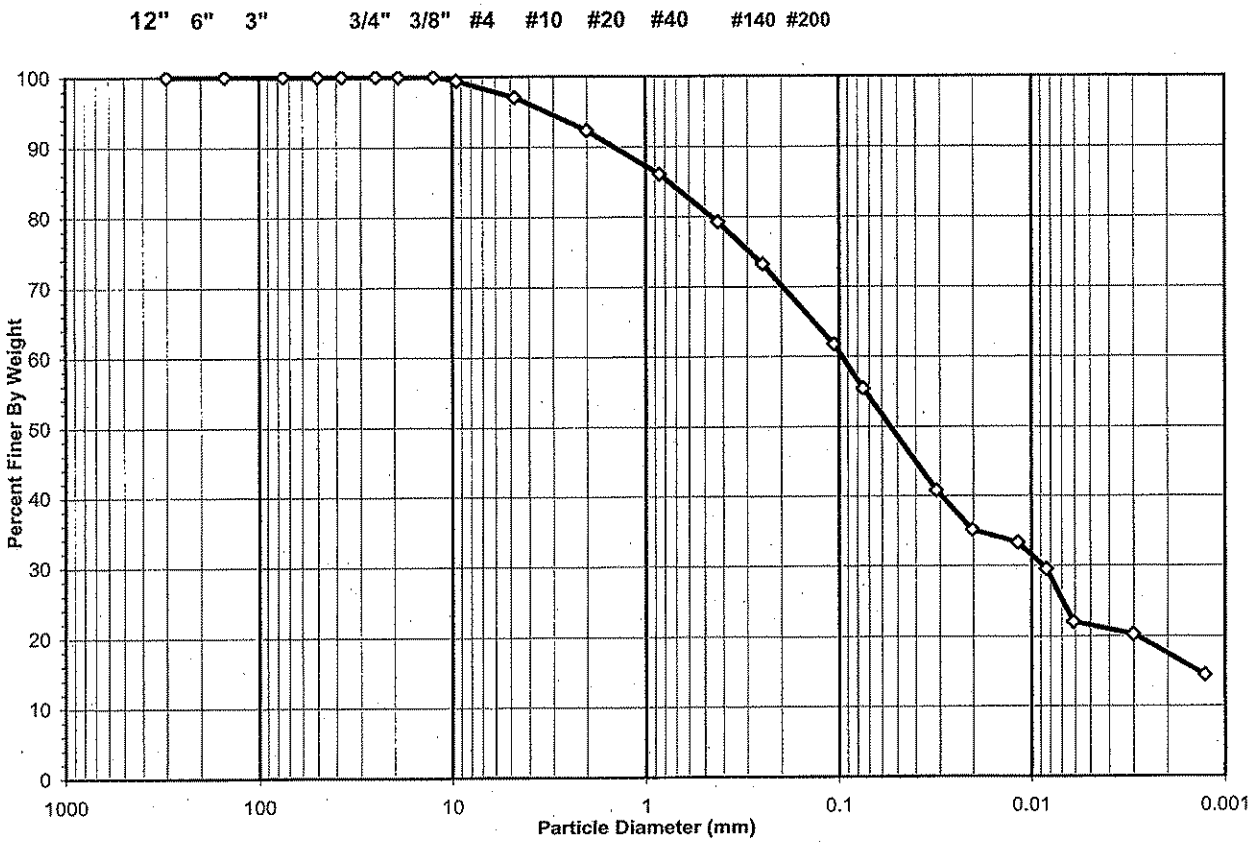
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID	2009-666-06-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS				HYDROMETER	
USCS	cobbles	gravel	sand		silt and clay fraction	
USDA	cobbles	gravel	sand		silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	2.93
#4 To #200	*Sand*	41.66
Finer Than #200	*Silt & Clay*	55.41

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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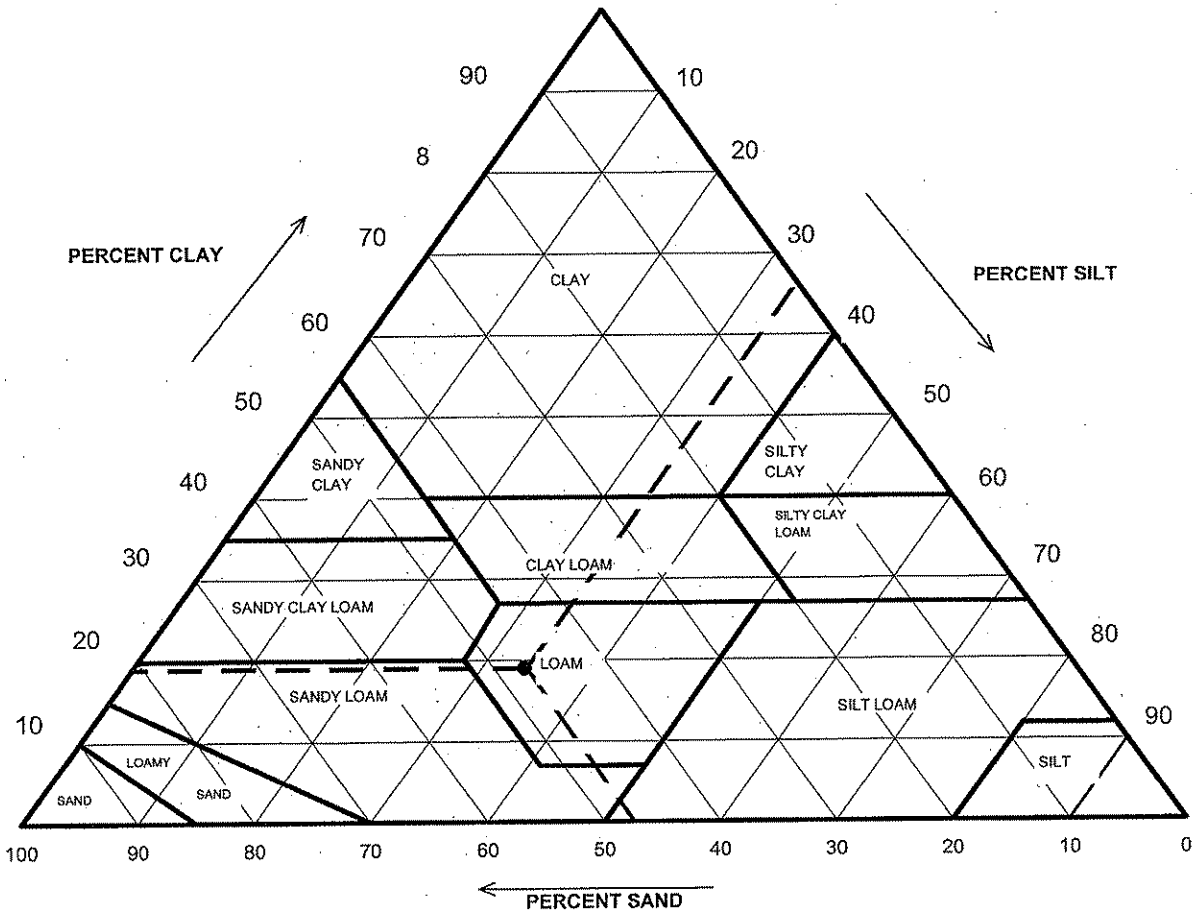
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID	2009-666-06-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	7.69	**0.00**
2	92.31	*Sand*	43.68	**47.31**
0.05	48.63	*Silt*	31.13	**33.72**
0.002	17.51	*Clay*	17.51	**18.97**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-06-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID	2009-666-06-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	211	Tare No.	E-2
Wgt.Tare + Wet Soil (gm)	476.33	Wgt.Tare + Wet Soil (gm)	66.30
Wgt.Tare + Dry Soil (gm)	423.33	Wgt.Tare + Dry Soil (gm)	65.04
Weight of Tare (gm)	171.17	Weight of Tare (gm)	21.93
Weight of Water (gm)	53.00	Weight of Water (gm)	1.26
Weight of Dry Soil (gm)	252.16	Weight of Dry Soil (gm)	43.11
Moisture Content (%)	**21.0**	**Moisture Content (%)**	**2.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	305.16	Weight of the Dry Sample (gm)	300.74
Dry Weight +#10 Material(gm)	252.2	Weight of minus #200 material (gm)	29.16
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	271.58
Dry Weight Hydro. Material (gm)	48.58		
Total Dry Weight Sample (gm)	300.74	**J-FACTOR (%FINER THAN #10)**	**0.9231**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.43	0.57	0.57	99.43	**99.43**
#4	4.75	5.95	2.36	2.93	97.07	**97.07**
#10	2.00	12.01	4.76	7.69	92.31	**92.31**
#20	0.85	3.28	6.75	6.75	93.25	**86.08**
#40	0.425	3.59	7.39	14.14	85.86	**79.26**
#60	0.250	3.18	6.55	20.69	79.31	**73.21**
#140	0.106	6.03	12.41	33.10	66.90	**61.76**
#200	0.075	3.34	6.88	39.98	60.02	**55.41**
Pan	-	29.16	60.02	100.00	-	-

Notes :

Tested By SD Date 9/22/2009 Checked By GEM Date 9-22-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-06	Sample No.	ST10
Lab ID	2009-666-06-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	26.0	26.0	24.5	4.31	21.7	44.2	0.01275	0.0313	**40.8**
5		23.0	24.5	4.31	18.7	38.1	0.01275	0.0202	**35.2**
15		22.0	24.5	4.31	17.7	36.0	0.01275	0.0117	**33.3**
30		20.0	24.5	4.31	15.7	32.0	0.01275	0.0084	**29.5**
60		16.0	24.5	4.31	11.7	23.8	0.01275	0.0061	**22.0**
250		15.0	24.6	4.25	10.8	21.9	0.01273	0.0030	**20.2**
1440		12.0	24.5	4.31	7.7	15.7	0.01275	0.0013	**14.5**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	48.58	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	92.31
Weight of Dry Material (gm)	48.58		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 9/19/2009 Checked By GZM Date 9-22-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

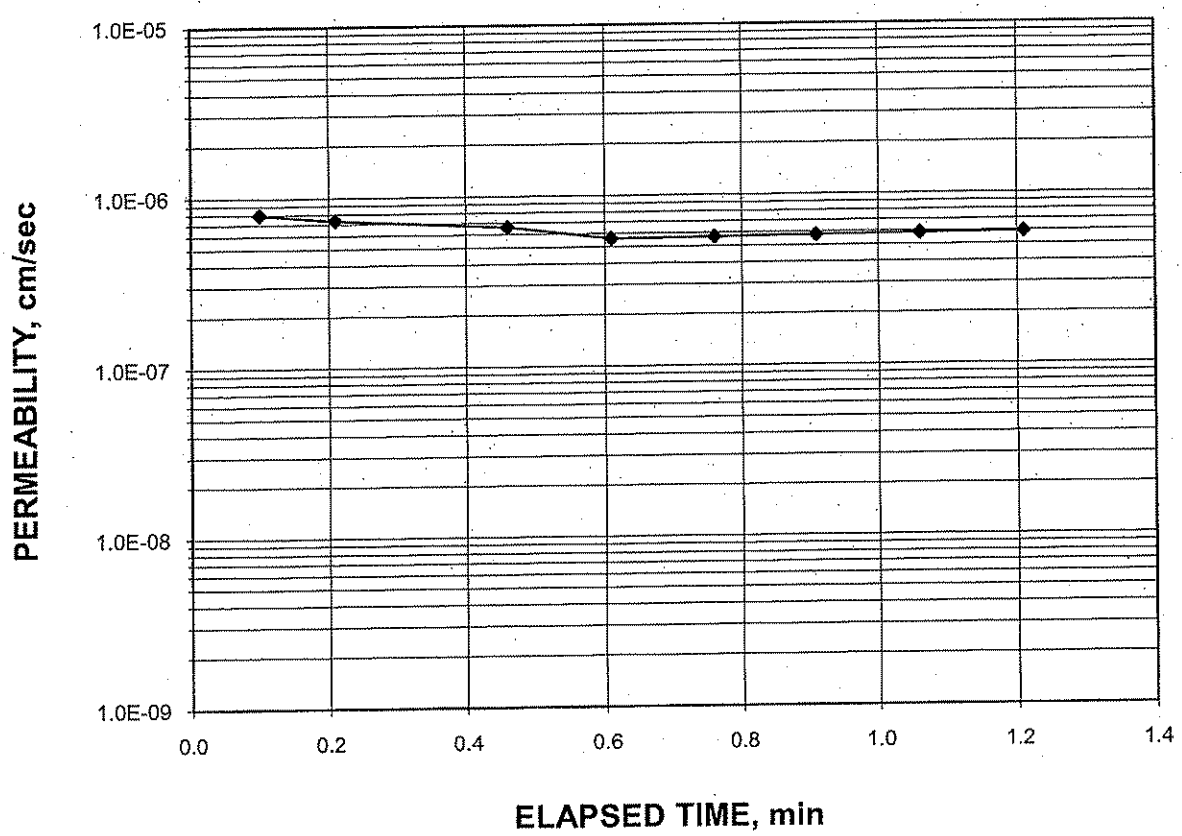
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-05		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 5.7E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.7E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 10/6/2009 Checked By: GZM Date: 10-9-09

DCN: CT-22C DATE:12-[illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-05		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	202	805
Wt. of Tare & WS (gm.)	541.43	339.13
Wt. of Tare & DS (gm.)	474.55	288.23
Wt. of Tare (gm.)	197.34	106.39
Wt. of Water (gm.)	66.88	50.90
Wt. of DS (gm.)	277.21	181.84
Moisture Content (%)	**24.1**	**28.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	527.25	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	527.25	543.67
Length 1 (in.)	2.700	2.701
Length 2 (in.)	2.727	2.650
Length 3 (in.)	2.678	2.652
Top Diameter (in.)	2.835	2.836
Middle Diameter (in.)	2.815	2.803
Bottom Diameter (in.)	2.842	2.791
Average Length (in.)	2.70	2.67
Average Area (in.^{2})	6.29	6.20
Sample Volume (cm^3)	278.61	271.10
Unit Wet Wt. (gm./ cm^3)	1.892	2.005
Unit Wet Wt. (pcf)	118.1	125.2
Unit Dry Wt. (pcf)	95.2	97.8
Unit Dry Wt. (gm./ cm^3)	1.525	1.567
Void Ratio, e	0.771	0.723
Porosity, n	0.435	0.420
Pore Volume (cm^3)	121.3	113.8
Total Wt. Of Sample After Test		530.57

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

DCN: CT-22C DATE:12/28/2009 FILE:C:\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-05		

Test Pressures

Cell Pressure(psi)	75.0
Back Pressure(psi)	50.0
Eff. Cons. Pressure(psi)	25.0
Response (%)	95

Final Sample Dimensions

Sample Length (cm), L	6.78
Sample Area (cm^2), A	40.01
Pipette Area (cm^2), a_p	0.03142
Annulus Area (cm^2), a_a	0.76712
Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 5.7E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.7E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	ELAPSED TIME (min)	t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	9	38.12	0.0	9.5	15.0	0	24.0	NA
10/6/2009	9	38.22	0.1	9.4	14.8	0	24.0	8.0E-07
10/6/2009	9	38.33	0.2	9.3	14.6	0	24.0	7.3E-07
10/6/2009	9	38.58	0.5	9.1	14.3	0	24.0	6.6E-07
10/6/2009	9	38.73	0.6	9.0	14.1	0	24.0	5.6E-07
10/6/2009	9	38.88	0.8	8.9	13.9	0	24.0	5.7E-07
10/6/2009	9	39.03	0.9	8.8	13.7	0	24.0	5.8E-07
10/6/2009	9	39.18	1.1	8.7	13.5	0	24.0	5.8E-07
10/6/2009	9	39.33	1.2	8.6	13.3	1	24.0	5.9E-07

Tested By: TMS Date: 10/6/2009 Checked By: GJM Date: 10-9-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-05	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

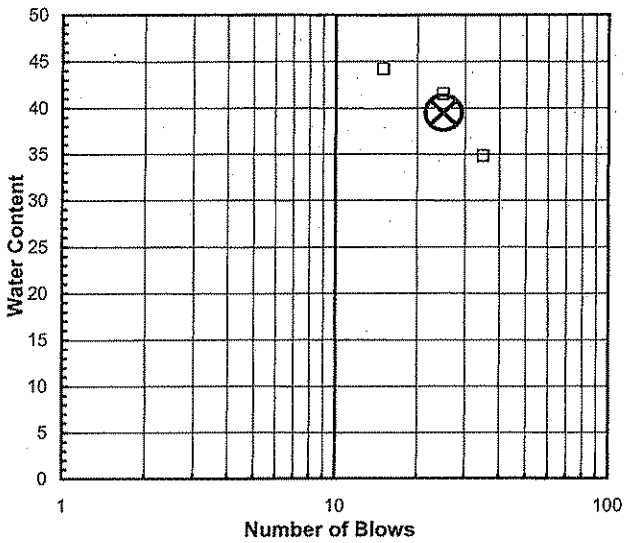
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-T	A-L	A-H	M U L T I P O I N T
Wt. of Tare & WS (gm)	28.35	27.91	25.79	
Wt. of Tare & DS (gm)	24.44	24.28	23.15	
Wt. of Tare (gm)	15.58	15.52	15.56	
Wt. of Water (gm)	3.9	3.6	2.6	
Wt. of DS (gm)	8.9	8.8	7.6	
Moisture Content (%)	**44.1**	**41.4**	**34.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-O	B-B	
Wt. of Tare & WS (gm)	21.51	22.16	
Wt. of Tare & DS (gm)	19.94	20.46	
Wt. of Tare (gm)	15.42	15.51	
Wt. of Water (gm)	1.6	1.7	
Wt. of DS (gm)	4.5	5.0	
Moisture Content (%)	**34.7**	**34.3**	**0.4**

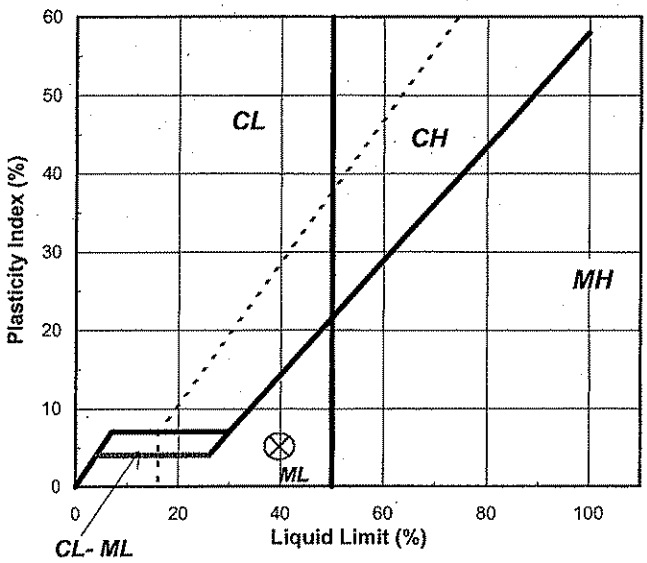
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**40**
Plastic Limit (%)	**35**
Plasticity Index (%)	**5**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 10/12/2009 *Checked By* GEM *Date* 10-13-09

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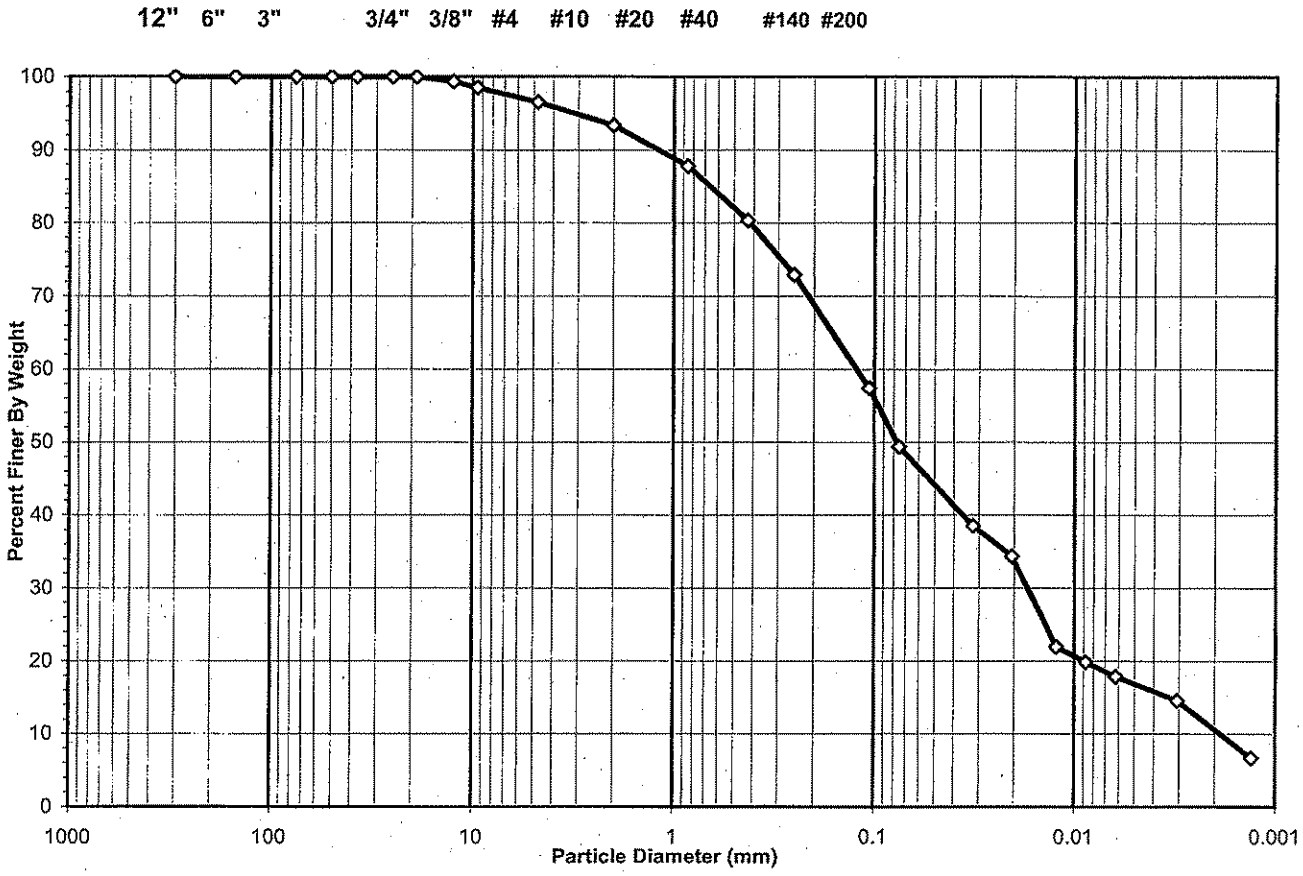
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-05	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	3.49
#4 To #200	*Sand*	47.20
Finer Than #200	*Silt & Clay*	49.32

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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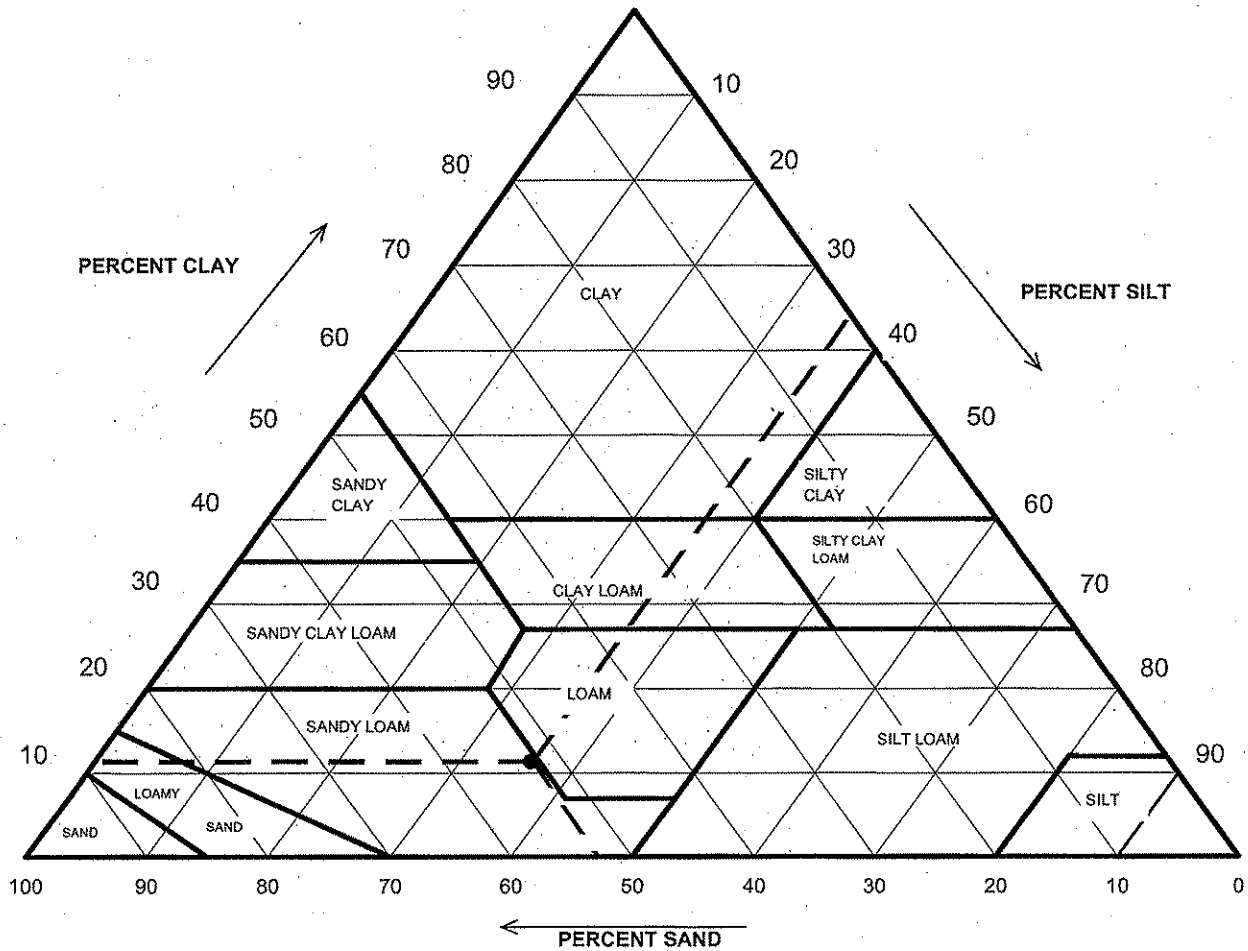
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-05	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	6.62	**0.00**
2	93.38	*Sand*	49.20	**52.69**
0.05	44.18	*Silt*	33.55	**35.93**
0.002	10.63	*Clay*	10.63	**11.38**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:05/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-05 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-05	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	202	Tare No.	L
Wgt.Tare + Wet Soil (gm)	541.43	Wgt.Tare + Wet Soil (gm)	35.70
Wgt.Tare + Dry Soil (gm)	474.55	Wgt.Tare + Dry Soil (gm)	33.47
Weight of Tare (gm)	197.34	Weight of Tare (gm)	15.34
Weight of Water (gm)	66.88	Weight of Water (gm)	2.23
Weight of Dry Soil (gm)	277.21	Weight of Dry Soil (gm)	18.13
Moisture Content (%)	**24.1**	**Moisture Content (%)**	**12.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	344.09	Weight of the Dry Sample (gm)	321.73
Dry Weight +#10 Material(gm)	277.2	Weight of minus #200 material (gm)	23.51
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	298.22
Dry Weight Hydro. Material (gm)	44.52		
Total Dry Weight Sample (gm)	321.73	**J-FACTOR (%FINER THAN #10)**	**0.9338**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	1.86	0.67	0.67	99.33	**99.33**
3/8"	9.50	2.26	0.82	1.49	98.51	**98.51**
#4	4.75	5.55	2.00	3.49	96.51	**96.51**
#10	2.00	8.68	3.13	6.62	93.38	**93.38**
#20	0.85	2.66	5.97	5.97	94.03	**87.80**
#40	0.425	3.57	8.02	13.99	86.01	**80.31**
#60	0.250	3.53	7.93	21.92	78.08	**72.91**
#140	0.106	7.39	16.60	38.52	61.48	**57.41**
#200	0.075	3.86	8.67	47.19	52.81	**49.32**
Pan	-	23.51	52.81	100.00	-	-

Notes :

Tested By SD Date 10/9/2009 Checked By GEM Date 10-13-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-15
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A1
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-05	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	24.3	4.45	18.6	41.2	0.01278	0.0320	**38.5**
5		21.0	24.3	4.45	16.6	36.8	0.01278	0.0205	**34.4**
15		15.0	24.3	4.45	10.6	23.5	0.01278	0.0123	**21.9**
30		14.0	24.3	4.45	9.6	21.2	0.01278	0.0087	**19.8**
60		13.0	24.4	4.38	8.6	19.2	0.01276	0.0062	**17.9**
250		11.0	25.0	3.98	7.0	15.6	0.01268	0.0031	**14.6**
1440		8.0	23.8	4.79	3.2	7.1	0.01285	0.0013	**6.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	44.52	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	93.38
Weight of Dry Material (gm)	44.52		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GEM Date 10-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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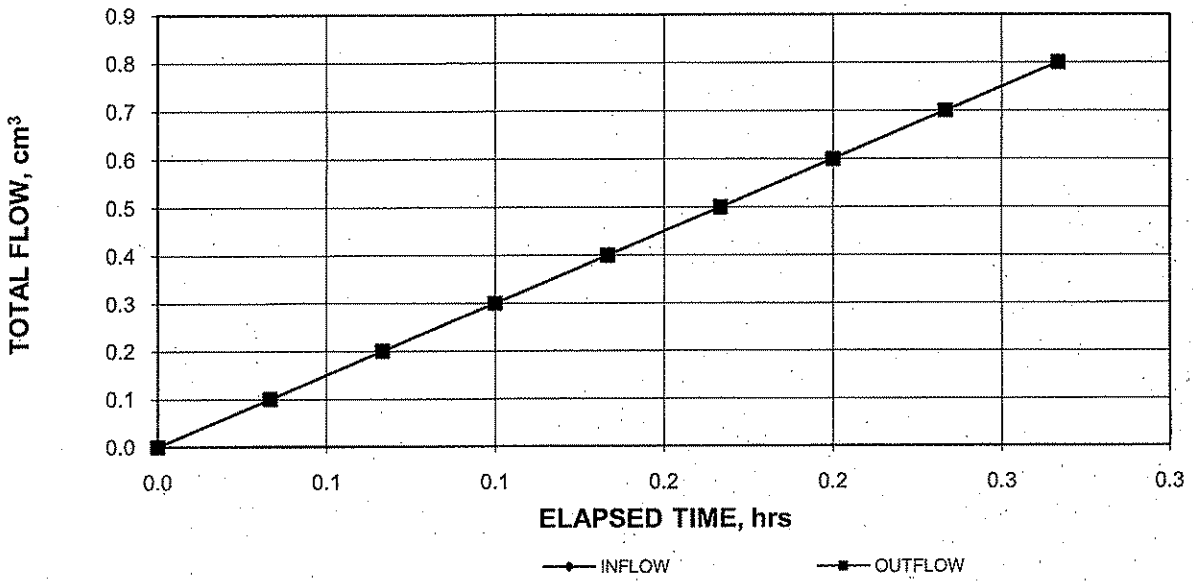
INTEGRITY IN TESTING

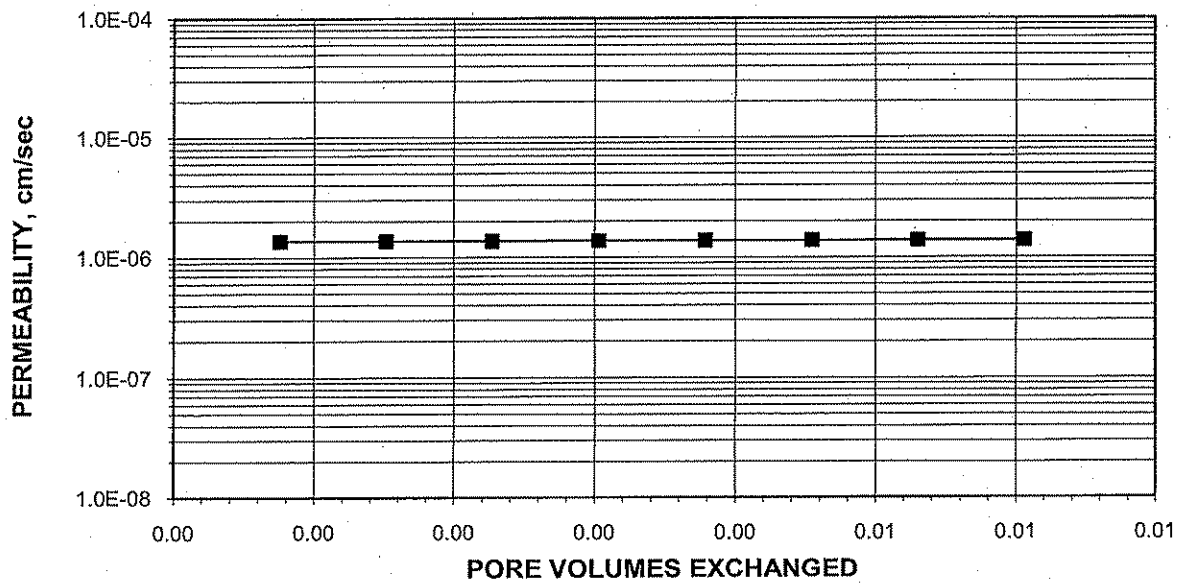
Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID No.	2009-666-07-01		

AVERAGE PERMEABILITY = 1.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 10/6/2009 Checked By: GZM Date: 10-9-09

DCN: CT-22 DATE: [illegible] PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID No.	2009-666-07-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	833	803
Wt. of Tare & WS (gm.)	707.11	433.83
Wt. of Tare & DS (gm.)	633.72	365.08
Wt. of Tare (gm.)	259.29	104.21
Wt. of Water (gm.)	73.39	68.75
Wt. of DS (gm.)	374.43	260.87
Moisture Content (%)	**19.6**	**26.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	582.11	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	582.11	614.98
Length 1 (in.)	3.035	3.026
Length 2 (in.)	3.012	2.980
Length 3 (in.)	3.021	3.029
Top Diameter (in.)	2.837	2.854
Middle Diameter (in.)	2.835	2.839
Bottom Diameter (in.)	2.847	2.822
Average Length (in.)	3.02	3.01
Average Area (in.^{2})	6.33	6.33
Sample Volume (cm^3)	313.70	312.27
Unit Wet Wt. (gm./ cm^3)	1.86	1.97
Unit Wet Wt. (pcf)	115.8	122.9
Unit Dry Wt. (pcf)	96.8	97.3
Unit Dry Wt. (gm./ cm^3)	1.55	1.56
Void Ratio, e	0.74	0.73
Porosity, n	0.43	0.42
Pore Volume (cm^3)	133.4	132.0
Total Wgt. Of Sample After Test		612.59

Tested By: TMS Date: 10/6/2009 Checked By: GZM Date: 10-9-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID No.	2009-666-07-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.9	Sample Length (cm), L	7.65
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.21
Cell (psi)	75.0	Sample Area (cm^2), A	40.82
Total Pressure Head (cm)	77.3	Inflow Burette Area (cm^2), a-in	0.887
Hydraulic Gradient	10.11	Outflow Burette Area (cm^2), a-out	0.884
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	11	30	0.0	0.0	0.0	104.1	0	24.0	NA
10/6/2009	11	32	0.0	0.1	0.1	103.9	0	24.0	1.4E-06
10/6/2009	11	34	0.1	0.2	0.2	103.7	0	24.0	1.4E-06
10/6/2009	11	36	0.1	0.3	0.3	103.4	0	24.0	1.4E-06
10/6/2009	11	38	0.1	0.4	0.4	103.2	0	24.0	1.4E-06
10/6/2009	11	40	0.2	0.5	0.5	103.0	0	24.0	1.4E-06
10/6/2009	11	42	0.2	0.6	0.6	102.8	0	24.0	1.4E-06
10/6/2009	11	44	0.2	0.7	0.7	102.5	0	24.0	1.4E-06
10/6/2009	11	46	0.3	0.8	0.8	102.3	1	24.0	1.4E-06

Tested By: TMS Date: 10/6/2009 Checked By: GZM Date: 10-9-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

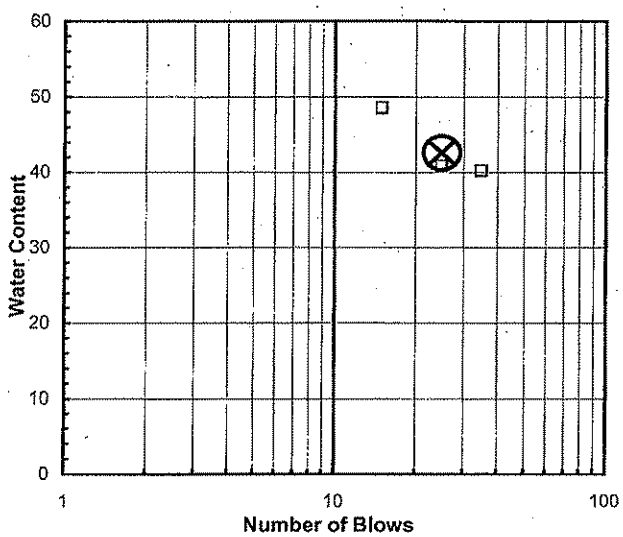
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	G	L	S	**MULTIPOINT**
Wt. of Tare & WS (gm)	30.31	30.86	30.53	
Wt. of Tare & DS (gm)	25.34	26.36	26.13	
Wt. of Tare (gm)	15.10	15.33	15.18	
Wt. of Water (gm)	5.0	4.5	4.4	
Wt. of DS (gm)	10.2	11.0	11.0	
Moisture Content (%)	**48.5**	**40.8**	**40.2**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-M	A-K	
Wt. of Tare & WS (gm)	24.80	25.55	
Wt. of Tare & DS (gm)	22.34	22.93	
Wt. of Tare (gm)	15.35	15.51	
Wt. of Water (gm)	2.5	2.6	
Wt. of DS (gm)	7.0	7.4	
Moisture Content (%)	**35.2**	**35.3**	**-0.1**

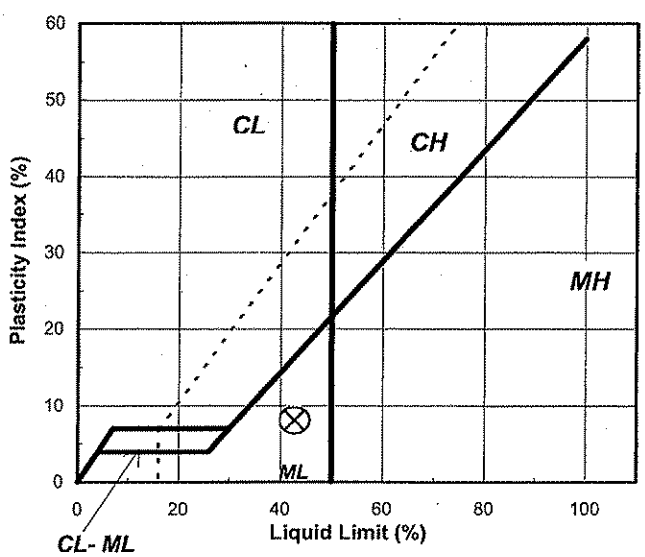
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**43**
Plastic Limit (%)	**35**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



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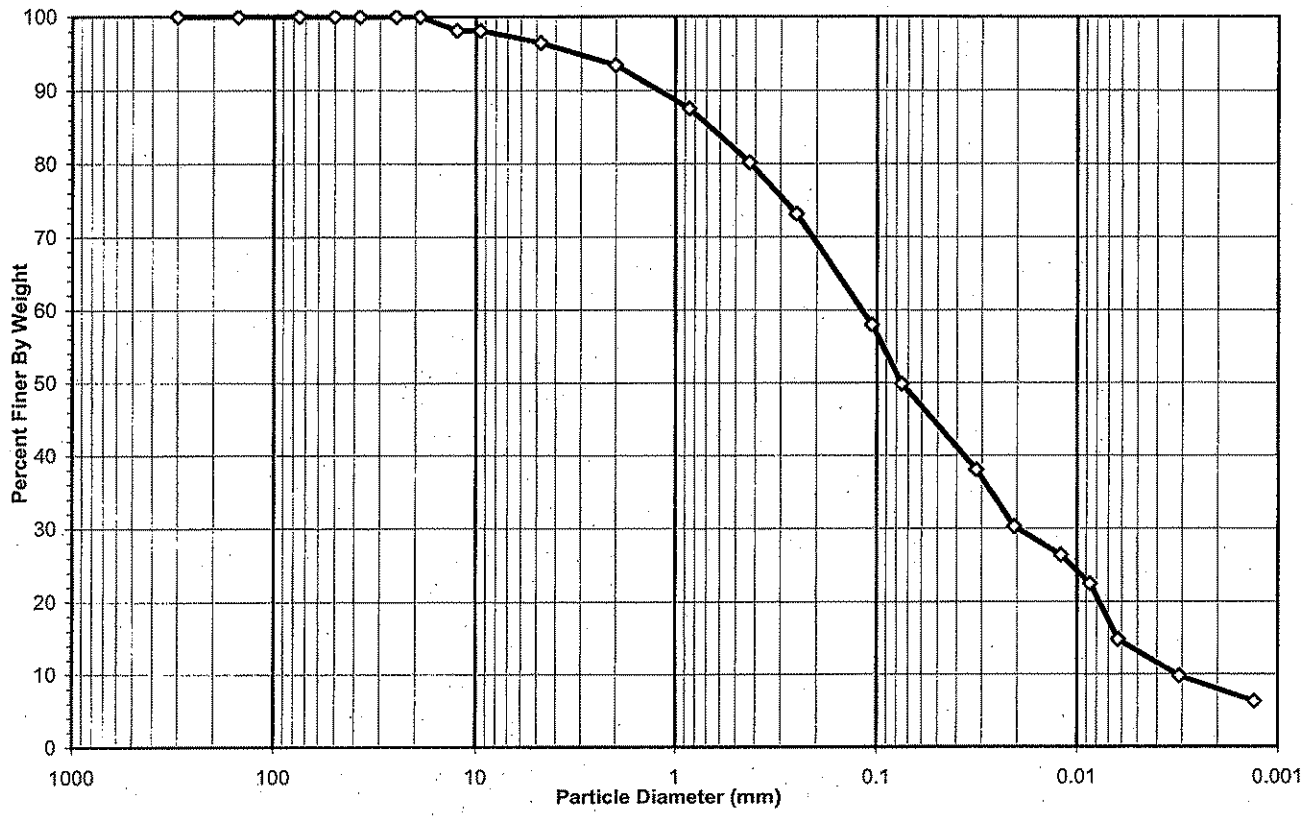
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	3.54
#4 To #200	*Sand*	46.65
Finer Than #200	*Silt & Clay*	49.81

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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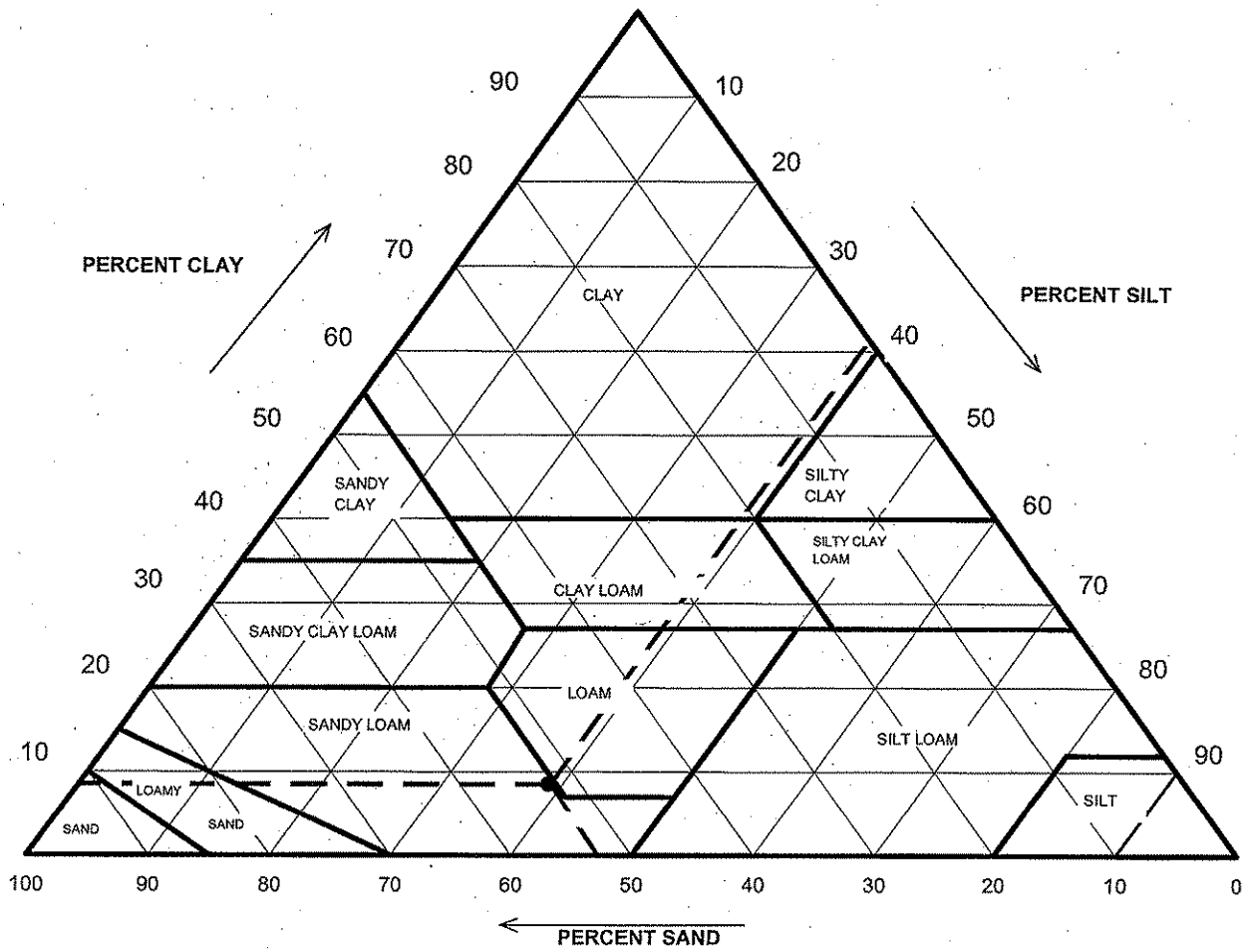
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	6.60	**0.00**
2	93.40	*Sand*	49.17	**52.65**
0.05	44.23	*Silt*	36.25	**38.81**
0.002	7.98	*Clay*	7.98	**8.54**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:05/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	833	Tare No.	AK
Wgt.Tare + Wet Soil (gm)	707.11	Wgt.Tare + Wet Soil (gm)	41.68
Wgt.Tare + Dry Soil (gm)	633.72	Wgt.Tare + Dry Soil (gm)	40.42
Weight of Tare (gm)	259.29	Weight of Tare (gm)	15.59
Weight of Water (gm)	73.39	Weight of Water (gm)	1.26
Weight of Dry Soil (gm)	374.43	Weight of Dry Soil (gm)	24.83
Moisture Content (%)	**19.6**	**Moisture Content (%)**	**5.1**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	447.82	Weight of the Dry Sample (gm)	422.02
Dry Weight +#10 Material(gm)	374.4	Weight of minus #200 material (gm)	25.38
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	396.64
Dry Weight Hydro. Material (gm)	47.59		
Total Dry Weight Sample (gm)	422.02	**J-FACTOR (%FINER THAN #10)**	**0.9340**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	7.00	1.87	1.87	98.13	**98.13**
3/8"	9.50	0.00	0.00	1.87	98.13	**98.13**
#4	4.75	6.26	1.67	3.54	96.46	**96.46**
#10	2.00	11.46	3.06	6.60	93.40	**93.40**
#20	0.85	3.00	6.30	6.30	93.70	**87.51**
#40	0.425	3.72	7.82	14.12	85.88	**80.21**
#60	0.250	3.59	7.54	21.67	78.33	**73.16**
#140	0.106	7.73	16.24	37.91	62.09	**57.99**
#200	0.075	4.17	8.76	46.67	53.33	**49.81**
Pan	-	25.38	53.33	100.00	-	-

Notes :

Tested By SD Date 10/9/2009 Checked By GEM Date 10-12-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-11
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	24.3	4.45	19.6	40.7	0.01278	0.0318	**38.0**
5		20.0	24.3	4.45	15.6	32.4	0.01278	0.0206	**30.2**
15		18.0	24.3	4.45	13.6	28.2	0.01278	0.0121	**26.3**
30		16.0	24.3	4.45	11.6	24.0	0.01278	0.0086	**22.4**
60		12.0	24.4	4.38	7.6	15.8	0.01276	0.0062	**14.8**
250		9.0	25.0	3.98	5.0	10.4	0.01268	0.0031	**9.8**
1440		8.0	23.8	4.79	3.2	6.7	0.01285	0.0013	**6.2**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	47.59	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	93.40
Weight of Dry Material (gm)	47.59		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GEM Date 10-12-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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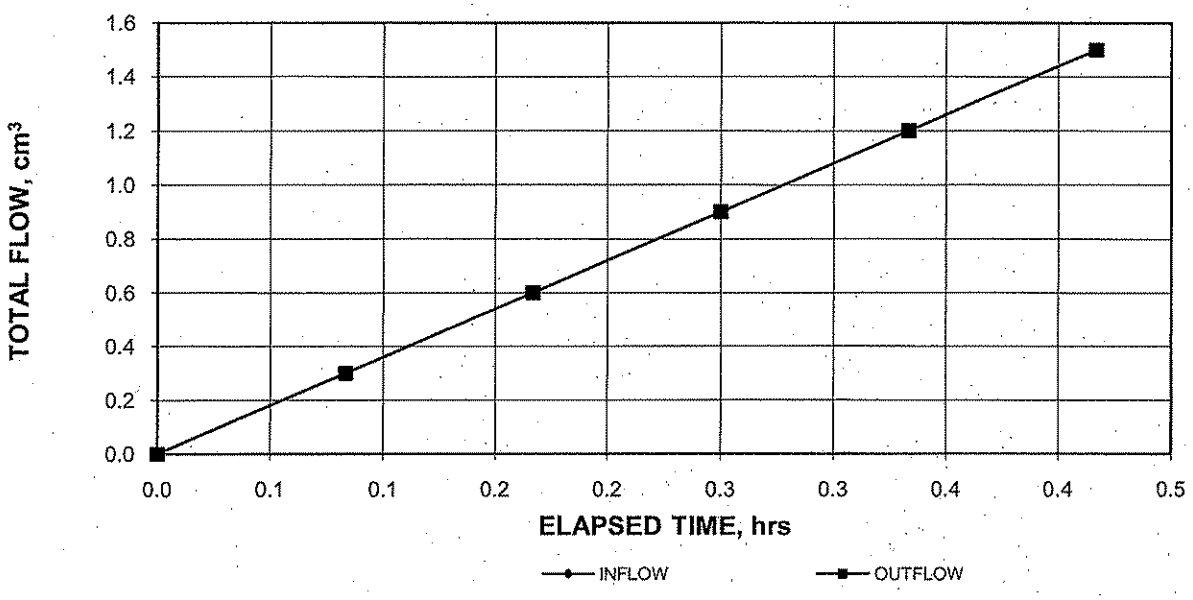
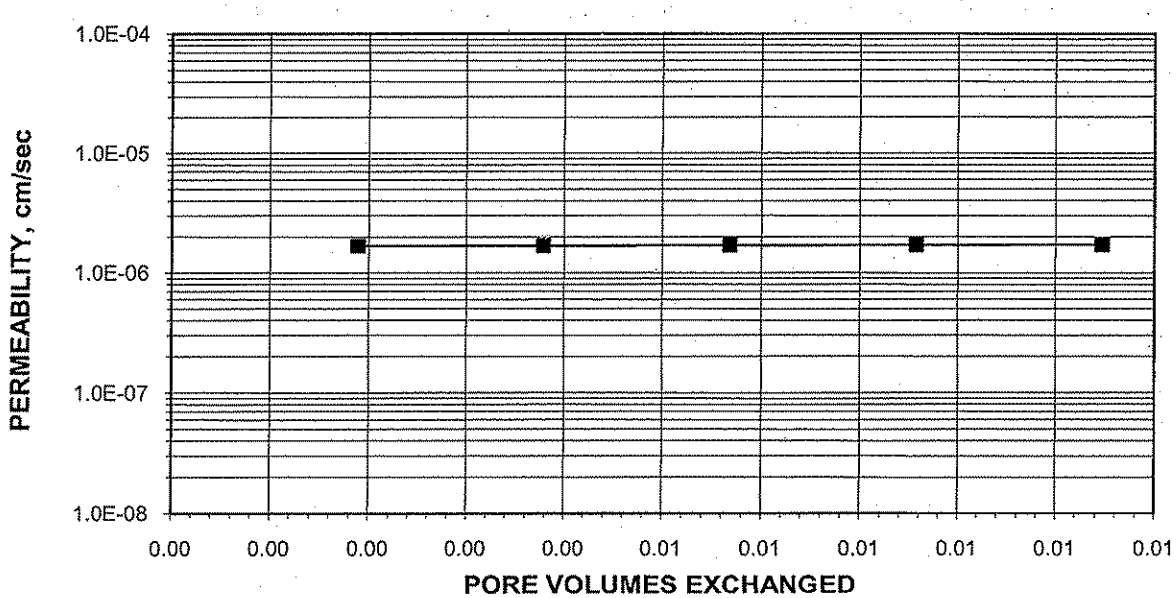
Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID No.	2009-666-07-03		

AVERAGE PERMEABILITY = 1.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.7E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

DCN: CT-22 DATE: [illegible] PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID No.	2009-666-07-03		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	209	808
Wt. of Tare & WS (gm.)	526.69	460.85
Wt. of Tare & DS (gm.)	445.36	373.85
Wt. of Tare (gm.)	171.72	104.94
Wt. of Water (gm.)	81.33	87.00
Wt. of DS (gm.)	273.64	268.91
Moisture Content (%)	**29.7**	**32.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	653.60	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	653.60	666.86
Length 1 (in.)	3.334	3.320
Length 2 (in.)	3.329	3.372
Length 3 (in.)	3.331	3.279
Top Diameter (in.)	2.849	2.860
Middle Diameter (in.)	2.840	2.824
Bottom Diameter (in.)	2.828	2.836
Average Length (in.)	3.33	3.32
Average Area (in.^{2})	6.33	6.33
Sample Volume (cm^3)	345.57	345.02
Unit Wet Wt. (gm./ cm^3)	1.89	1.93
Unit Wet Wt. (pcf)	118.1	120.6
Unit Dry Wt. (pcf)	91.0	91.2
Unit Dry Wt. (gm./ cm^3)	1.46	1.46
Void Ratio, e	0.85	0.85
Porosity, n	0.46	0.46
Pore Volume (cm^3)	159.0	158.4
Total Wgt. Of Sample After Test		650.36

Tested By: TMS Date: 10/6/2009 Checked By: GZM Date: 10-9-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID No.	2009-666-07-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.44
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.21
Cell (psi)	75.0	Sample Area (cm^2), A	40.87
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.888
Hydraulic Gradient	9.99	Outflow Burette Area (cm^2), a-out	0.869
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.7E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	10	0	0.0	0.0	0.0	111.0	0	24.0	NA
10/6/2009	10	5	0.1	0.3	0.3	110.4	0	24.0	1.7E-06
10/6/2009	10	10	0.2	0.6	0.6	109.7	0	24.0	1.7E-06
10/6/2009	10	15	0.3	0.9	0.9	109.0	0	24.0	1.7E-06
10/6/2009	10	20	0.3	1.2	1.2	108.3	0	24.0	1.7E-06
10/6/2009	10	25	0.4	1.5	1.5	107.7	1	24.0	1.7E-06

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-03	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

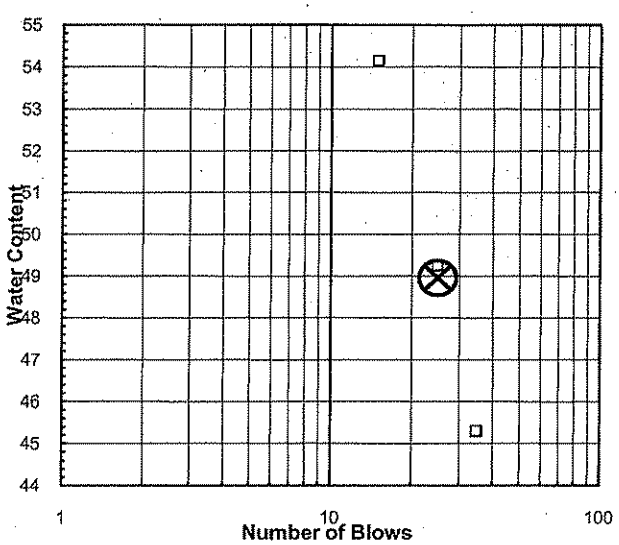
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-H	A-T	A-L	**MULTIPOINT**
Wt. of Tare & WS (gm)	29.74	29.46	28.93	
Wt. of Tare & DS (gm)	24.76	24.88	24.75	
Wt. of Tare (gm)	15.56	15.58	15.52	
Wt. of Water (gm)	5.0	4.6	4.2	
Wt. of DS (gm)	9.2	9.3	9.2	
Moisture Content (%)	**54.1**	**49.2**	**45.3**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-O	B-B	
Wt. of Tare & WS (gm)	23.17	21.65	
Wt. of Tare & DS (gm)	21.03	19.99	
Wt. of Tare (gm)	15.42	15.51	
Wt. of Water (gm)	2.1	1.7	
Wt. of DS (gm)	5.6	4.5	
Moisture Content (%)	**38.1**	**37.1**	**1.1**

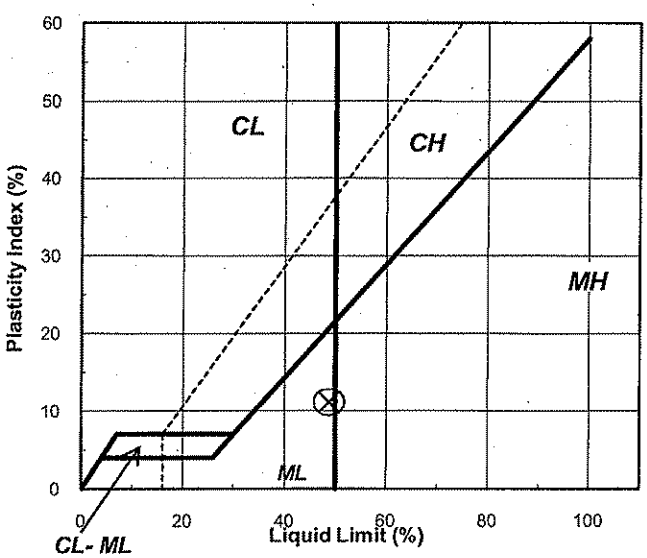
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**49**
Plastic Limit (%)	**38**
Plasticity Index (%)	**11**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 10/9/2009 *Checked By* GBM *Date* 10-12-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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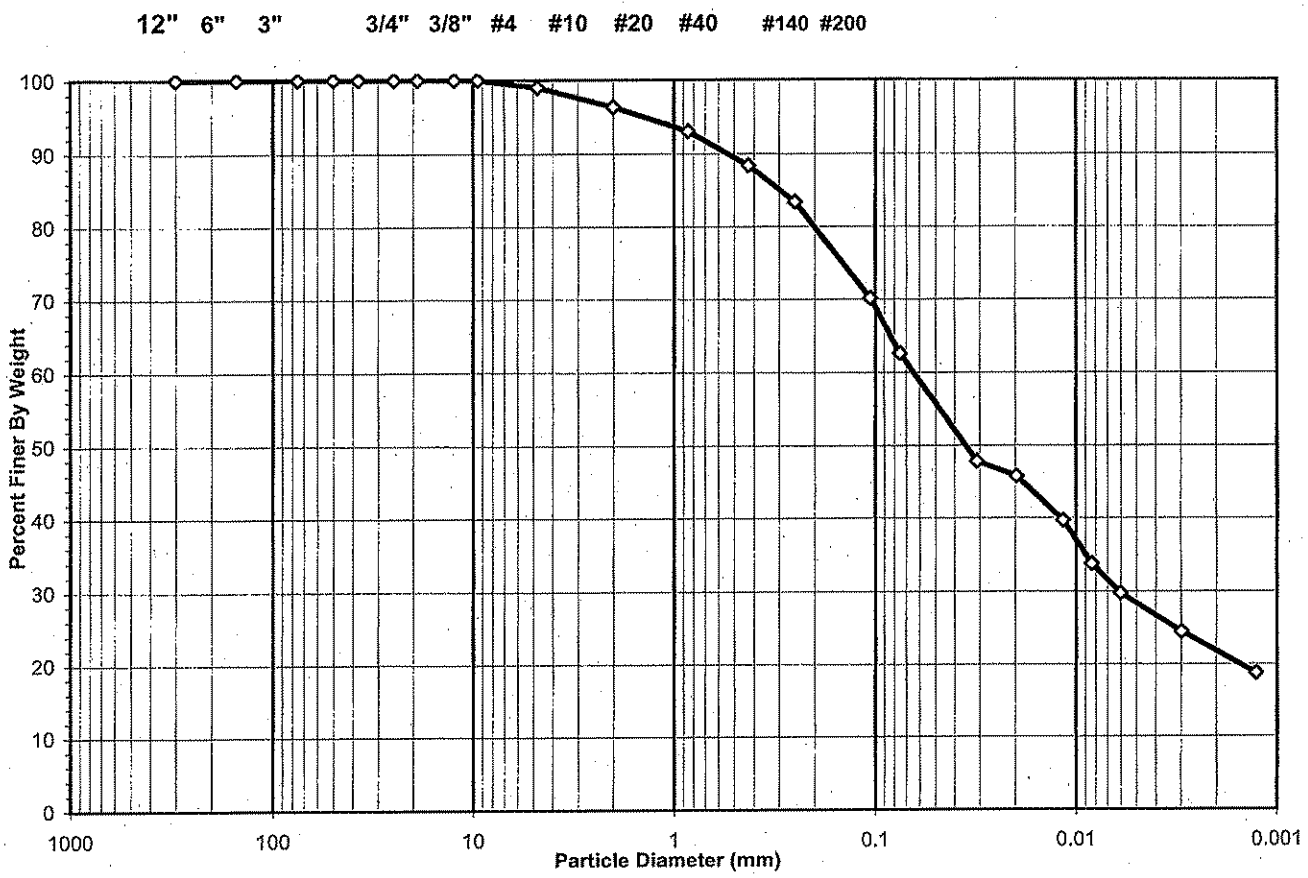
INTEGRITY IN TESTING

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-03	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	1.01
#4 To #200	*Sand*	36.45
Finer Than #200	*Silt & Clay*	62.54

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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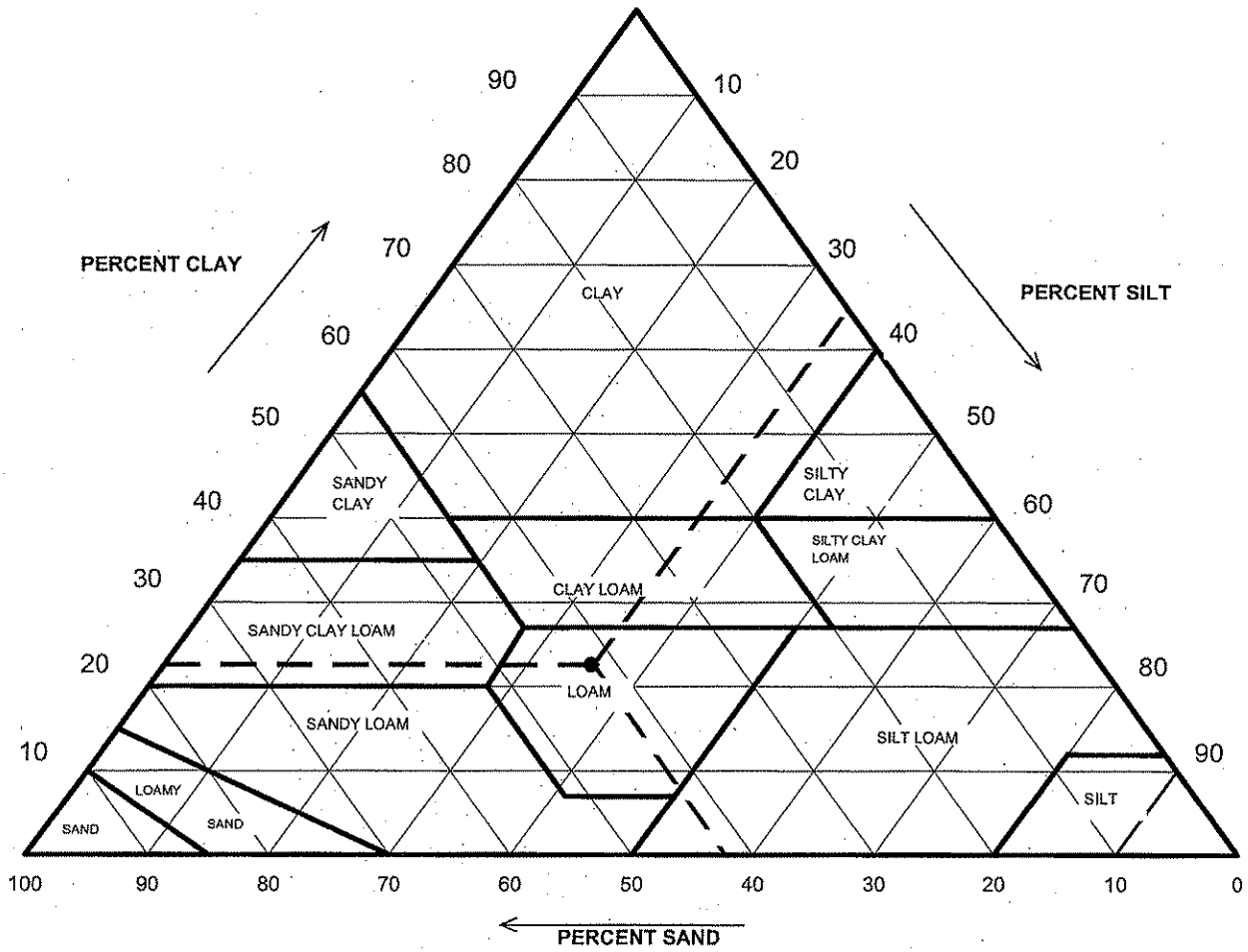
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-03	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.63	**0.00**
2	96.37	*Sand*	40.57	**42.10**
0.05	55.80	*Silt*	34.04	**35.32**
0.002	21.76	*Clay*	21.76	**22.58**

USDA Classification: ***LOAM***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-03	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	209	Tare No.	G
Wgt.Tare + Wet Soil (gm)	526.69	Wgt.Tare + Wet Soil (gm)	32.55
Wgt.Tare + Dry Soil (gm)	445.36	Wgt.Tare + Dry Soil (gm)	31.50
Weight of Tare (gm)	171.72	Weight of Tare (gm)	15.01
Weight of Water (gm)	81.33	Weight of Water (gm)	1.05
Weight of Dry Soil (gm)	273.64	Weight of Dry Soil (gm)	16.49
Moisture Content (%)	**29.7**	**Moisture Content (%)**	**6.4**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	354.97	Weight of the Dry Sample (gm)	320.65
Dry Weight +#10 Material(gm)	273.6	Weight of minus #200 material (gm)	30.51
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	290.14
Dry Weight Hydro. Material (gm)	47.01		
Total Dry Weight Sample (gm)	320.65	**J-FACTOR (%FINER THAN #10)**	**0.9637**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	2.77	1.01	1.01	98.99	**98.99**
#10	2.00	7.17	2.62	3.63	96.37	**96.37**
#20	0.85	1.61	3.43	3.43	96.57	**93.07**
#40	0.425	2.27	4.83	8.25	91.75	**88.41**
#60	0.250	2.45	5.21	13.47	86.53	**83.39**
#140	0.106	6.46	13.74	27.21	72.79	**70.15**
#200	0.075	3.71	7.89	35.10	64.90	**62.54**
Pan	-	30.51	64.90	100.00	-	-

Notes :

Tested By SD Date 10/9/2009 Checked By Gen Date 10-12-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-13
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-03	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	28.0	28.0	24.3	4.45	23.6	49.6	0.01278	0.0309	**47.8**
5		27.0	24.3	4.45	22.6	47.5	0.01278	0.0197	**45.8**
15		24.0	24.3	4.45	19.6	41.2	0.01278	0.0116	**39.7**
30		21.0	24.4	4.38	16.6	35.0	0.01276	0.0084	**33.7**
60		19.0	24.4	4.38	14.6	30.8	0.01276	0.0060	**29.7**
250		16.0	25.0	3.98	12.0	25.3	0.01268	0.0030	**24.4**
1440		14.0	23.8	4.79	9.2	19.4	0.01285	0.0013	**18.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	47.01	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	96.37
Weight of Dry Material (gm)	47.01		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GEM Date 10-12-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

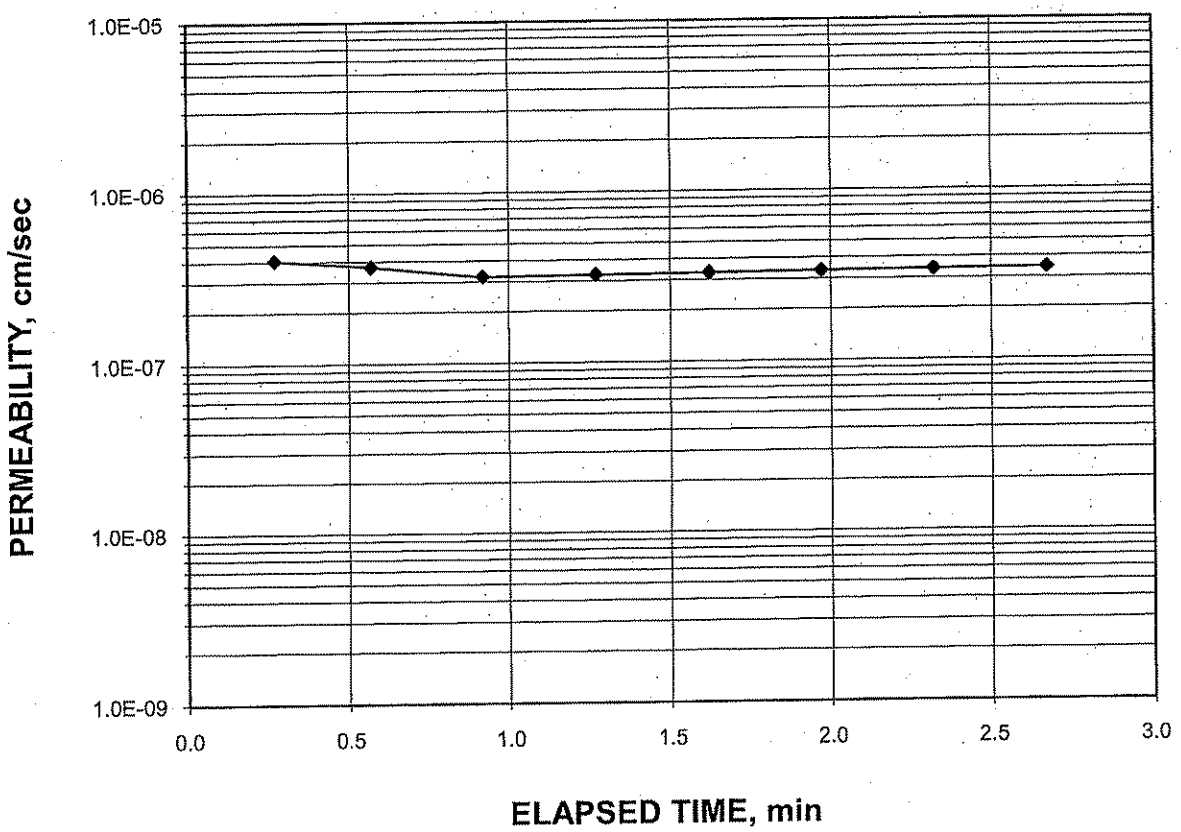
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-06		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 10/6/2009 Checked By: GZM Date: 10-9-09

DCN: CT-22C DATE:12-15-08 REVISION: 0 \\SERVER\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-06		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	200	807
Wt. of Tare & WS (gm.)	999.37	445.19
Wt. of Tare & DS (gm.)	830.46	373.15
Wt. of Tare (gm.)	171.77	104.74
Wt. of Water (gm.)	168.91	72.04
Wt. of DS (gm.)	658.69	268.41
Moisture Content (%)	**25.6**	**26.8**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	745.40	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	745.40	752.50
Length 1 (in.)	3.746	3.717
Length 2 (in.)	3.762	3.708
Length 3 (in.)	3.734	3.698
Top Diameter (in.)	2.860	2.840
Middle Diameter (in.)	2.848	2.822
Bottom Diameter (in.)	2.846	2.815
Average Length (in.)	3.75	3.71
Average Area (in.^{2})	6.39	6.27
Sample Volume (cm^3)	392.11	381.01
Unit Wet Wt. (gm./ cm^3)	1.901	1.975
Unit Wet Wt. (pcf)	118.7	123.3
Unit Dry Wt. (pcf)	94.4	97.2
Unit Dry Wt. (gm./ cm^3)	1.513	1.557
Void Ratio, e	0.785	0.734
Porosity, n	0.440	0.423
Pore Volume (cm^3)	172.4	161.3
Total Wt. Of Sample After Test		754.11

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

DCN: CT-22C DATE:12/28/2009 FILE:C:\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-06		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	9.42
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.46
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READI NG R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	9	20.33	0.0	9.5	10.8	0	24.0	NA
10/6/2009	9	20.60	0.3	9.4	10.7	0	24.0	4.1E-07
10/6/2009	9	20.90	0.6	9.3	10.5	0	24.0	3.7E-07
10/6/2009	9	21.25	0.9	9.2	10.4	0	24.0	3.2E-07
10/6/2009	9	21.60	1.3	9.1	10.3	0	24.0	3.3E-07
10/6/2009	9	21.95	1.6	9.0	10.1	0	24.0	3.3E-07
10/6/2009	9	22.30	2.0	8.9	10.0	0	24.0	3.3E-07
10/6/2009	9	22.65	2.3	8.8	9.8	0	24.0	3.4E-07
10/6/2009	9	23.00	2.7	8.7	9.7	1	24.0	3.4E-07

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

DCN: CT-22C DATE:12\28\2009 FILE:C:\Documents and Settings\Administrator\Desktop\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-06	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

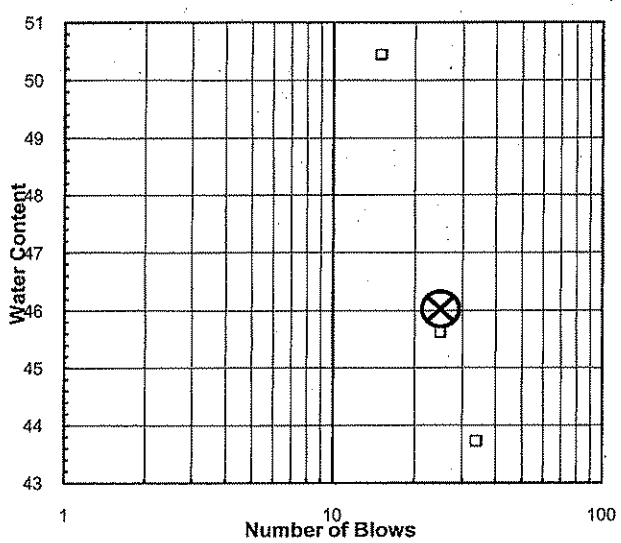
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	O	U	T	MULTIPOINT
Wt. of Tare & WS (gm)	27.43	30.65	29.29	
Wt. of Tare & DS (gm)	23.34	25.81	25.01	
Wt. of Tare (gm)	15.23	15.20	15.22	
Wt. of Water (gm)	4.1	4.8	4.3	
Wt. of DS (gm)	8.1	10.6	9.8	
Moisture Content (%)	**50.4**	**45.6**	**43.7**	
Number of Blows	**15**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	Q	I	
Wt. of Tare & WS (gm)	21.27	21.33	
Wt. of Tare & DS (gm)	19.70	19.77	
Wt. of Tare (gm)	15.16	15.21	
Wt. of Water (gm)	1.6	1.6	
Wt. of DS (gm)	4.5	4.6	
Moisture Content (%)	**34.6**	**34.2**	**0.4**

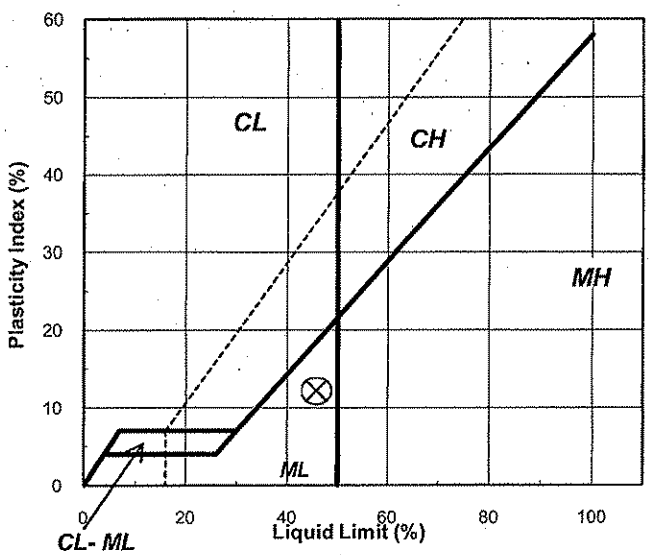
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**46**
Plastic Limit (%)	**34**
Plasticity Index (%)	**12**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* *10/9/2009* *Checked By* GEM *Date* 10-12-09

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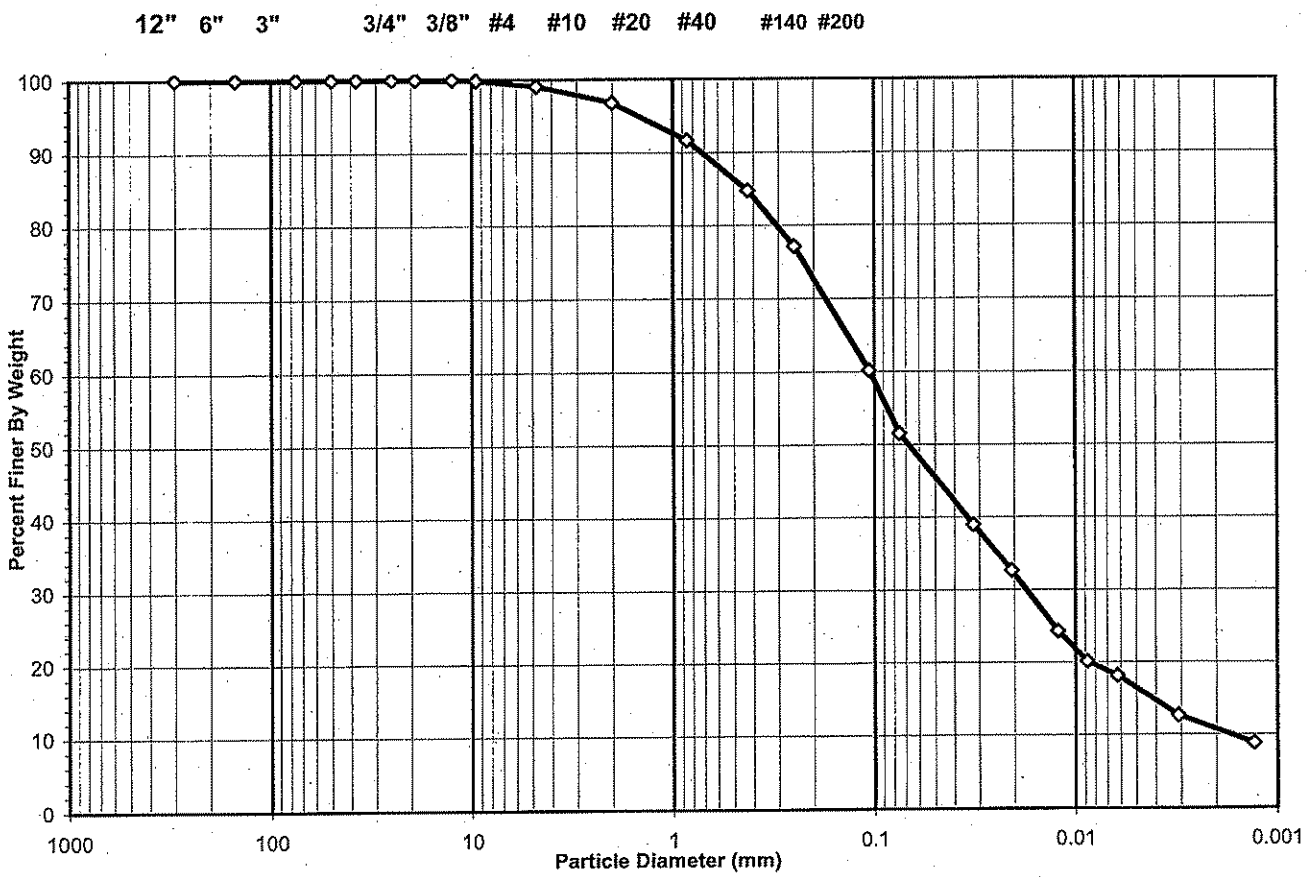
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-06	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.92
#4 To #200	*Sand*	47.58
Finer Than #200	*Silt & Clay*	51.50

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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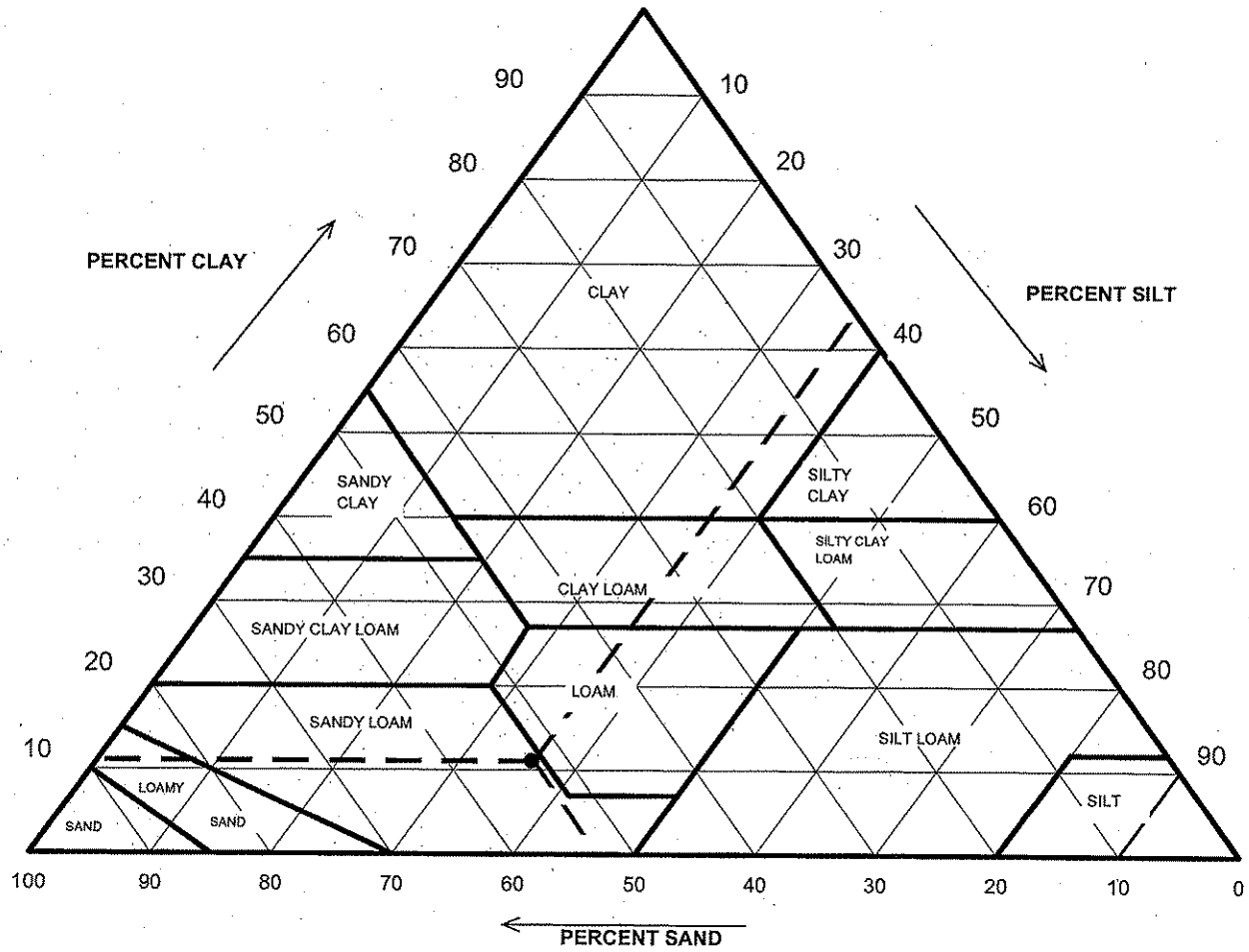
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-06	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.14	**0.00**
2	96.86	*Sand*	51.33	**53.00**
0.05	45.53	*Silt*	34.78	**35.91**
0.002	10.74	*Clay*	10.74	**11.09**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-06 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-06	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	200	Tare No.	A-M
Wgt.Tare + Wet Soil (gm)	999.37	Wgt.Tare + Wet Soil (gm)	34.89
Wgt.Tare + Dry Soil (gm)	830.46	Wgt.Tare + Dry Soil (gm)	33.20
Weight of Tare (gm)	171.77	Weight of Tare (gm)	15.34
Weight of Water (gm)	168.91	Weight of Water (gm)	1.69
Weight of Dry Soil (gm)	658.69	Weight of Dry Soil (gm)	17.86
Moisture Content (%)	**25.6**	**Moisture Content (%)**	**9.5**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	827.60	Weight of the Dry Sample (gm)	704.37
Dry Weight +#10 Material(gm)	658.7	Weight of minus #200 material (gm)	24.29
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	680.08
Dry Weight Hydro. Material (gm)	45.68		
Total Dry Weight Sample (gm)	704.37	**J-FACTOR (%FINER THAN #10)**	**0.9686**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.84	0.13	0.13	99.87	**99.87**
#4	4.75	5.22	0.79	0.92	99.08	**99.08**
#10	2.00	14.64	2.22	3.14	96.86	**96.86**
#20	0.85	2.45	5.36	5.36	94.64	**91.66**
#40	0.425	3.25	7.12	12.48	87.52	**84.77**
#60	0.250	3.61	7.90	20.38	79.62	**77.12**
#140	0.106	8.00	17.51	37.90	62.10	**60.15**
#200	0.075	4.08	8.93	46.83	53.17	**51.50**
Pan	-	24.29	53.17	100.00	-	-

Notes :

Tested By SD Date 10/9/2009 Checked By GEM Date 10-12-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-16
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A2
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-06	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	24.3	4.45	18.6	40.2	0.01278	0.0320	**38.9**
5		20.0	24.3	4.45	15.6	33.7	0.01278	0.0206	**32.6**
15		16.0	24.3	4.45	11.6	25.0	0.01278	0.0122	**24.2**
30		14.0	24.3	4.45	9.6	20.7	0.01278	0.0087	**20.0**
60		13.0	24.4	4.38	8.6	18.7	0.01276	0.0062	**18.1**
250		10.0	25.0	3.98	6.0	13.1	0.01268	0.0031	**12.6**
1440		9.0	23.8	4.79	4.2	9.1	0.01285	0.0013	**8.8**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	45.68	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	96.86
Weight of Dry Material (gm)	45.68		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GEM Date 10-12-09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

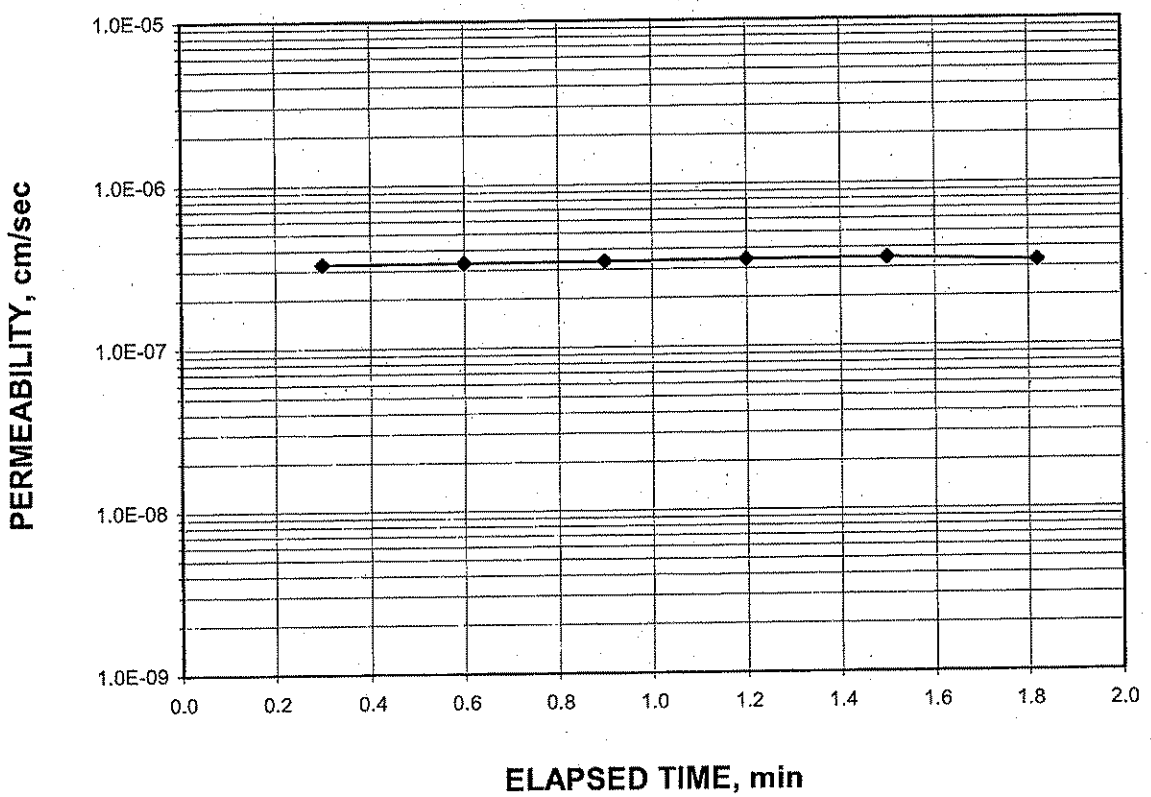
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID No.	2009-666-08-01		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 10/20/2009 Checked By: GAM Date: 10-21-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID No.	2009-666-08-01		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	842	814
Wt. of Tare & WS (gm.)	620.18	376
Wt. of Tare & DS (gm.)	547.06	320.32
Wt. of Tare (gm.)	255.67	111.98
Wt. of Water (gm.)	73.12	55.68
Wt. of DS (gm.)	291.39	208.34
Moisture Content (%)	**25.1**	**26.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	647.90	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	647.90	656.35
Length 1 (in.)	3.232	3.223
Length 2 (in.)	3.239	3.205
Length 3 (in.)	3.235	3.215
Top Diameter (in.)	2.843	2.836
Middle Diameter (in.)	2.823	2.826
Bottom Diameter (in.)	2.803	2.822
Average Length (in.)	3.24	3.21
Average Area (in.^{2})	6.26	6.28
Sample Volume (cm^3)	331.84	330.86
Unit Wet Wt. (gm./ cm^3)	1.952	1.984
Unit Wet Wt. (pcf)	121.9	123.8
Unit Dry Wt. (pcf)	97.4	97.7
Unit Dry Wt. (gm./ cm^3)	1.561	1.565
Void Ratio, e	0.730	0.725
Porosity, n	0.422	0.420
Pore Volume (cm^3)	140.0	139.0
Total Wt. Of Sample After Test		654.63

Tested By: TMS Date: 10/20/2009 Checked By: GZM Date: 10-21-09

DCN: CT-22C DATE:12-21-[illegible] \\Server\[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-08-01 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID No.	2009-666-08-01		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.16
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.52
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	ELAPSED TIME (min)	t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/20/2009	9	54.70	0.0	9.5	12.5	0	22.5	NA
10/20/2009	9	55.00	0.3	9.4	12.3	0	22.5	3.3E-07
10/20/2009	9	55.30	0.6	9.3	12.2	0	22.5	3.3E-07
10/20/2009	9	55.60	0.9	9.2	12.0	0	22.5	3.4E-07
10/20/2009	9	55.90	1.2	9.1	11.8	0	22.5	3.4E-07
10/20/2009	9	56.20	1.5	9.0	11.7	0	22.5	3.5E-07
10/20/2009	9	56.52	1.8	8.9	11.5	1	22.5	3.3E-07

Tested By: TMS Date: 10/20/2009 Checked By: GEM Date: 10-21-09

DCN: CT-22C DATE:12-21-[illegible] \\Server[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-08-01 PERMOM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID	2008-666-08-01	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

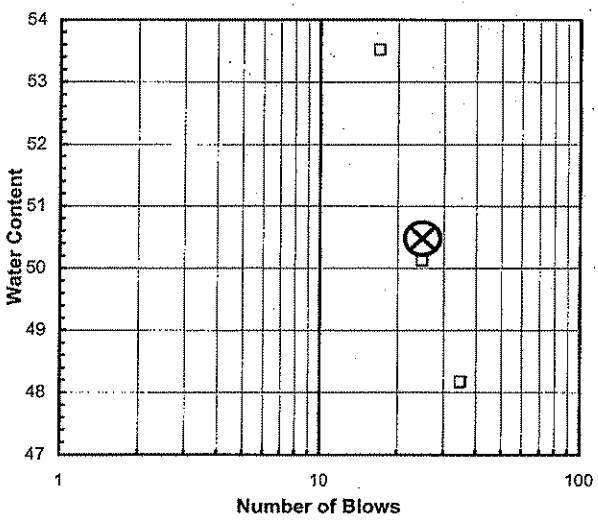
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	I	U	G	M U L T I P O I N T
Wt. of Tare & WS (gm)	28.32	28.01	26.08	
Wt. of Tare & DS (gm)	23.75	23.73	22.53	
Wt. of Tare (gm)	15.21	15.19	15.16	
Wt. of Water (gm)	4.6	4.3	3.6	
Wt. of DS (gm)	8.5	8.5	7.4	
Moisture Content (%)	**53.5**	**50.1**	**48.2**	
Number of Blows	**17**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	O	T	
Wt. of Tare & WS (gm)	21.86	21.38	
Wt. of Tare & DS (gm)	19.94	19.59	
Wt. of Tare (gm)	15.20	15.19	
Wt. of Water (gm)	1.9	1.8	
Wt. of DS (gm)	4.7	4.4	
Moisture Content (%)	**40.5**	**40.7**	**-0.2**

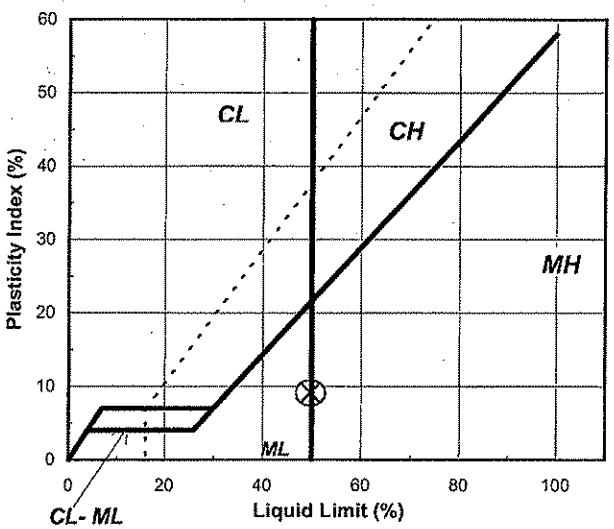
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**50**
Plastic Limit (%)	**41**
Plasticity Index (%)	**9**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By SD *Date* 10/19/2009 *Checked By* GEM *Date* ~~10-20-09~~ 10-20-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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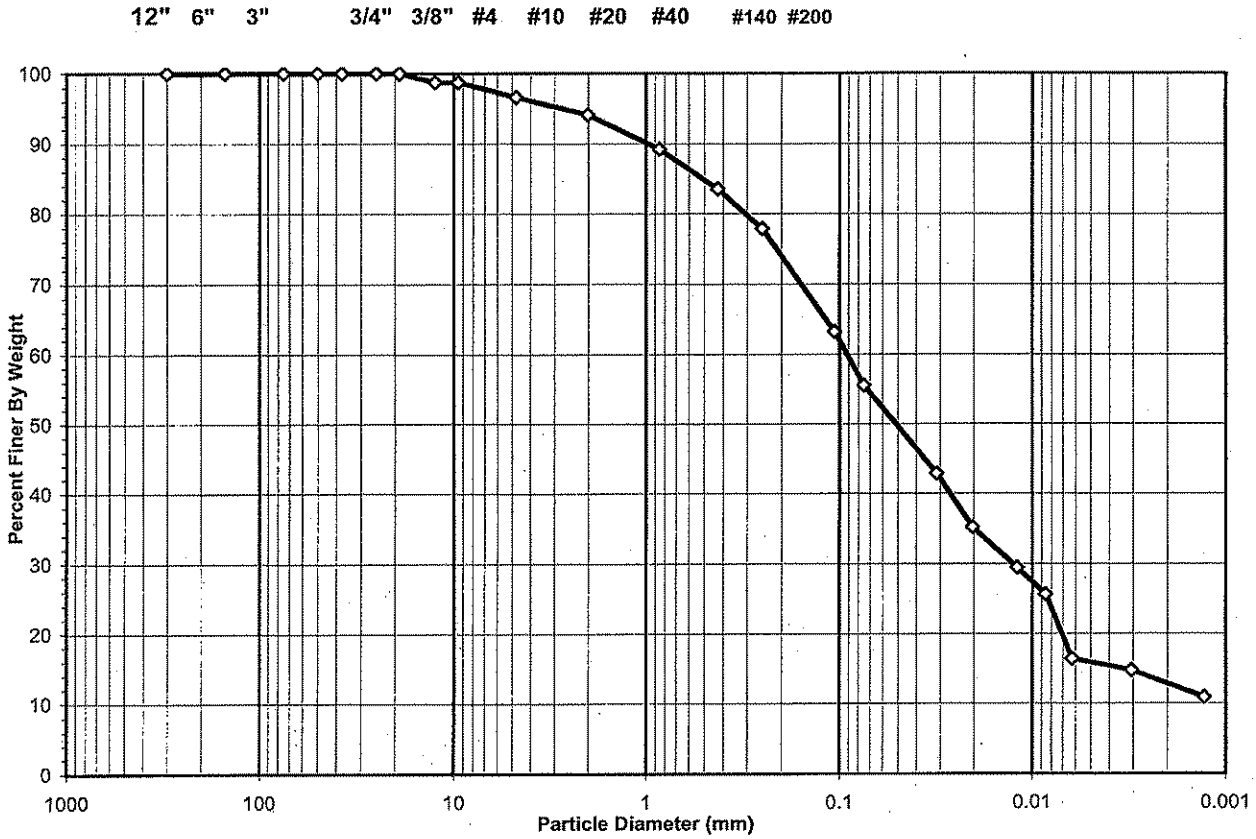
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID	2009-666-08-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	3.37
#4 To #200	*Sand*	41.10
Finer Than #200	*Silt & Clay*	55.53

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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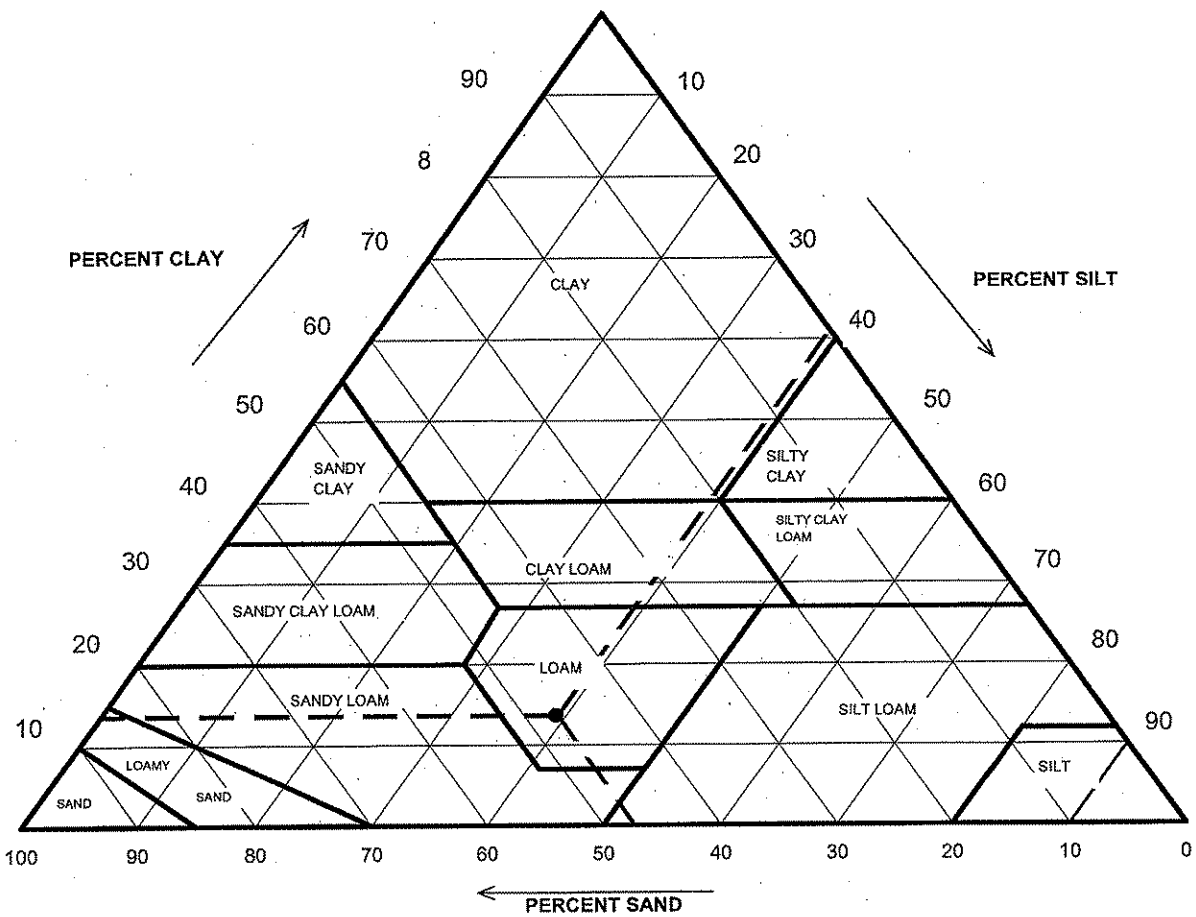
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID	2009-666-08-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	5.88	**0.00**
2	94.12	*Sand*	44.46	**47.23**
0.05	49.67	*Silt*	36.80	**39.10**
0.002	12.86	*Clay*	12.86	**13.67**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-08-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID	2009-666-08-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	842	Tare No.	1010
Wgt.Tare + Wet Soil (gm)	620.18	Wgt.Tare + Wet Soil (gm)	80.48
Wgt.Tare + Dry Soil (gm)	547.06	Wgt.Tare + Dry Soil (gm)	79.23
Weight of Tare (gm)	255.67	Weight of Tare (gm)	36.49
Weight of Water (gm)	73.12	Weight of Water (gm)	1.25
Weight of Dry Soil (gm)	291.39	Weight of Dry Soil (gm)	42.74
Moisture Content (%)	**25.1**	**Moisture Content (%)**	**2.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	364.51	Weight of the Dry Sample (gm)	339.97
Dry Weight +#10 Material(gm)	291.4	Weight of minus #200 material (gm)	28.66
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	311.31
Dry Weight Hydro. Material (gm)	48.58		
Total Dry Weight Sample (gm)	339.97	**J-FACTOR (%FINER THAN #10)**	**0.9412**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	3.73	1.28	1.28	98.72	**98.72**
3/8"	9.50	0.00	0.00	1.28	98.72	**98.72**
#4	4.75	6.09	2.09	3.37	96.63	**96.63**
#10	2.00	7.31	2.51	5.88	94.12	**94.12**
#20	0.85	2.54	5.23	5.23	94.77	**89.20**
#40	0.425	2.93	6.03	11.26	88.74	**83.52**
#60	0.250	2.92	6.01	17.27	82.73	**77.87**
#140	0.106	7.55	15.54	32.81	67.19	**63.24**
#200	0.075	3.98	8.19	41.01	58.99	**55.53**
Pan	-	28.66	58.99	100.00	-	-

Notes :

Tested By SD Date 10/26/2009 Checked By GZM Date 10-26-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L1
Project No.	2009-666-08	Sample No.	ST-18
Lab ID	2009-666-08-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	24.0	4.65	22.3	45.5	0.01282	0.0312	**42.9**
5		23.0	24.0	4.65	18.3	37.4	0.01282	0.0203	**35.2**
15		20.0	24.0	4.65	15.3	31.3	0.01282	0.0119	**29.4**
30		18.0	24.0	4.65	13.3	27.2	0.01282	0.0086	**25.6**
60		13.0	24.3	4.45	8.6	17.4	0.01278	0.0062	**16.4**
250		12.0	24.5	4.31	7.7	15.7	0.01275	0.0031	**14.7**
1440		10.0	24.5	4.31	5.7	11.6	0.01275	0.0013	**10.9**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	48.58	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	94.12
Weight of Dry Material (gm)	48.58		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/23/2009 Checked By GEM Date 10-26-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

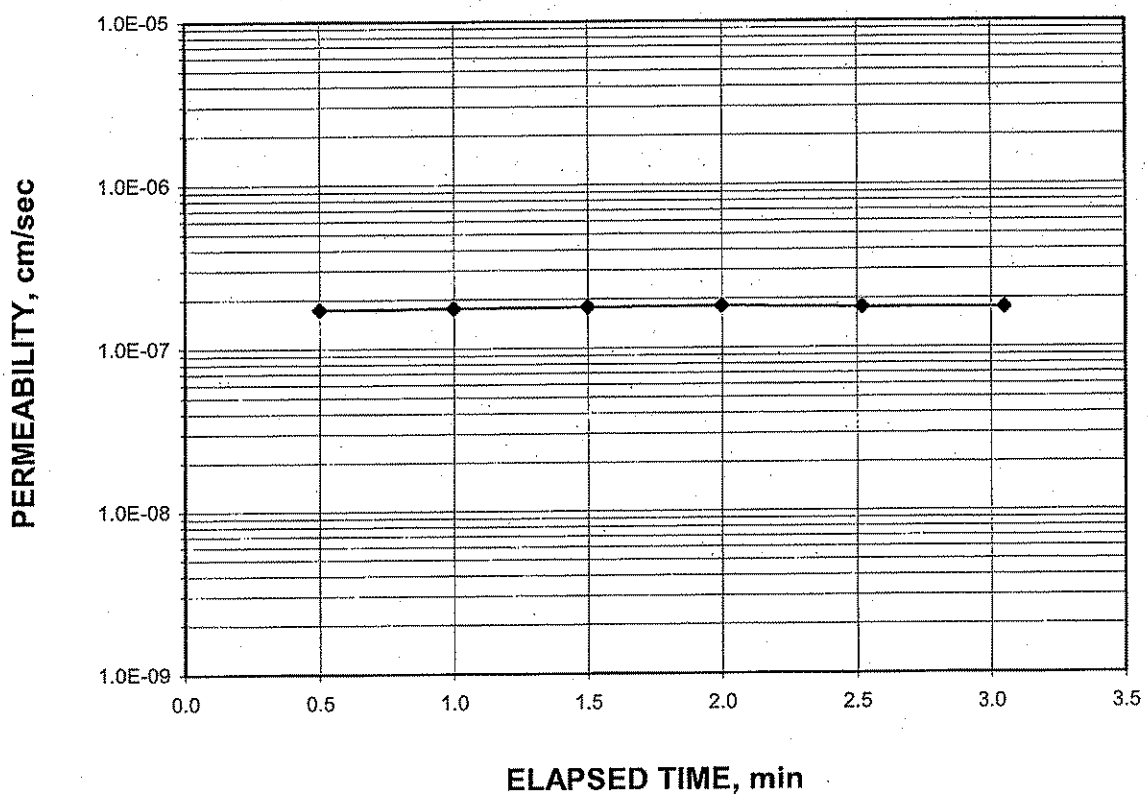
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID No.	2009-666-08-02		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 1.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 10/20/2009 Checked By: GEM Date: 10-21-09

DCN: CT-22C DATE:12-21-98 REV:[illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-08-02 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID No.	2009-666-08-02		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	838	802
Wt. of Tare & WS (gm.)	783.57	323.63
Wt. of Tare & DS (gm.)	679.28	278.59
Wt. of Tare (gm.)	261.52	103.87
Wt. of Water (gm.)	104.29	45.04
Wt. of DS (gm.)	417.76	174.72
Moisture Content (%)	**25.0**	**25.8**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	565.26	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	565.26	568.94
Length 1 (in.)	2.849	2.793
Length 2 (in.)	2.825	2.757
Length 3 (in.)	2.814	2.784
Top Diameter (in.)	2.832	2.821
Middle Diameter (in.)	2.831	2.807
Bottom Diameter (in.)	2.830	2.796
Average Length (in.)	2.83	2.78
Average Area (in.^{2})	6.29	6.19
Sample Volume (cm^3)	291.85	281.91
Unit Wet Wt. (gm./ cm^3)	1.937	2.018
Unit Wet Wt. (pcf)	120.9	126.0
Unit Dry Wt. (pcf)	96.7	100.2
Unit Dry Wt. (gm./ cm^3)	1.550	1.605
Void Ratio, e	0.742	0.683
Porosity, n	0.426	0.406
Pore Volume (cm^3)	124.3	114.4
Total Wt. Of Sample After Test		564.43

Tested By: TMS Date: 10/20/2009 Checked By: GEM Date: 10-21-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID No.	2009-666-08-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	7.06
Back Pressure(psi)	50.0	Sample Area (cm^2), A	39.95
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 1.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	(min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/20/2009	9	46.50	0.0	9.5	14.3	0	22.5	NA
10/20/2009	9	47.00	0.5	9.4	14.2	0	22.5	1.7E-07
10/20/2009	9	47.50	1.0	9.3	14.0	0	22.5	1.8E-07
10/20/2009	9	48.00	1.5	9.2	13.8	0	22.5	1.8E-07
10/20/2009	9	48.50	2.0	9.1	13.6	0	22.5	1.8E-07
10/20/2009	9	49.02	2.5	9.0	13.4	0	22.5	1.8E-07
10/20/2009	9	49.55	3.0	8.9	13.2	1	22.5	1.7E-07

Tested By: TMS Date: 10/20/2009 Checked By: GEM Date: 10-21-09

DCN: CT-22C DATE:12-21-[illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-08-02 PERMOM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID	2008-666-08-02	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

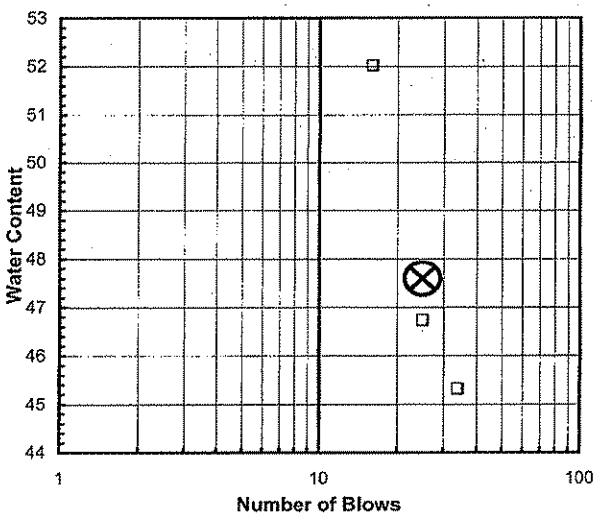
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	P	B	F	MULTIPOINT
Wt. of Tare & WS (gm)	28.07	28.20	29.67	
Wt. of Tare & DS (gm)	23.67	24.06	25.13	
Wt. of Tare (gm)	15.21	15.20	15.11	
Wt. of Water (gm)	4.4	4.1	4.5	
Wt. of DS (gm)	8.5	8.9	10.0	
Moisture Content (%)	**52.0**	**46.7**	**45.3**	
Number of Blows	**16**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	K	M	
Wt. of Tare & WS (gm)	21.34	21.16	
Wt. of Tare & DS (gm)	19.77	19.61	
Wt. of Tare (gm)	15.22	15.14	
Wt. of Water (gm)	1.6	1.6	
Wt. of DS (gm)	4.6	4.5	
Moisture Content (%)	**34.5**	**34.7**	**-0.2**

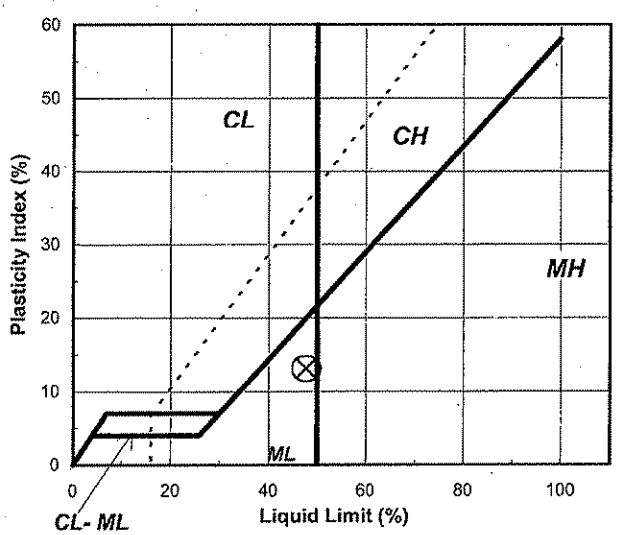
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**48**
Plastic Limit (%)	**35**
Plasticity Index (%)	**13**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 10/19/2009 *Checked By* GZM *Date* 10-20-09

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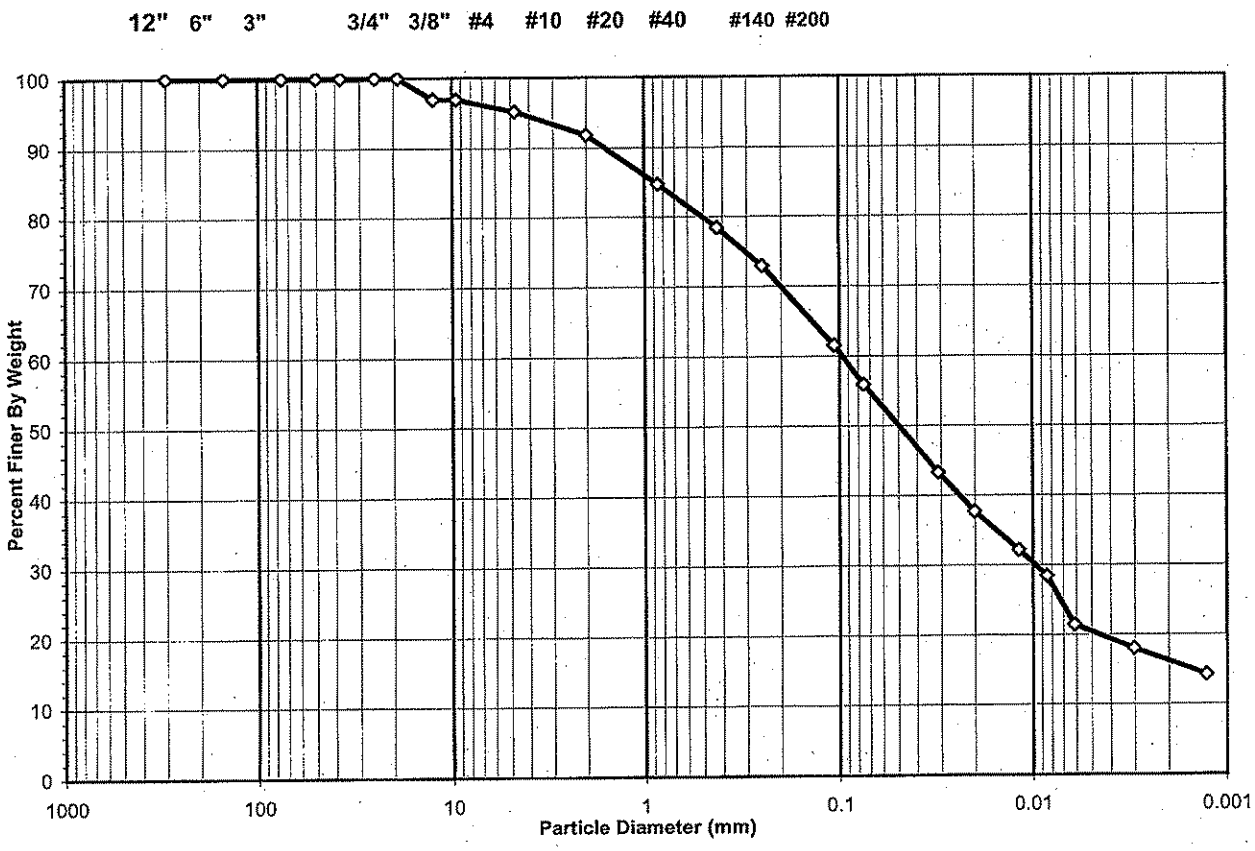
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID	2009-666-08-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel		sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	4.78
#4 To #200	*Sand*	39.32
Finer Than #200	*Silt & Clay*	55.90

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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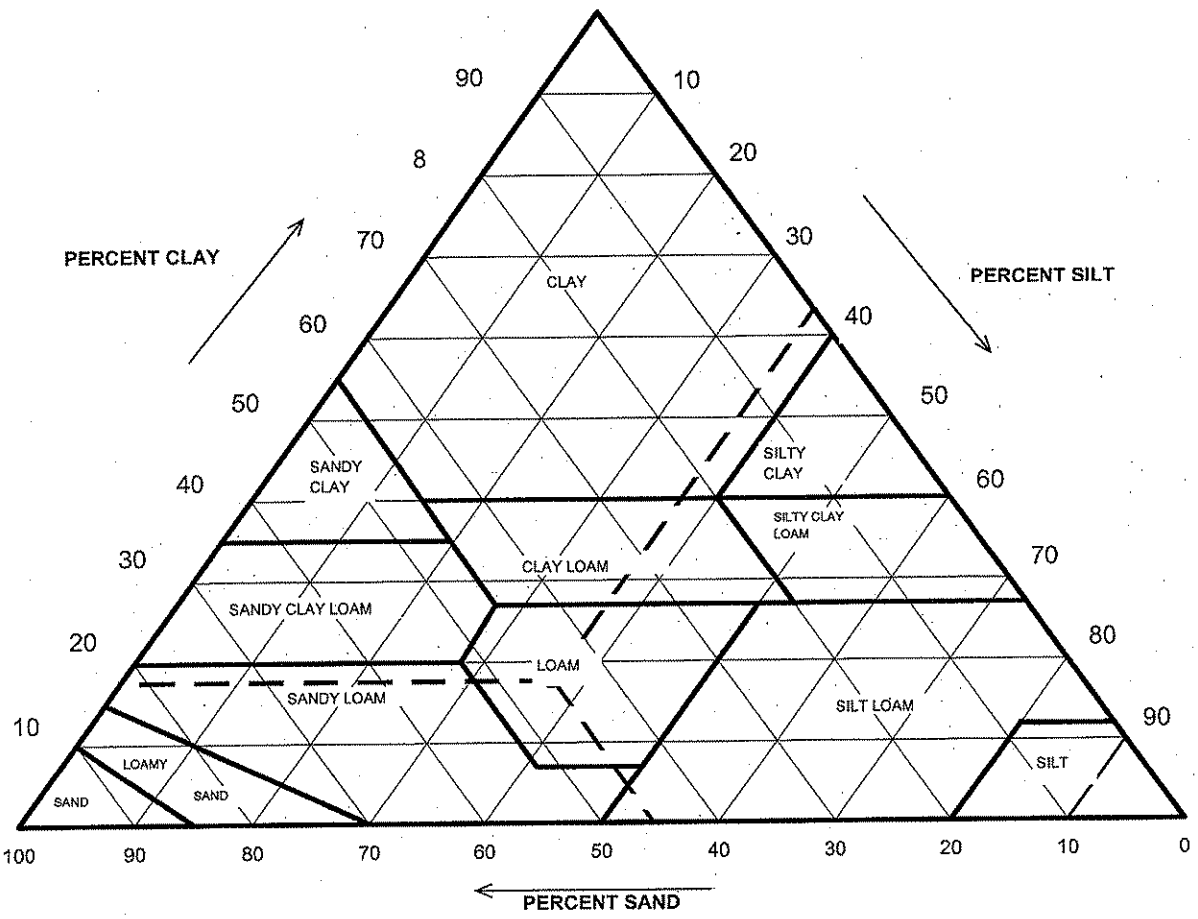
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID	2009-666-08-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	8.19	**0.00**
2	91.81	*Sand*	41.72	**45.44**
0.05	50.09	*Silt*	33.91	**36.94**
0.002	16.18	*Clay*	16.18	**17.62**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:05/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-08-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID	2009-666-08-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	838	Tare No.	O3
Wgt.Tare + Wet Soil (gm)	783.57	Wgt.Tare + Wet Soil (gm)	78.30
Wgt.Tare + Dry Soil (gm)	679.28	Wgt.Tare + Dry Soil (gm)	77.51
Weight of Tare (gm)	261.52	Weight of Tare (gm)	36.59
Weight of Water (gm)	104.29	Weight of Water (gm)	0.79
Weight of Dry Soil (gm)	417.76	Weight of Dry Soil (gm)	40.92
Moisture Content (%)	**25.0**	**Moisture Content (%)**	**1.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	522.05	Weight of the Dry Sample (gm)	466.82
Dry Weight +#10 Material(gm)	417.8	Weight of minus #200 material (gm)	29.87
Wet Weight Hydro. Material.(gm)	50.01	Weight of plus #200 material (gm)	436.95
Dry Weight Hydro. Material (gm)	49.06		
Total Dry Weight Sample (gm)	466.82	**J-FACTOR (%FINER THAN #10)**	**0.9181**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	12.66	3.03	3.03	96.97	**96.97**
3/8"	9.50	0.00	0.00	3.03	96.97	**96.97**
#4	4.75	7.31	1.75	4.78	95.22	**95.22**
#10	2.00	14.24	3.41	8.19	91.81	**91.81**
#20	0.85	3.78	7.70	7.70	92.30	**84.74**
#40	0.425	3.37	6.87	14.57	85.43	**78.43**
#60	0.250	2.93	5.97	20.55	79.45	**72.95**
#140	0.106	6.07	12.37	32.92	67.08	**61.59**
#200	0.075	3.04	6.20	39.11	60.89	**55.90**
Pan	-	29.87	60.89	100.00	-	-

Notes :

Tested By SD Date 10/26/2009 Checked By GEM Date 10-26-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	L2
Project No.	2009-666-08	Sample No.	ST-19
Lab ID	2009-666-08-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	28.0	28.0	24.0	4.65	23.3	47.1	0.01282	0.0310	**43.3**
5		25.0	24.0	4.65	20.3	41.1	0.01282	0.0200	**37.7**
15		22.0	24.0	4.65	17.3	35.0	0.01282	0.0118	**32.1**
30		20.0	24.0	4.65	15.3	31.0	0.01282	0.0084	**28.4**
60		16.0	24.3	4.45	11.6	23.3	0.01278	0.0061	**21.4**
250		14.0	24.5	4.31	9.7	19.5	0.01275	0.0030	**17.9**
1440		12.0	24.5	4.31	7.7	15.5	0.01275	0.0013	**14.2**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.06	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	91.81
Weight of Dry Material (gm)	49.06		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/23/2009 Checked By GAM Date 10-26-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

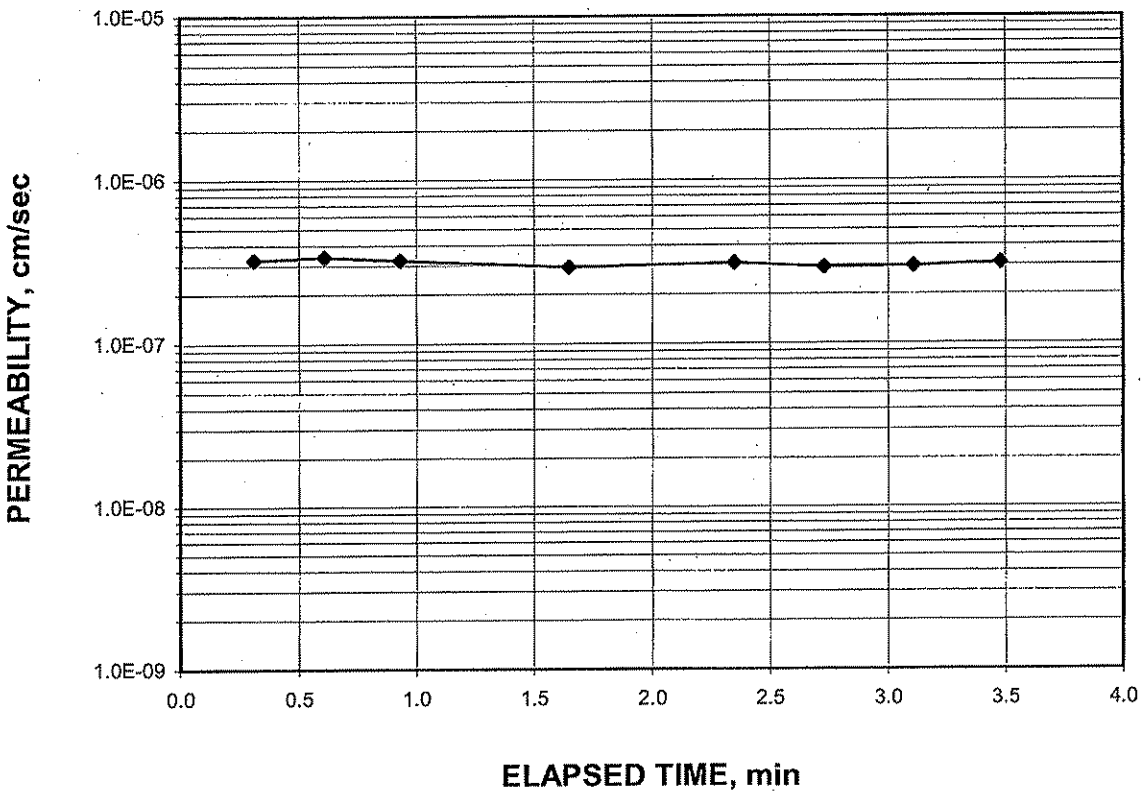
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID No.	2009-666-09-01		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 3.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.0E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID No.	2009-666-09-01		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	834	800
Wt. of Tare & WS (gm.)	633.53	389.89
Wt. of Tare & DS (gm.)	561.26	331.67
Wt. of Tare (gm.)	259.55	103.99
Wt. of Water (gm.)	72.27	58.22
Wt. of DS (gm.)	301.71	227.68
Moisture Content (%)	**24.0**	**25.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	688.92	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	688.92	697.91
Length 1 (in.)	3.410	3.345
Length 2 (in.)	3.353	3.261
Length 3 (in.)	3.387	3.324
Top Diameter (in.)	2.846	2.811
Middle Diameter (in.)	2.818	2.818
Bottom Diameter (in.)	2.809	2.803
Average Length (in.)	3.38	3.31
Average Area (in.^{2})	6.27	6.20
Sample Volume (cm^3)	347.35	336.54
Unit Wet Wt. (gm./ cm^3)	1.983	2.074
Unit Wet Wt. (pcf)	123.8	129.4
Unit Dry Wt. (pcf)	99.9	103.1
Unit Dry Wt. (gm./ cm^3)	1.600	1.651
Void Ratio, e	0.687	0.635
Porosity, n	0.407	0.388
Pore Volume (cm^3)	141.5	130.7
Total Wt. Of Sample After Test		689.23

Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

DCN: CT-22C DATE:12-21-[illegible] \\Server\[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-01 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID No.	2009-666-09-01		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.41
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.03
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 3.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	(min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/10/2009	12	58.57	0.0	9.5	12.0	0	23.5	NA
11/10/2009	12	58.88	0.3	9.4	11.9	0	23.5	3.2E-07
11/10/2009	12	59.18	0.6	9.3	11.7	0	23.5	3.4E-07
11/10/2009	12	59.50	0.9	9.2	11.6	0	23.5	3.2E-07
11/10/2009	13	0.22	1.6	9.0	11.3	0	23.5	2.9E-07
11/10/2009	13	0.92	2.3	8.8	11.0	0	23.5	3.1E-07
11/10/2009	13	1.30	2.7	8.7	10.8	0	23.5	2.9E-07
11/10/2009	13	1.68	3.1	8.6	10.6	0	23.5	3.0E-07
11/10/2009	13	2.05	3.5	8.5	10.5	1	23.5	3.1E-07

Tested By: TMS Date: 11/10/2009 Checked By: GZM Date: 11-11-09

DCN: CT-22C DATE:12-21\[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-01 PERMOM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID	2009-666-09-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

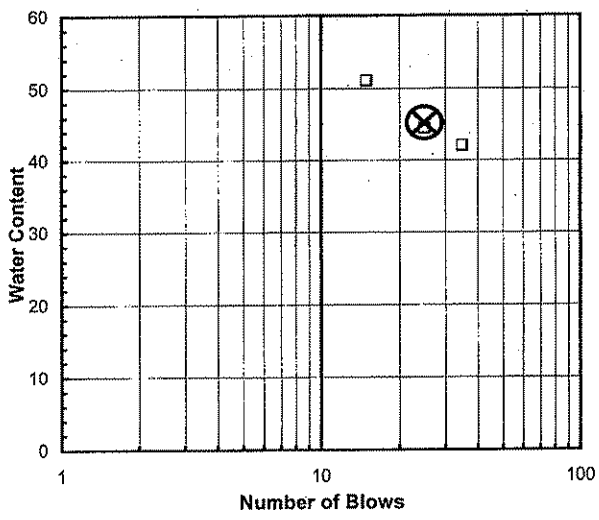
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	S	O	J	MULTIPOINT
Wt. of Tare & WS (gm)	28.44	28.36	29.23	
Wt. of Tare & DS (gm)	23.99	24.31	25.07	
Wt. of Tare (gm)	15.27	15.20	15.16	
Wt. of Water (gm)	4.5	4.1	4.2	
Wt. of DS (gm)	8.7	9.1	9.9	
Moisture Content (%)	**51.0**	**44.5**	**42.0**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-M	A-K	
Wt. of Tare & WS (gm)	22.55	23.59	
Wt. of Tare & DS (gm)	20.61	21.42	
Wt. of Tare (gm)	15.39	15.51	
Wt. of Water (gm)	1.9	2.2	
Wt. of DS (gm)	5.2	5.9	
Moisture Content (%)	**37.2**	**36.7**	**0.4**

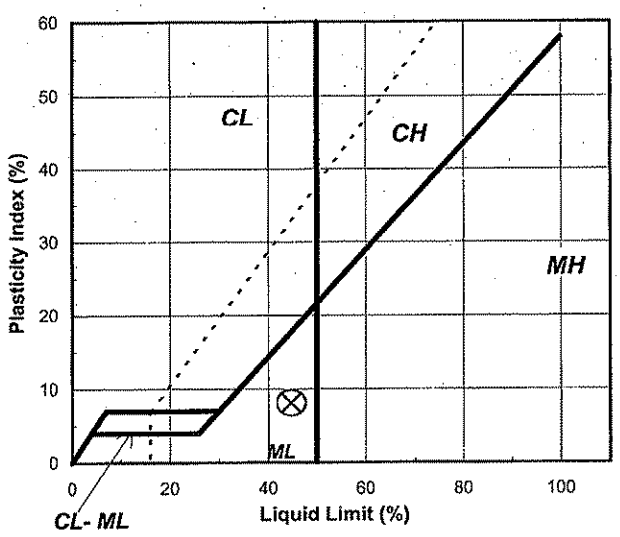
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**37**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/17/2009 *Checked By* GZM *Date* 11-19-09

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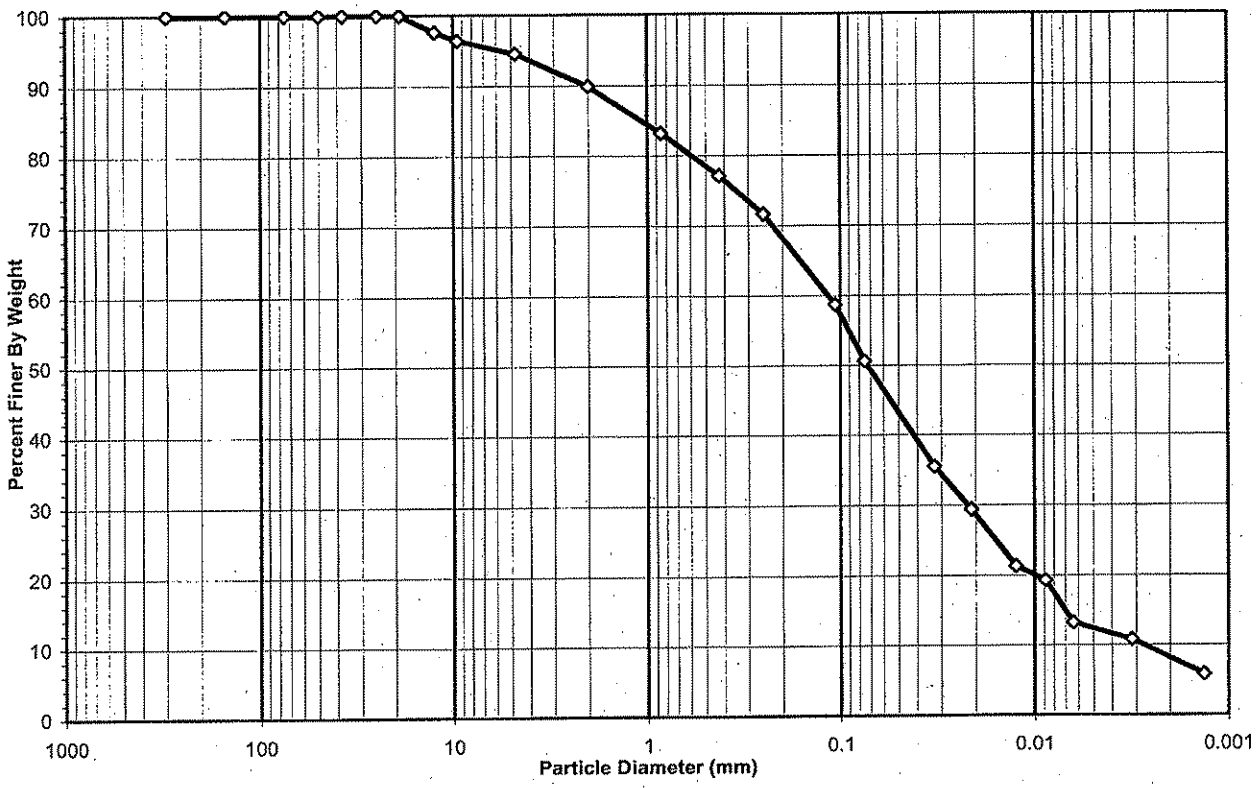
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID	2009-666-09-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	5.46
#4 To #200	*Sand*	43.97
Finer Than #200	*Silt & Clay*	50.56

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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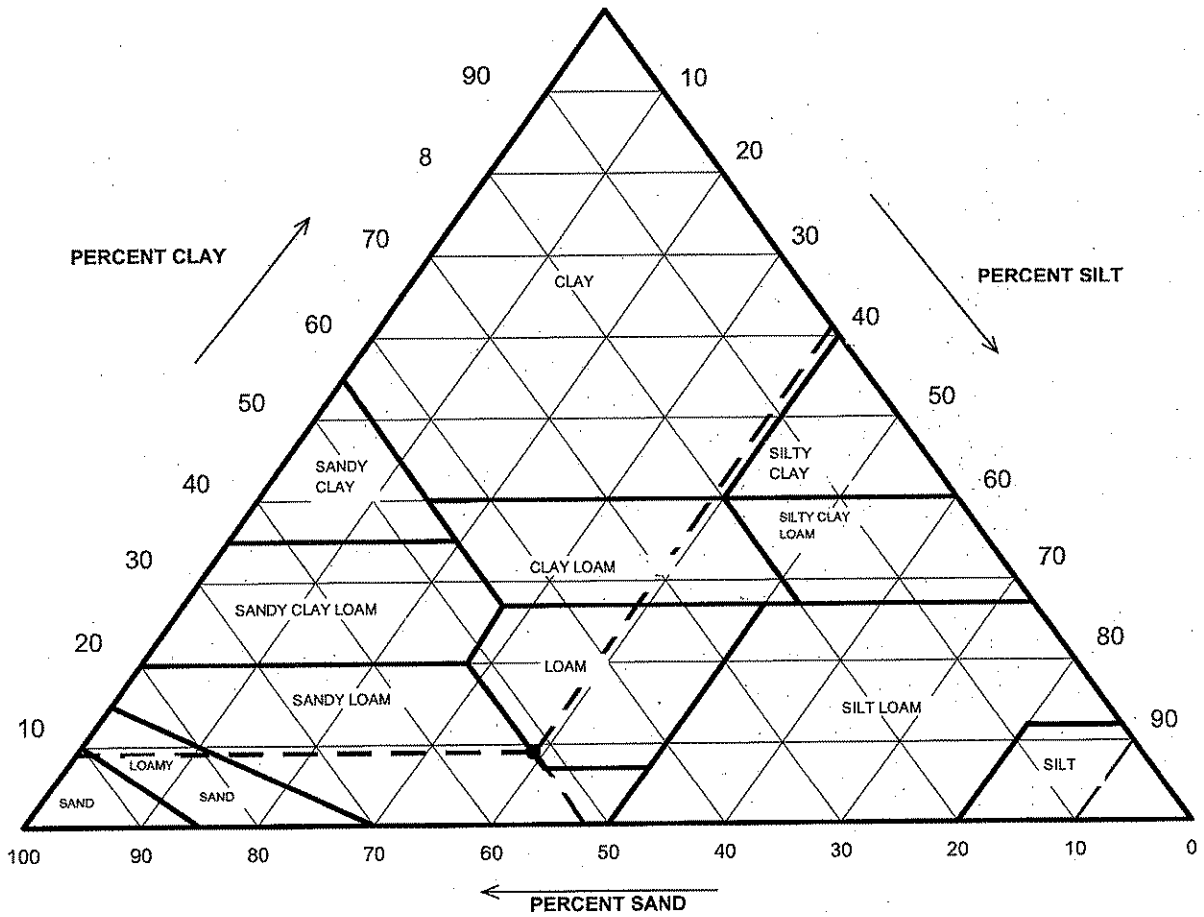
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID	2009-666-09-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	10.08	**0.00**
2	89.92	*Sand*	46.69	**51.92**
0.05	43.23	*Silt*	35.08	**39.01**
0.002	8.15	*Clay*	8.15	**9.07**

USDA Classification: ***LOAM***

 DCN: CT-53P DATE:05/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID	2009-666-09-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	834	Tare No.	E-2
Wgt.Tare + Wet Soil (gm)	633.53	Wgt.Tare + Wet Soil (gm)	48.95
Wgt.Tare + Dry Soil (gm)	561.26	Wgt.Tare + Dry Soil (gm)	45.71
Weight of Tare (gm)	259.55	Weight of Tare (gm)	21.91
Weight of Water (gm)	72.27	Weight of Water (gm)	3.24
Weight of Dry Soil (gm)	301.71	Weight of Dry Soil (gm)	23.80
Moisture Content (%)	**24.0**	**Moisture Content (%)**	**13.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	373.98	Weight of the Dry Sample (gm)	345.74
Dry Weight +#10 Material(gm)	301.7	Weight of minus #200 material (gm)	24.76
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	320.98
Dry Weight Hydro. Material (gm)	44.03		
Total Dry Weight Sample (gm)	345.74	**J-FACTOR (%FINER THAN #10)**	**0.8992**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	7.17	2.38	2.38	97.62	**97.62**
3/8"	9.50	3.62	1.20	3.58	96.42	**96.42**
#4	4.75	5.69	1.89	5.46	94.54	**94.54**
#10	2.00	13.93	4.62	10.08	89.92	**89.92**
#20	0.85	3.31	7.52	7.52	92.48	**83.16**
#40	0.425	2.96	6.72	14.24	85.76	**77.11**
#60	0.250	2.68	6.09	20.33	79.67	**71.64**
#140	0.106	6.33	14.38	34.71	65.29	**58.71**
#200	0.075	3.99	9.06	43.77	56.23	**50.56**
Pan	-	24.76	56.23	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-18-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A3
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-20
Lab ID	2009-666-09-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	22.8	5.46	17.5	39.4	0.01300	0.0325	**35.5**
5		20.0	22.8	5.46	14.5	32.7	0.01300	0.0210	**29.4**
15		16.0	22.8	5.46	10.5	23.7	0.01300	0.0124	**21.3**
30		15.0	22.8	5.46	9.5	21.5	0.01300	0.0088	**19.3**
60		12.0	22.8	5.46	6.5	14.7	0.01300	0.0064	**13.2**
250		11.0	22.5	5.66	5.3	12.0	0.01305	0.0031	**10.8**
1440		9.0	21.8	6.13	2.9	6.4	0.01316	0.0013	**5.8**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	44.03	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	89.92
Weight of Dry Material (gm)	44.03		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GEM Date 11-18-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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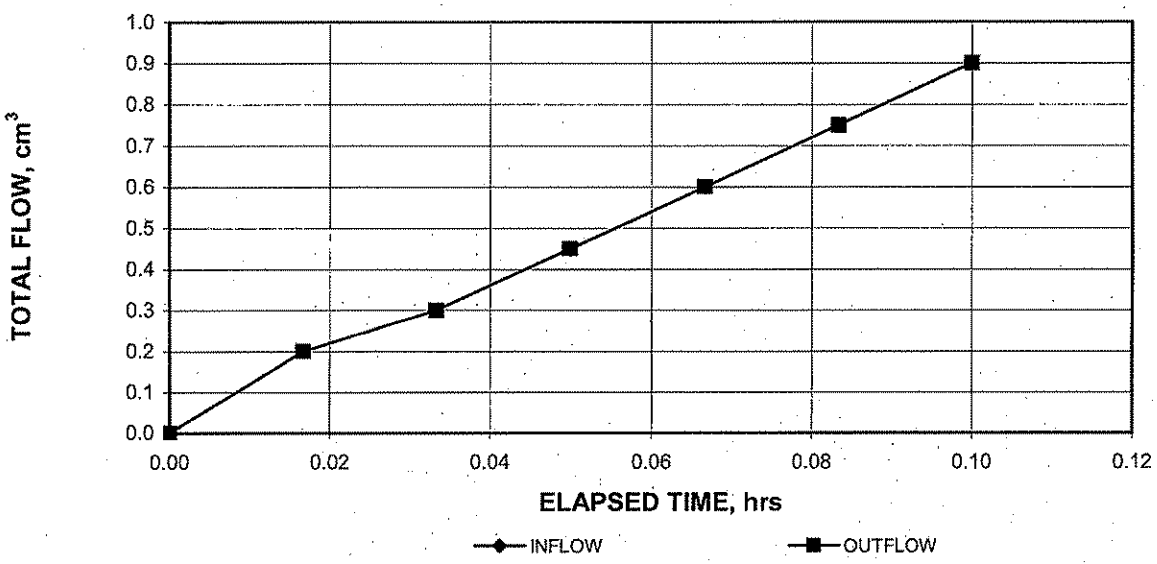
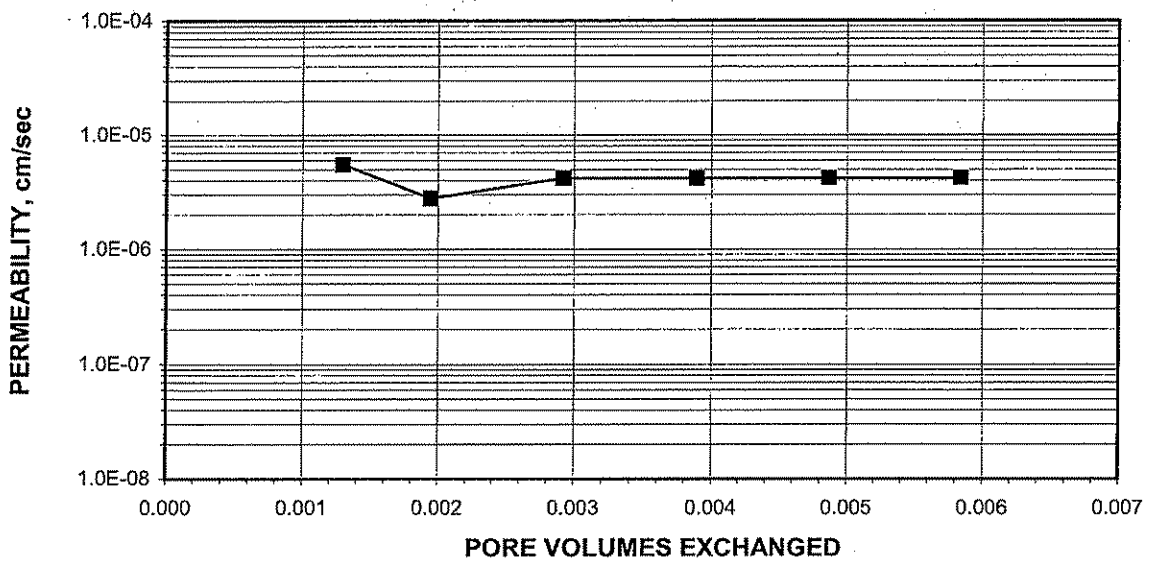
Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID No.	2009-666-10-06		

AVERAGE PERMEABILITY = 4.2E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.2E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 REVISION: 0 [illegible]PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-06 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID No.	2009-666-10-06		

Specific Gravity	2.70 Assumed
Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	209	806
Wt. of Tare & WS (gm.)	458.10	315.46
Wt. of Tare & DS (gm.)	401.57	263.95
Wt. of Tare (gm.)	171.69	102.60
Wt. of Water (gm.)	56.53	51.51
Wt. of DS (gm.)	229.88	161.35
Moisture Content (%)	**24.6**	**31.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	599.92	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	599.92	635.23
Length 1 (in.)	3.190	3.185
Length 2 (in.)	3.192	3.189
Length 3 (in.)	3.203	3.198
Top Diameter (in.)	2.854	2.849
Middle Diameter (in.)	2.846	2.829
Bottom Diameter (in.)	2.848	2.857
Average Length (in.)	3.20	3.19
Average Area (in.^{2})	6.38	6.36
Sample Volume (cm^3)	333.85	332.38
Unit Wet Wt. (gm./ cm^3)	1.80	1.91
Unit Wet Wt. (pcf)	112.2	119.3
Unit Dry Wt. (pcf)	90.0	90.4
Unit Dry Wt. (gm./ cm^3)	1.44	1.45
Void Ratio, e	0.87	0.86
Porosity, n	0.47	0.46
Pore Volume (cm^3)	155.5	154.0
Total Wgt. Of Sample After Test		624.38

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 REVISION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-06 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID No.	2009-666-10-06		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.10
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.23
Cell (psi)	75.0	Sample Area (cm^2), A	41.01
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.959
Hydraulic Gradient	10.41	Outflow Burette Area (cm^2), a-out	0.983
		B Parameter (%)	95

AVERAGE PERMEABILITY = 4.2E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.2E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	10	47.5	0.00	0.0	0.0	109.2	0	23.8	NA
11/20/2009	10	48.5	0.02	0.2	0.2	108.7	0	23.8	5.5E-06
11/20/2009	10	49.5	0.03	0.3	0.3	108.5	0	23.8	2.8E-06
11/20/2009	10	50.5	0.05	0.5	0.4	108.2	0	23.8	4.2E-06
11/20/2009	10	51.5	0.07	0.6	0.6	107.9	0	23.8	4.2E-06
11/20/2009	10	52.5	0.08	0.8	0.8	107.6	0	23.8	4.2E-06
11/20/2009	10	53.5	0.10	0.9	0.9	107.3	1	23.8	4.2E-06

Tested By: TMS Date: 11/20/2009 Checked By: GBM Date: 11-23-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID	2009-666-10-06	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

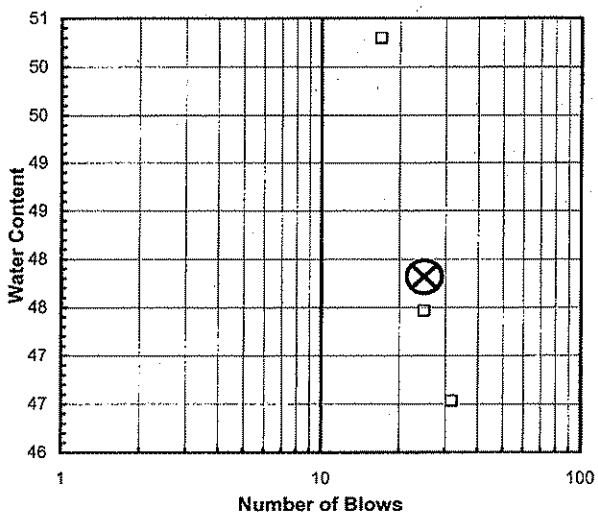
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	B-B	A-T	A-O	MULTIPOINT
Wt. of Tare & WS (gm)	28.34	27.21	26.82	
Wt. of Tare & DS (gm)	24.05	23.47	23.20	
Wt. of Tare (gm)	15.52	15.59	15.42	
Wt. of Water (gm)	4.3	3.7	3.6	
Wt. of DS (gm)	8.5	7.9	7.8	
Moisture Content (%)	**50.3**	**47.5**	**46.5**	
Number of Blows	**17**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-L	A-H	
Wt. of Tare & WS (gm)	21.72	21.79	
Wt. of Tare & DS (gm)	20.01	20.08	
Wt. of Tare (gm)	15.50	15.54	
Wt. of Water (gm)	1.7	1.7	
Wt. of DS (gm)	4.5	4.5	
Moisture Content (%)	**37.9**	**37.7**	**0.3**

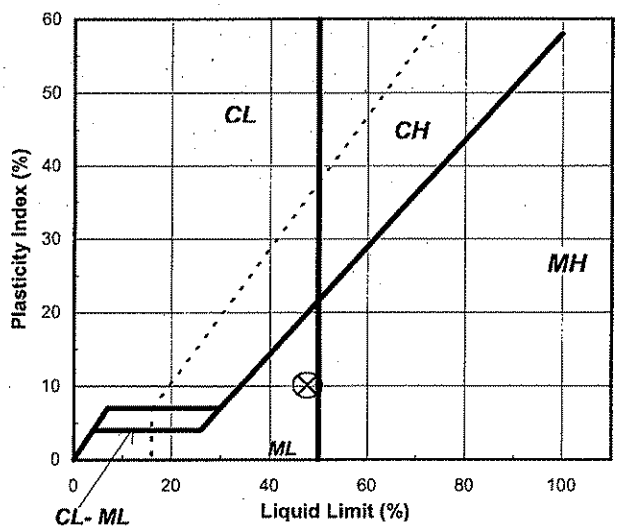
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**48**
Plastic Limit (%)	**38**
Plasticity Index (%)	**10**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/20/2009 *Checked By* GEM *Date* 11-23-09

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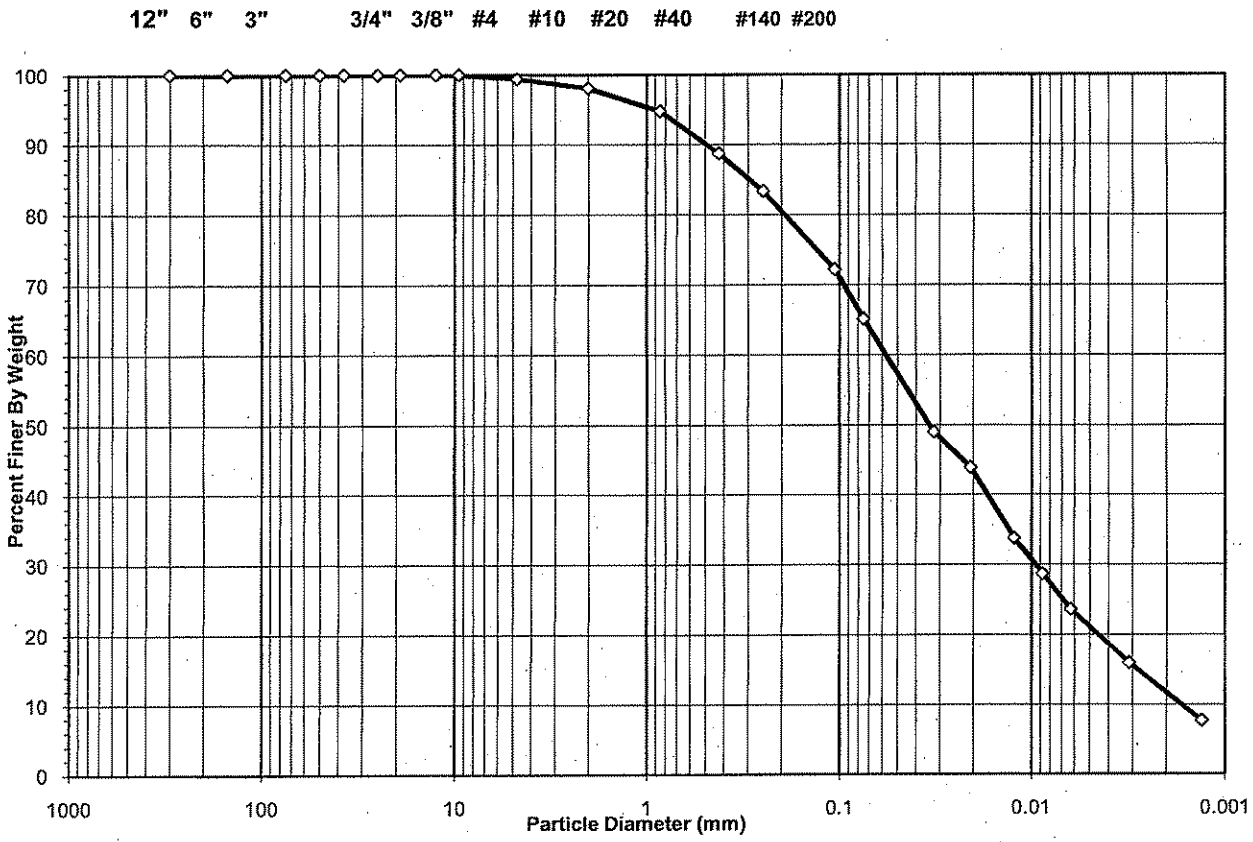
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID	2009-666-10-06	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.58
#4 To #200	*Sand*	34.32
Finer Than #200	*Silt & Clay*	65.10

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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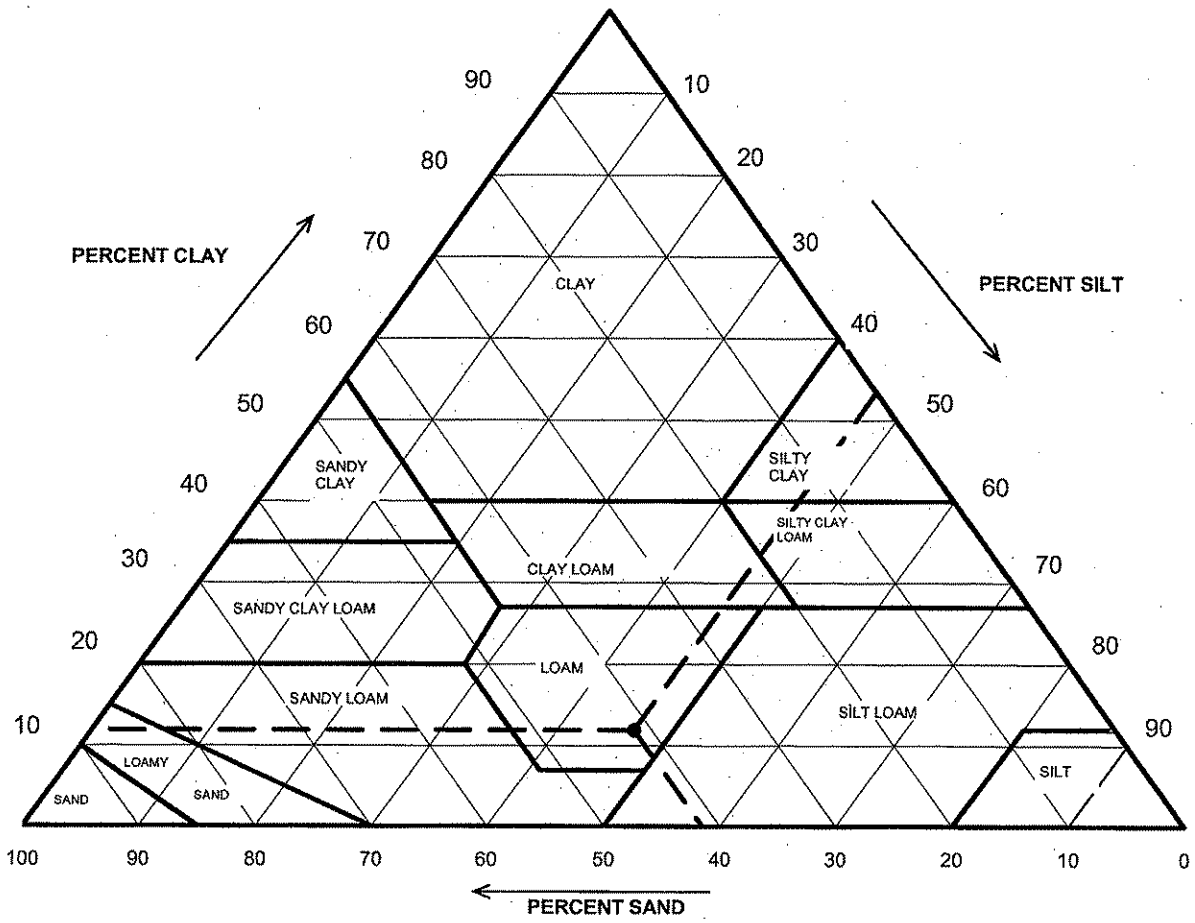
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID	2009-666-10-06	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.93	**0.00**
2	98.07	*Sand*	40.72	**41.52**
0.05	57.36	*Silt*	45.69	**46.59**
0.002	11.66	*Clay*	11.66	**11.89**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:08/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-06 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID	2009-666-10-06	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	209	Tare No.	U-1
Wgt.Tare + Wet Soil (gm)	458.10	Wgt.Tare + Wet Soil (gm)	55.37
Wgt.Tare + Dry Soil (gm)	401.57	Wgt.Tare + Dry Soil (gm)	46.00
Weight of Tare (gm)	171.69	Weight of Tare (gm)	15.67
Weight of Water (gm)	56.53	Weight of Water (gm)	9.37
Weight of Dry Soil (gm)	229.88	Weight of Dry Soil (gm)	30.33
Moisture Content (%)	**24.6**	**Moisture Content (%)**	**30.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	286.41	Weight of the Dry Sample (gm)	268.07
Dry Weight +#10 Material(gm)	229.9	Weight of minus #200 material (gm)	25.35
Wet Weight Hydro. Material.(gm)	49.99	Weight of plus #200 material (gm)	242.72
Dry Weight Hydro. Material (gm)	38.19		
Total Dry Weight Sample (gm)	268.07	**J-FACTOR (%FINER THAN #10)**	**0.9807**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.33	0.58	0.58	99.42	**99.42**
#10	2.00	3.10	1.35	1.93	98.07	**98.07**
#20	0.85	1.28	3.35	3.35	96.65	**94.79**
#40	0.425	2.37	6.21	9.56	90.44	**88.70**
#60	0.250	2.08	5.45	15.00	85.00	**83.36**
#140	0.106	4.37	11.44	26.45	73.55	**72.14**
#200	0.075	2.74	7.17	33.62	66.38	**65.10**
Pan	-	25.35	66.38	100.00	-	-

Notes :

Tested By DAW Date 11.25.09 Checked By JRB Date 11.25.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST32
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L1
Lab ID	2009-666-10-06	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	25.0	25.0	22.4	5.73	19.3	50.0	0.01307	0.0323	**49.0**
5		23.0	22.4	5.73	17.3	44.8	0.01307	0.0207	**43.9**
15		19.0	22.4	5.73	13.3	34.4	0.01307	0.0122	**33.7**
30		17.0	22.4	5.73	11.3	29.2	0.01307	0.0088	**28.7**
60		15.0	22.4	5.73	9.3	24.0	0.01307	0.0063	**23.6**
250		12.0	22.4	5.73	6.3	16.3	0.01307	0.0031	**15.9**
1440		8.0	23.5	4.99	3.0	7.8	0.01290	0.0013	**7.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	38.19	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.07
Weight of Dry Material (gm)	38.19		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By JER Date 11.25-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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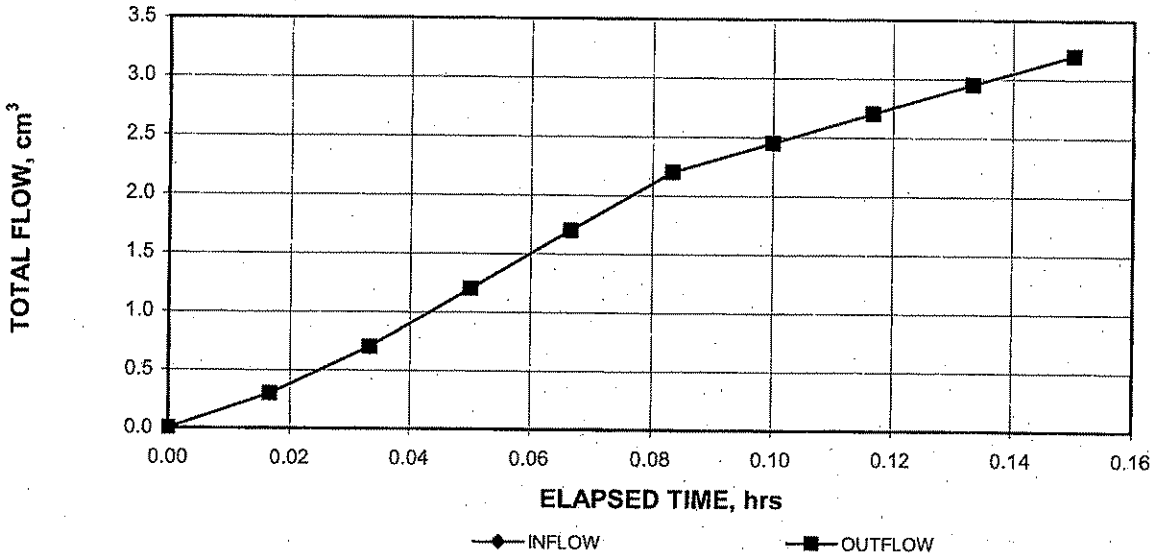
INTEGRITY IN TESTING

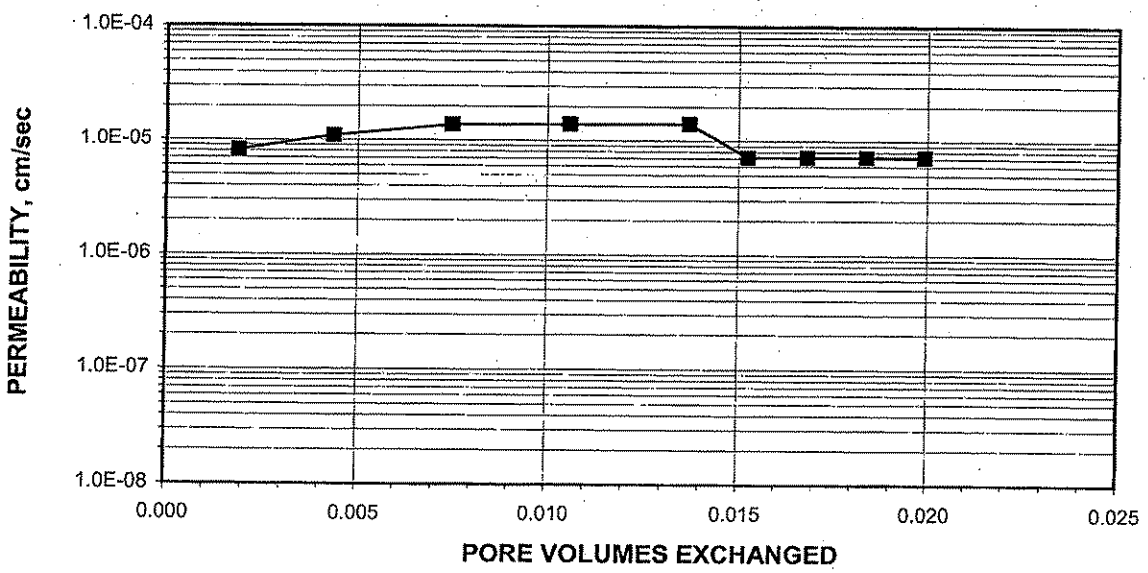
Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-07		

AVERAGE PERMEABILITY = 7.2E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 7.2E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 REVISION: 5 \\Server\data\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-07 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-07		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	214	803
Wt. of Tare & WS (gm.)	487.90	314.68
Wt. of Tare & DS (gm.)	430.44	265.87
Wt. of Tare (gm.)	171.33	104.17
Wt. of Water (gm.)	57.46	48.81
Wt. of DS (gm.)	259.11	161.70
Moisture Content (%)	**22.2**	**30.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	617.51	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	617.51	657.99
Length 1 (in.)	3.284	3.332
Length 2 (in.)	3.253	3.234
Length 3 (in.)	3.320	3.315
Top Diameter (in.)	2.858	2.874
Middle Diameter (in.)	2.847	2.878
Bottom Diameter (in.)	2.809	2.841
Average Length (in.)	3.29	3.29
Average Area (in.^{2})	6.33	6.44
Sample Volume (cm^3)	340.60	347.79
Unit Wet Wt. (gm./ cm^3)	1.81	1.89
Unit Wet Wt. (pcf)	113.2	118.1
Unit Dry Wt. (pcf)	92.6	90.7
Unit Dry Wt. (gm./ cm^3)	1.48	1.45
Void Ratio, e	0.82	0.86
Porosity, n	0.45	0.46
Pore Volume (cm^3)	153.4	160.6
Total Wgt. Of Sample After Test		660.26

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-07 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-07		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.37
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.28
Cell (psi)	75.0	Sample Area (cm^2), A	41.57
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.878
Hydraulic Gradient	10.08	Outflow Burette Area (cm^2), a-out	0.871
		B Parameter (%)	95

AVERAGE PERMEABILITY = 7.2E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 7.2E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	10	47	0.00	0.0	0.0	110.7	0	23.8	NA
11/20/2009	10	48	0.02	0.3	0.3	110.0	0	23.8	8.2E-06
11/20/2009	10	49	0.03	0.7	0.7	109.1	0	23.8	1.1E-05
11/20/2009	10	50	0.05	1.2	1.2	108.0	0	23.8	1.4E-05
11/20/2009	10	51	0.07	1.7	1.7	106.9	0	23.8	1.4E-05
11/20/2009	10	52	0.08	2.2	2.2	105.8	0	23.8	1.4E-05
11/20/2009	10	53	0.10	2.5	2.5	105.2	0	23.8	7.1E-06
11/20/2009	10	54	0.12	2.7	2.7	104.7	0	23.8	7.2E-06
11/20/2009	10	55	0.13	3.0	3.0	104.1	0	23.8	7.2E-06
11/20/2009	10	56	0.15	3.2	3.2	103.5	1	23.8	7.2E-06

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-07	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

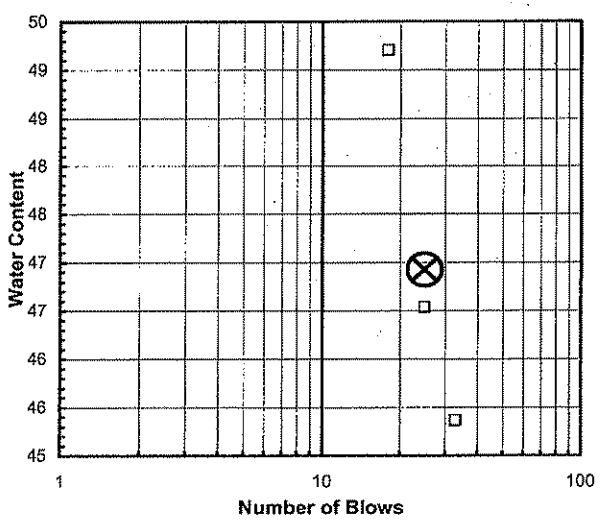
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	B	O	A-F	MULTIPOINT
Wt. of Tare & WS (gm)	27.32	28.30	26.88	
Wt. of Tare & DS (gm)	23.32	24.14	23.31	
Wt. of Tare (gm)	15.19	15.20	15.44	
Wt. of Water (gm)	4.0	4.2	3.6	
Wt. of DS (gm)	8.1	8.9	7.9	
Moisture Content (%)	**49.2**	**46.5**	**45.4**	
Number of Blows	**18**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-B	A-I	
Wt. of Tare & WS (gm)	22.19	21.66	
Wt. of Tare & DS (gm)	20.34	19.92	
Wt. of Tare (gm)	15.56	15.46	
Wt. of Water (gm)	1.9	1.7	
Wt. of DS (gm)	4.8	4.5	
Moisture Content (%)	**38.7**	**39.0**	**-0.3**

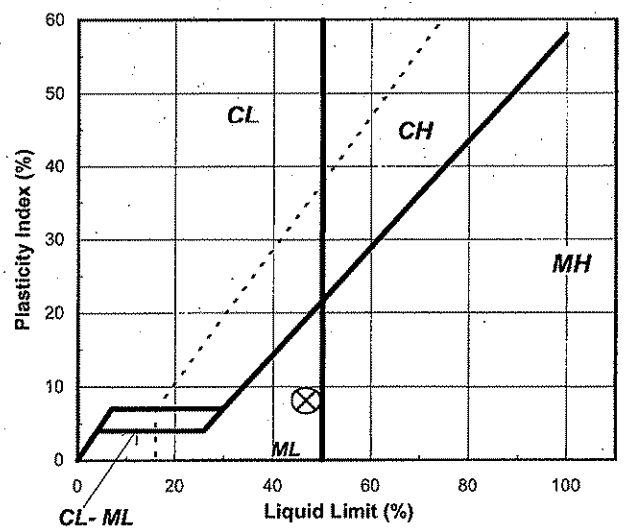
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**39**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/20/2009 *Checked By* GEM *Date* 11-23-09

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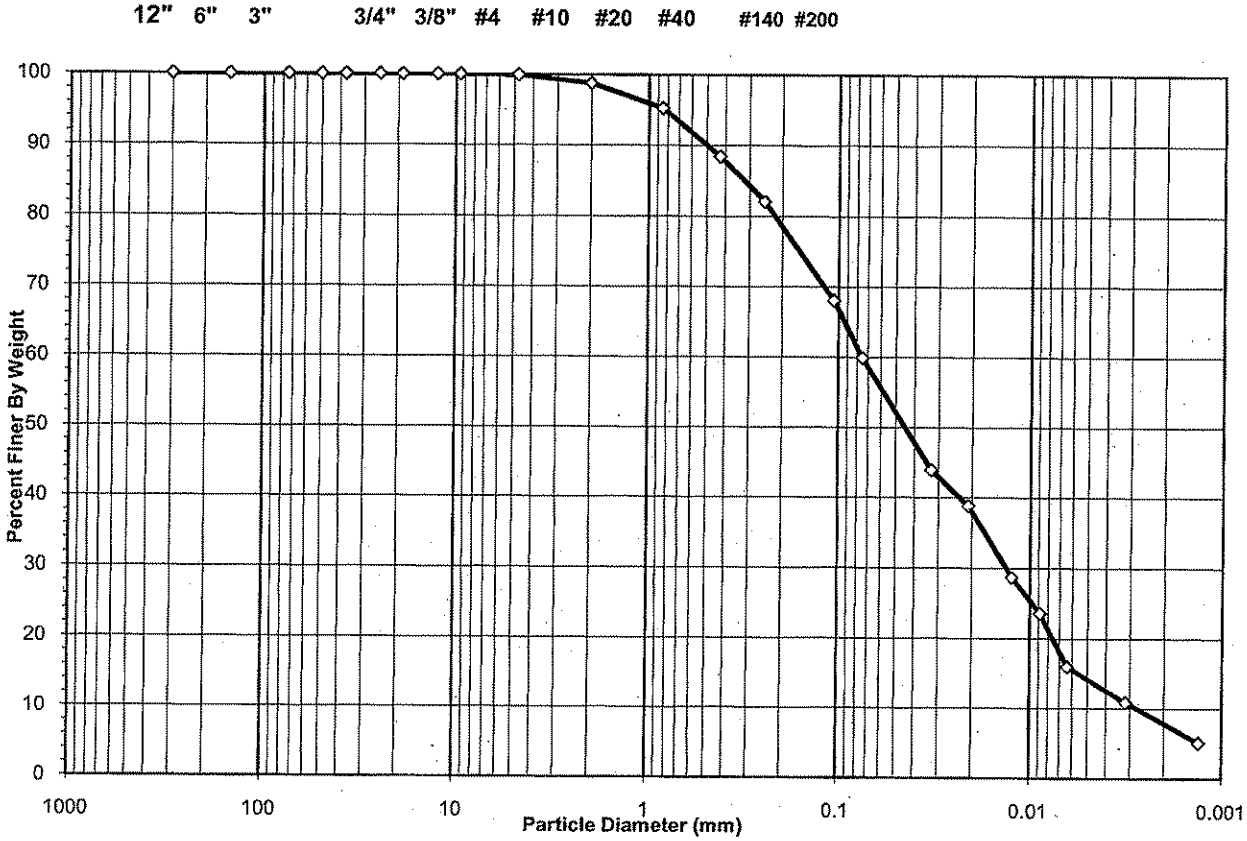
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-07	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.08
#4 To #200	*Sand*	40.02
Finer Than #200	*Silt & Clay*	59.89

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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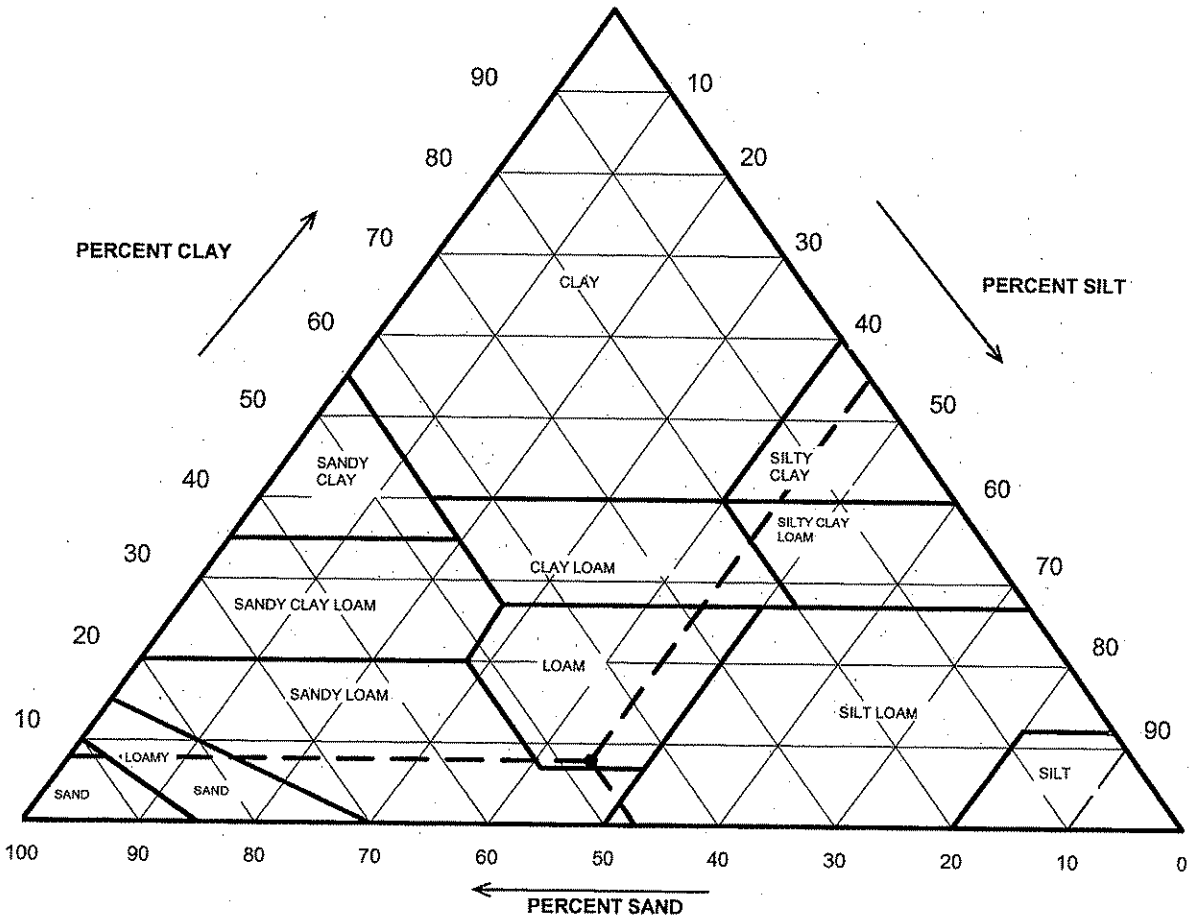
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-07	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.25	**0.00**
2	98.75	*Sand*	46.65	**47.24**
0.05	52.10	*Silt*	44.26	**44.82**
0.002	7.84	*Clay*	7.84	**7.94**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-07 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-07	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	214	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	487.90	Wgt.Tare + Wet Soil (gm)	59.58
Wgt.Tare + Dry Soil (gm)	430.44	Wgt.Tare + Dry Soil (gm)	49.41
Weight of Tare (gm)	171.33	Weight of Tare (gm)	15.70
Weight of Water (gm)	57.46	Weight of Water (gm)	10.17
Weight of Dry Soil (gm)	259.11	Weight of Dry Soil (gm)	33.71
Moisture Content (%)	**22.2**	**Moisture Content (%)**	**30.2**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	316.57	Weight of the Dry Sample (gm)	297.54
Dry Weight +#10 Material(gm)	259.1	Weight of minus #200 material (gm)	23.31
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	274.23
Dry Weight Hydro. Material (gm)	38.43		
Total Dry Weight Sample (gm)	297.54	**J-FACTOR (%FINER THAN #10)**	**0.9875**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.21	0.08	0.08	99.92	**99.92**
#10	2.00	3.03	1.17	1.25	98.75	**98.75**
#20	0.85	1.37	3.57	3.57	96.43	**95.23**
#40	0.425	2.65	6.90	10.46	89.54	**88.42**
#60	0.250	2.46	6.40	16.86	83.14	**82.10**
#140	0.106	5.48	14.26	31.12	68.88	**68.01**
#200	0.075	3.16	8.22	39.35	60.65	**59.89**
Pan	-	23.31	60.65	100.00	-	-

Notes :

Tested By DAW Date 11.25.09 Checked By JRB Date 11.25.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST33
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-07	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	22.4	5.73	17.3	44.5	0.01307	0.0327	**43.9**
5		21.0	22.4	5.73	15.3	39.3	0.01307	0.0209	**38.8**
15		17.0	22.4	5.73	11.3	29.0	0.01307	0.0124	**28.7**
30		15.0	22.4	5.73	9.3	23.9	0.01307	0.0089	**23.6**
60		12.0	22.4	5.73	6.3	16.2	0.01307	0.0064	**16.0**
250		10.0	22.4	5.73	4.3	11.0	0.01307	0.0032	**10.9**
1440		7.0	23.5	4.99	2.0	5.2	0.01290	0.0013	**5.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	38.43	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.75
Weight of Dry Material (gm)	38.43		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By JRB Date 11-25-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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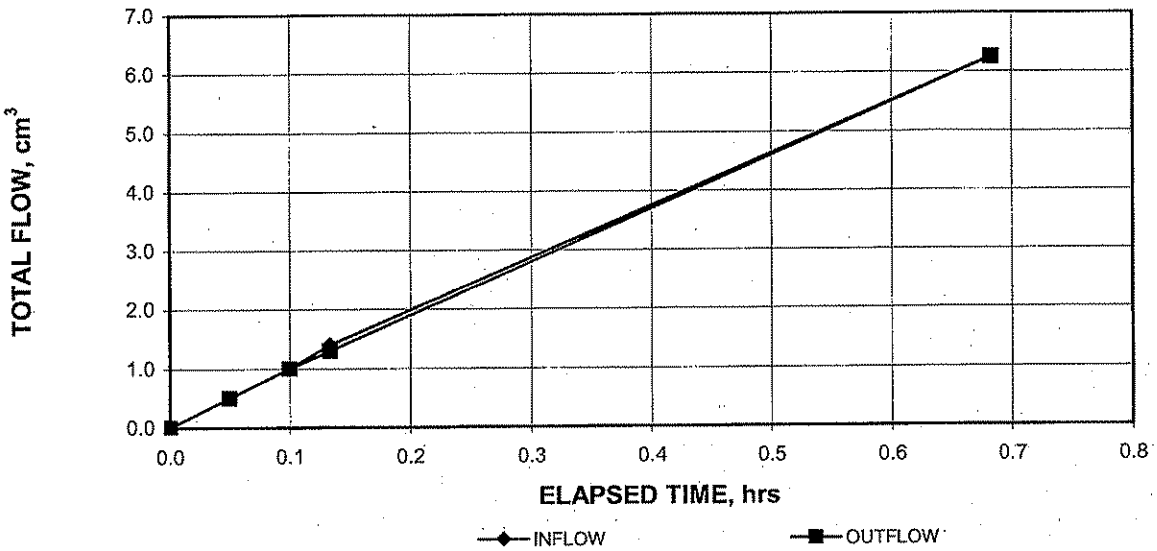
INTEGRITY IN TESTING

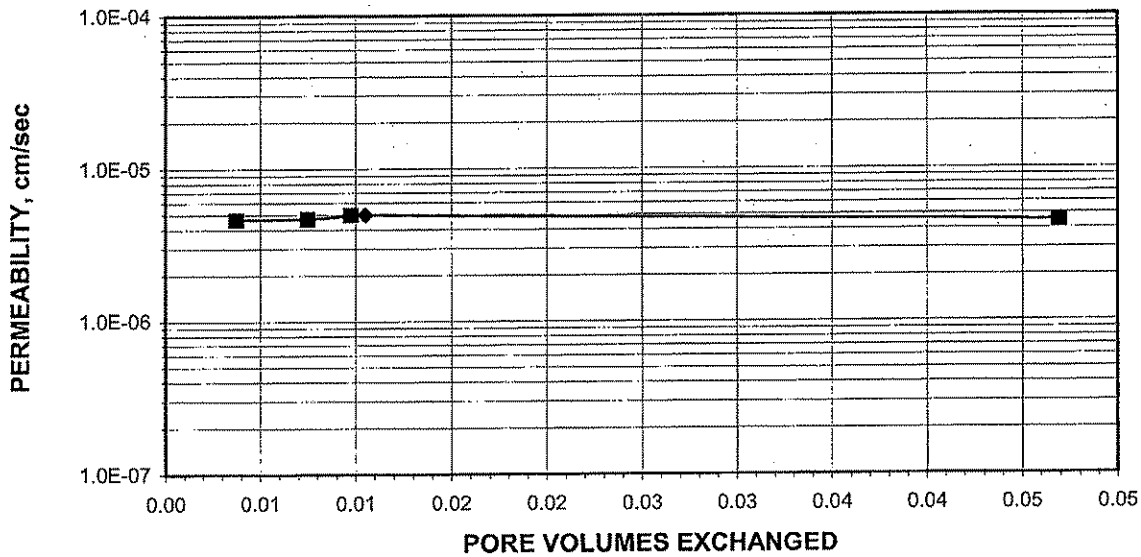
Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-03		

AVERAGE PERMEABILITY = 4.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.7E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MPS Date: 11/25/2009 Checked By: GZM Date: 11-30-09

DCN: CT-22C DATE: 11/25/2009 REV: 0 \\Server\data\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-03		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	212	804
Wt. of Tare & WS (gm.)	655.87	214.70
Wt. of Tare & DS (gm.)	560.36	189.51
Wt. of Tare (gm.)	171.52	106.77
Wt. of Water (gm.)	95.51	25.19
Wt. of DS (gm.)	388.84	82.74
Moisture Content (%)	**24.6**	**30.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	588.03	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	588.03	615.80
Length 1 (in.)	3.024	2.996
Length 2 (in.)	3.021	3.006
Length 3 (in.)	3.036	2.985
Top Diameter (in.)	2.851	2.850
Middle Diameter (in.)	2.834	2.824
Bottom Diameter (in.)	2.820	2.806
Average Length (in.)	3.03	3.00
Average Area (in.^{2})	6.31	6.28
Sample Volume (cm^3)	313.12	308.06
Unit Wet Wt. (gm./ cm^3)	1.88	2.00
Unit Wet Wt. (pcf)	117.2	124.8
Unit Dry Wt. (pcf)	94.1	95.7
Unit Dry Wt. (gm./ cm^3)	1.51	1.53
Void Ratio, e	0.79	0.76
Porosity, n	0.44	0.43
Pore Volume (cm^3)	138.3	133.2
Total Wgt. Of Sample After Test		600.3

Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	7.61
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.18
Cell (psi)	75.0	Sample Area (cm^2), A	40.49
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.891
Hydraulic Gradient	11.09	Outflow Burette Area (cm^2), a-out	0.883
		B Parameter (%)	96

AVERAGE PERMEABILITY = 4.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.7E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/25/2009	13	34	0.0	0.0	0.0	102.8	0	23.6	NA
11/25/2009	13	37	0.1	0.5	0.5	101.7	0	23.6	4.7E-06
11/25/2009	13	40	0.1	1.0	1.0	100.5	0	23.6	4.7E-06
11/25/2009	13	42	0.1	1.4	1.3	99.7	0	23.6	5.0E-06
11/25/2009	14	15	0.7	6.3	6.3	88.8	1	23.6	4.5E-06

Tested By: MPS Date: 11/25/2009 Checked By: GZM Date: 11-30-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-03	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

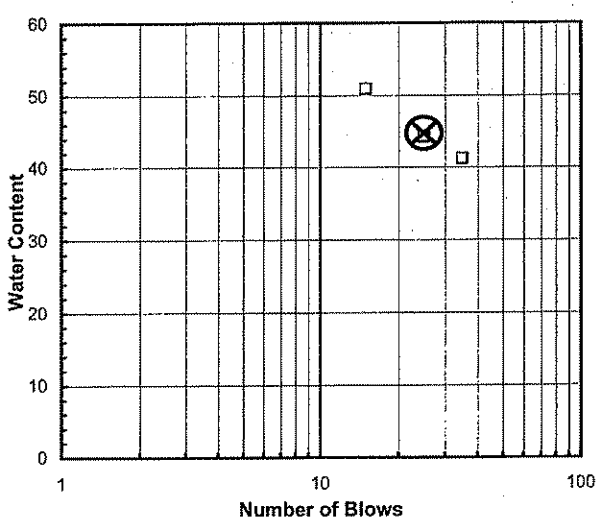
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A	E	Y	MULTIPOINT
Wt. of Tare & WS (gm)	29.11	27.74	25.24	
Wt. of Tare & DS (gm)	24.44	23.93	22.43	
Wt. of Tare (gm)	15.26	15.32	15.60	
Wt. of Water (gm)	4.7	3.8	2.8	
Wt. of DS (gm)	9.2	8.6	6.8	
Moisture Content (%)	**50.9**	**44.3**	**41.1**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	I	U	
Wt. of Tare & WS (gm)	23.88	23.83	
Wt. of Tare & DS (gm)	21.44	21.38	
Wt. of Tare (gm)	15.22	15.18	
Wt. of Water (gm)	2.4	2.5	
Wt. of DS (gm)	6.2	6.2	
Moisture Content (%)	**39.2**	**39.5**	**-0.3**

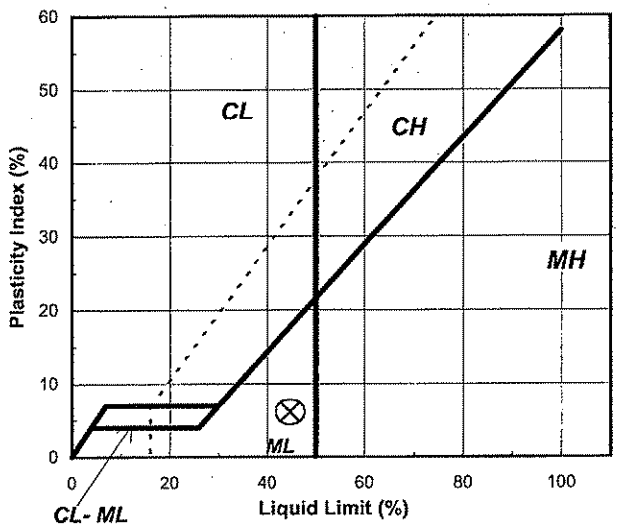
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**39**
Plasticity Index (%)	**6**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By *JBD* *Date* *11/30/2009* *Checked By* GEM *Date* 12-1-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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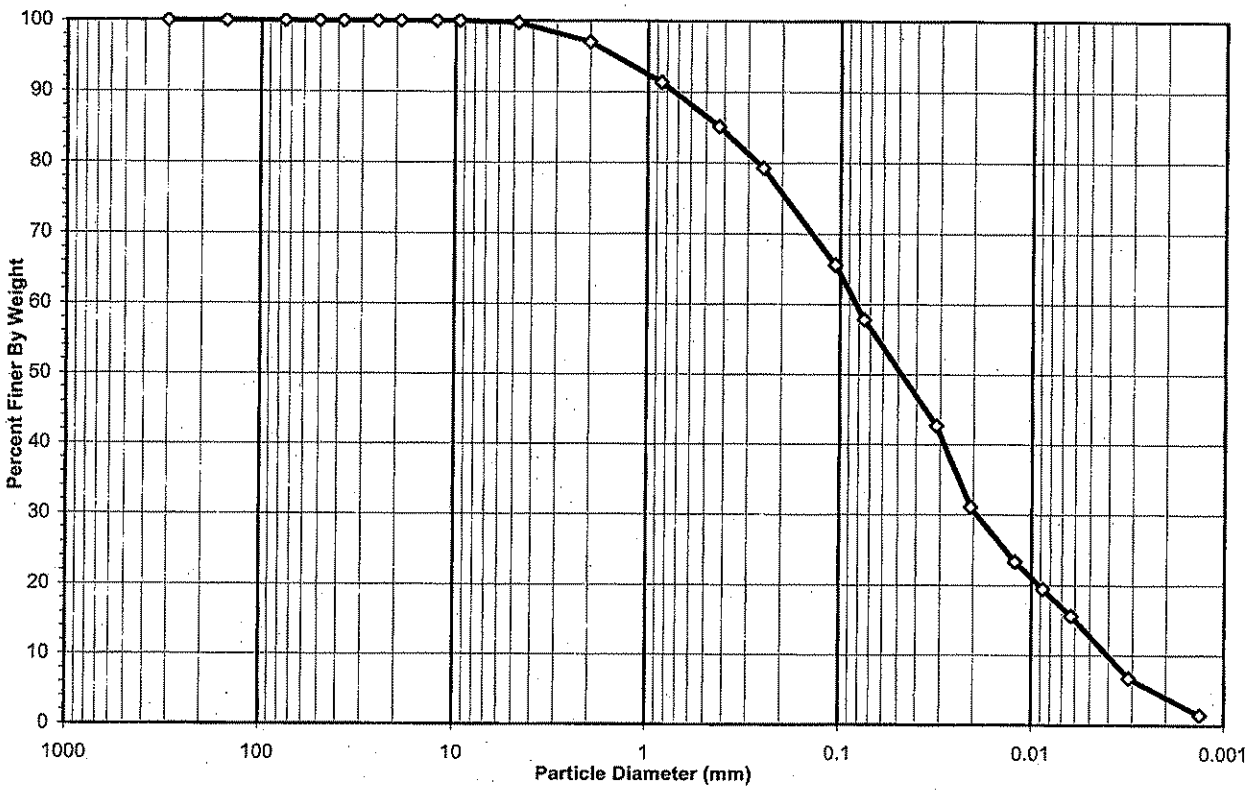
INTEGRITY IN TESTING

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-03	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.27
#4 To #200	*Sand*	41.94
Finer Than #200	*Silt & Clay*	57.79

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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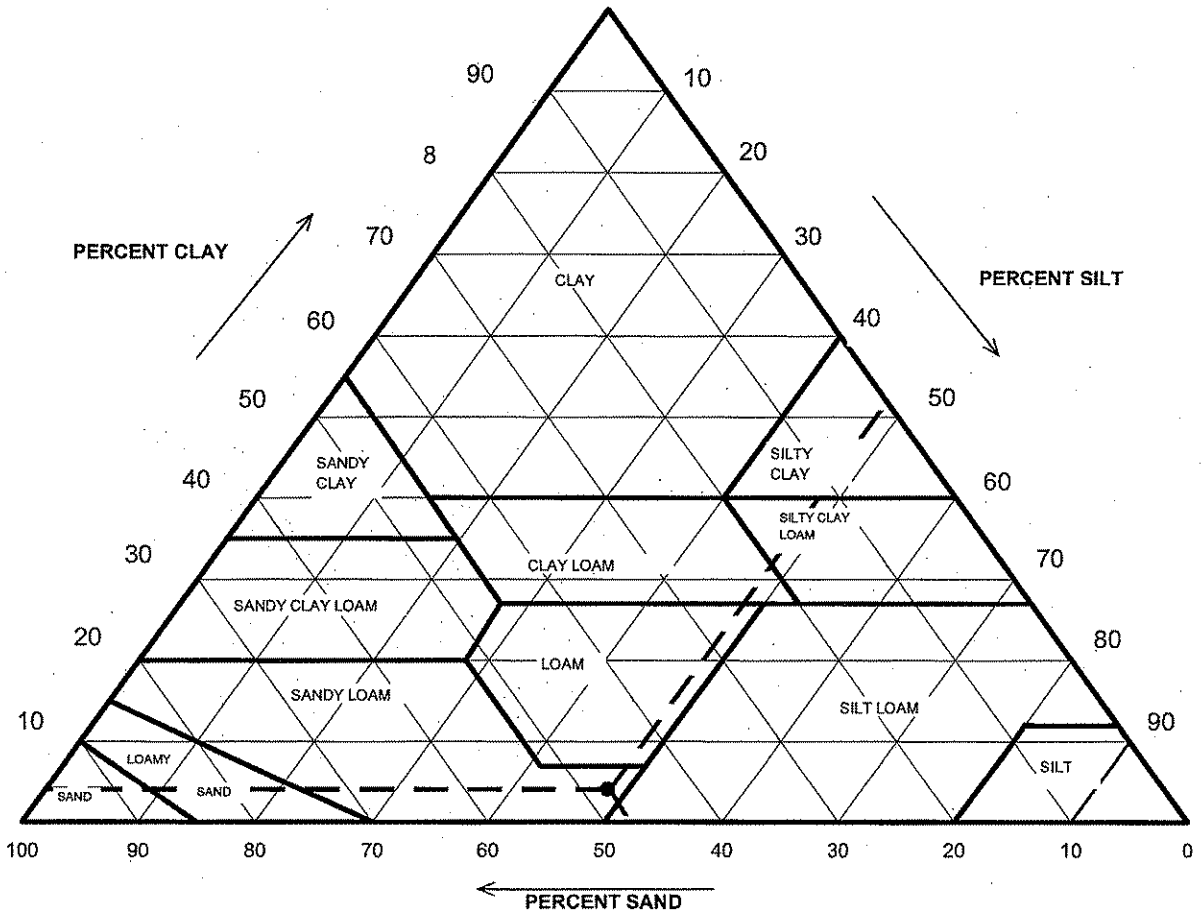
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-03	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.00	**0.00**
2	97.00	*Sand*	46.26	**47.69**
0.05	50.74	*Silt*	46.80	**48.25**
0.002	3.94	*Clay*	3.94	**4.06**

USDA Classification: ***SANDY LOAM***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-03	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	212	Tare No.	A-O
Wgt.Tare + Wet Soil (gm)	655.87	Wgt.Tare + Wet Soil (gm)	37.29
Wgt.Tare + Dry Soil (gm)	560.36	Wgt.Tare + Dry Soil (gm)	37.17
Weight of Tare (gm)	171.52	Weight of Tare (gm)	15.56
Weight of Water (gm)	95.51	Weight of Water (gm)	0.12
Weight of Dry Soil (gm)	388.84	Weight of Dry Soil (gm)	21.61
Moisture Content (%)	**24.6**	**Moisture Content (%)**	**0.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	484.35	Weight of the Dry Sample (gm)	438.56
Dry Weight +#10 Material(gm)	388.8	Weight of minus #200 material (gm)	29.62
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	408.94
Dry Weight Hydro. Material (gm)	49.72		
Total Dry Weight Sample (gm)	438.56	**J-FACTOR (%FINER THAN #10)**	**0.9700**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.05	0.27	0.27	99.73	**99.73**
#10	2.00	10.62	2.73	3.00	97.00	**97.00**
#20	0.85	2.90	5.83	5.83	94.17	**91.34**
#40	0.425	3.19	6.42	12.25	87.75	**85.12**
#60	0.250	2.99	6.01	18.26	81.74	**79.29**
#140	0.106	7.04	14.16	32.42	67.58	**65.55**
#200	0.075	3.98	8.00	40.42	59.58	**57.79**
Pan	-	29.62	59.58	100.00	-	-

Notes :

Tested By DAW Date 11/25/2009 Checked By GZM Date 12-3-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST34
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A4
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-03	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	23.6	4.92	22.1	44.0	0.01288	0.0314	**42.6**
5		21.0	23.6	4.92	16.1	32.0	0.01288	0.0207	**31.1**
15		17.0	23.6	4.92	12.1	24.0	0.01288	0.0122	**23.3**
30		15.0	23.6	4.92	10.1	20.1	0.01288	0.0087	**19.5**
60		13.0	23.6	4.92	8.1	16.1	0.01288	0.0063	**15.6**
250		8.0	24.2	4.52	3.5	6.9	0.01279	0.0031	**6.7**
1440		6.0	23.1	5.26	0.7	1.5	0.01296	0.0013	**1.4**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.72	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	97.00
Weight of Dry Material (gm)	49.72		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12/1/2009 Checked By GZM Date 12-3-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

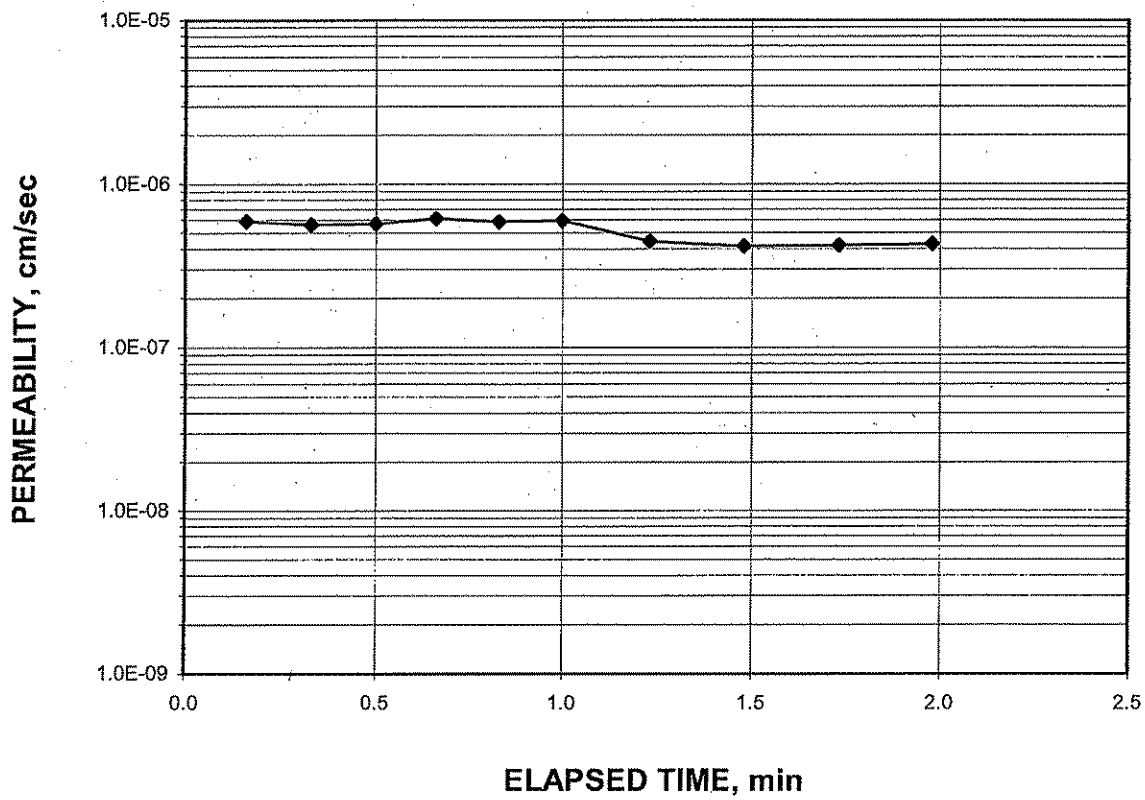
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID No.	2009-666-09-05		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 4.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.3E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

DCN: CT-22C DATE:12-21-08 REVISION: 1 \\Server\Shared Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-05 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID No.	2009-666-09-05		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	842	810
Wt. of Tare & WS (gm.)	523.86	366.15
Wt. of Tare & DS (gm.)	466.15	312.6
Wt. of Tare (gm.)	255.76	114.8
Wt. of Water (gm.)	57.71	53.55
Wt. of DS (gm.)	210.39	197.80
Moisture Content (%)	**27.4**	**27.1**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	646.53	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	646.53	644.72
Length 1 (in.)	3.229	3.238
Length 2 (in.)	3.205	3.163
Length 3 (in.)	3.230	3.192
Top Diameter (in.)	2.866	2.854
Middle Diameter (in.)	2.853	2.851
Bottom Diameter (in.)	2.853	2.833
Average Length (in.)	3.22	3.20
Average Area (in.^{2})	6.41	6.36
Sample Volume (cm^3)	338.49	333.35
Unit Wet Wt. (gm./ cm^3)	1.910	1.934
Unit Wet Wt. (pcf)	119.2	120.7
Unit Dry Wt. (pcf)	93.6	95.0
Unit Dry Wt. (gm./ cm^3)	1.499	1.522
Void Ratio, e	0.801	0.774
Porosity, n	0.445	0.436
Pore Volume (cm^3)	150.6	145.4
Total Wt. Of Sample After Test		651.17

Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

DCN: CT-22C DATE:12-21-09 REVISION: 0 \\Server\Archive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-05 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID No.	2009-666-09-05		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.12
Back Pressure(psi)	50.0	Sample Area (cm^2), A	41.04
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 4.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.3E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/10/2009	13	14.22	0.0	9.5	12.5	0	23.5	NA
11/10/2009	13	14.38	0.2	9.4	12.4	0	23.5	5.9E-07
11/10/2009	13	14.55	0.3	9.3	12.2	0	23.5	5.6E-07
11/10/2009	13	14.72	0.5	9.2	12.1	0	23.5	5.7E-07
11/10/2009	13	14.88	0.7	9.1	11.9	0	23.5	6.1E-07
11/10/2009	13	15.05	0.8	9.0	11.7	0	23.5	5.8E-07
11/10/2009	13	15.22	1.0	8.9	11.6	0	23.5	5.9E-07
11/10/2009	13	15.45	1.2	8.8	11.4	0	23.5	4.4E-07
11/10/2009	13	15.70	1.5	8.7	11.3	0	23.5	4.1E-07
11/10/2009	13	15.95	1.7	8.6	11.1	0	23.5	4.2E-07
11/10/2009	13	16.20	2.0	8.5	10.9	1	23.5	4.3E-07

Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH.III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID	2009-666-09-05	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

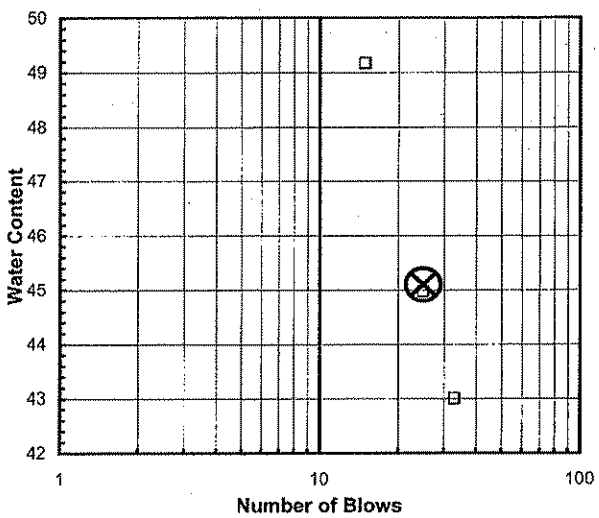
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-Q	D-1	A-D	MULTIPOINT
Wt. of Tare & WS (gm)	28.92	26.18	29.05	
Wt. of Tare & DS (gm)	24.50	22.78	24.94	
Wt. of Tare (gm)	15.51	15.22	15.38	
Wt. of Water (gm)	4.4	3.4	4.1	
Wt. of DS (gm)	9.0	7.6	9.6	
Moisture Content (%)	**49.2**	**45.0**	**43.0**	
Number of Blows	**15**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-N	A-P	
Wt. of Tare & WS (gm)	21.66	22.41	
Wt. of Tare & DS (gm)	20.06	20.65	
Wt. of Tare (gm)	15.42	15.56	
Wt. of Water (gm)	1.6	1.8	
Wt. of DS (gm)	4.6	5.1	
Moisture Content (%)	**34.5**	**34.6**	**-0.1**

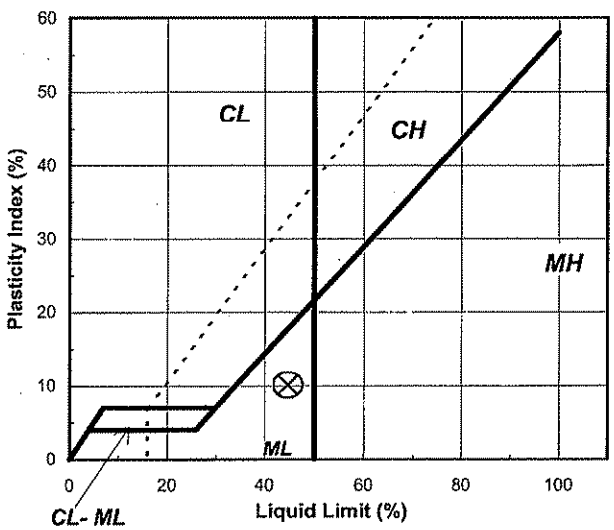
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**35**
Plasticity Index (%)	**10**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/3/2009 *Checked By* GEM *Date* 11-13-09

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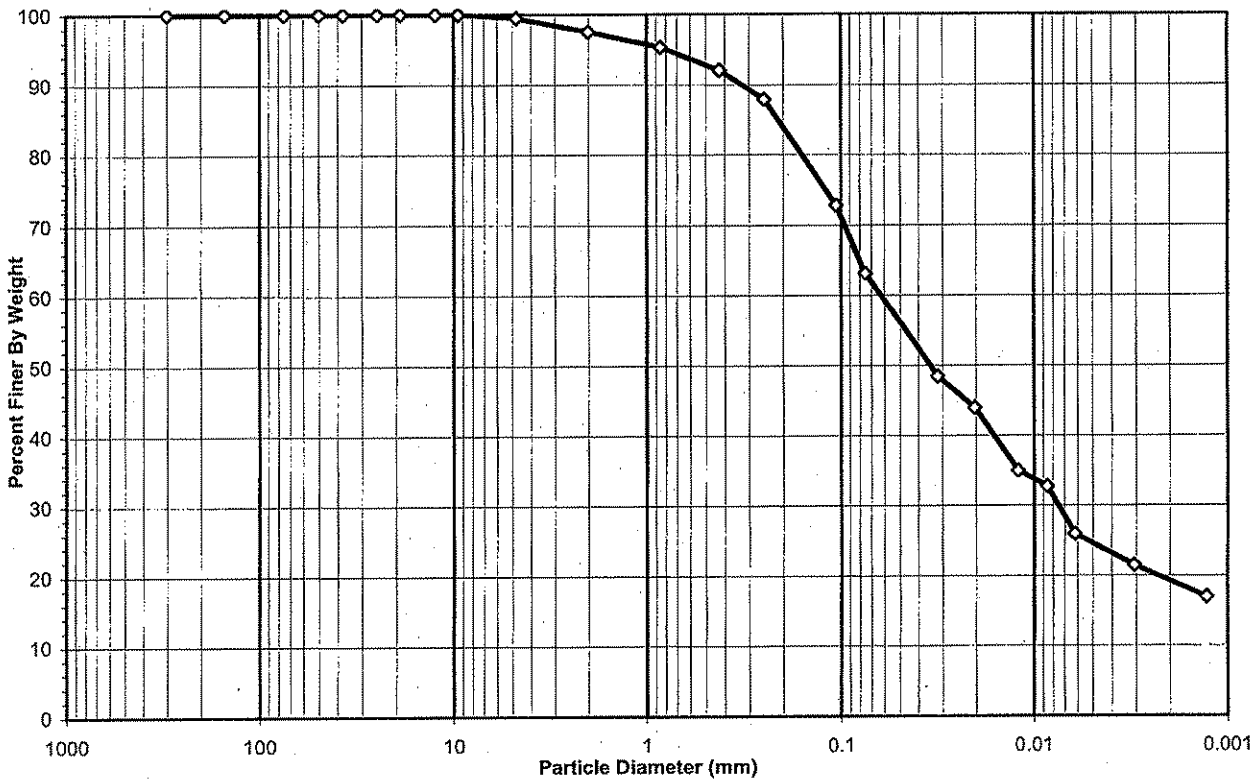
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID	2009-666-09-05	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.53
#4 To #200	*Sand*	36.36
Finer Than #200	*Silt & Clay*	63.11

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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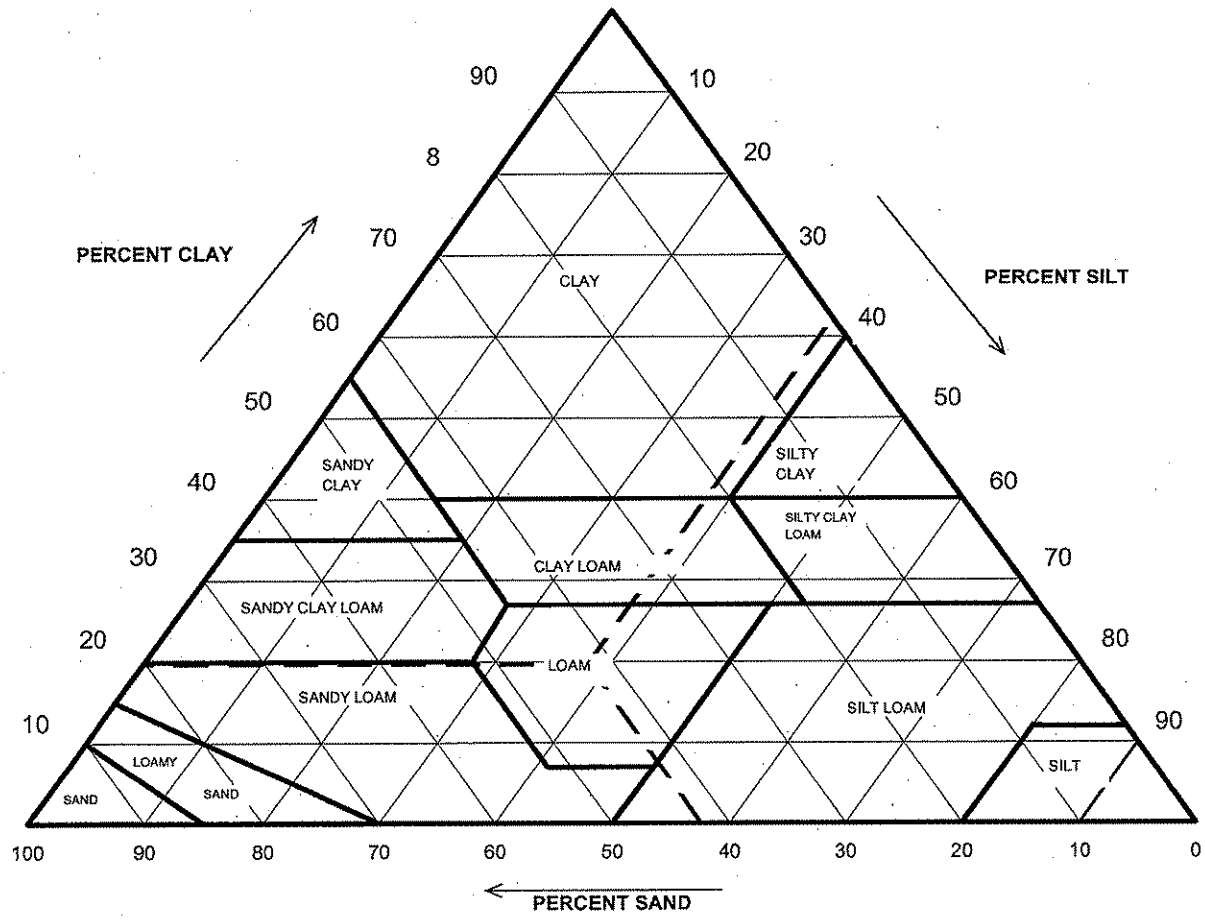
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID	2009-666-09-05	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	2.47	**0.00**
2	97.53	*Sand*	41.32	**42.36**
0.05	56.21	*Silt*	36.97	**37.90**
0.002	19.24	*Clay*	19.24	**19.73**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-05 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID	2009-666-09-05	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	842	Tare No.	U-1
Wgt.Tare + Wet Soil (gm)	523.86	Wgt.Tare + Wet Soil (gm)	57.34
Wgt.Tare + Dry Soil (gm)	466.15	Wgt.Tare + Dry Soil (gm)	51.44
Weight of Tare (gm)	255.76	Weight of Tare (gm)	15.70
Weight of Water (gm)	57.71	Weight of Water (gm)	5.90
Weight of Dry Soil (gm)	210.39	Weight of Dry Soil (gm)	35.74
Moisture Content (%)	**27.4**	**Moisture Content (%)**	**16.5**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	268.10	Weight of the Dry Sample (gm)	253.31
Dry Weight +#10 Material(gm)	210.4	Weight of minus #200 material (gm)	27.77
Wet Weight Hydro. Material.(gm)	50.01	Weight of plus #200 material (gm)	225.54
Dry Weight Hydro. Material (gm)	42.92		
Total Dry Weight Sample (gm)	253.31	**J-FACTOR (%FINER THAN #10)**	**0.9753**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.12	0.53	0.53	99.47	**99.47**
#10	2.00	4.07	1.93	2.47	97.53	**97.53**
#20	0.85	0.97	2.26	2.26	97.74	**95.33**
#40	0.425	1.45	3.38	5.64	94.36	**92.03**
#60	0.250	1.83	4.26	9.90	90.10	**87.88**
#140	0.106	6.63	15.45	25.35	74.65	**72.81**
#200	0.075	4.27	9.95	35.29	64.71	**63.11**
Pan	-	27.77	64.71	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-24
Lab ID	2009-666-09-05	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	22.8	5.46	21.5	49.7	0.01300	0.0317	**48.5**
5		25.0	22.8	5.46	19.5	45.1	0.01300	0.0203	**44.0**
15		21.0	22.8	5.46	15.5	35.8	0.01300	0.0120	**35.0**
30		20.0	22.8	5.46	14.5	33.5	0.01300	0.0086	**32.7**
60		17.0	22.8	5.46	11.5	26.6	0.01300	0.0062	**26.0**
250		15.0	22.8	5.46	9.5	22.0	0.01300	0.0031	**21.5**
1440		13.0	22.8	5.46	7.5	17.4	0.01300	0.0013	**17.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	42.92	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	97.53
Weight of Dry Material (gm)	42.92		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GEM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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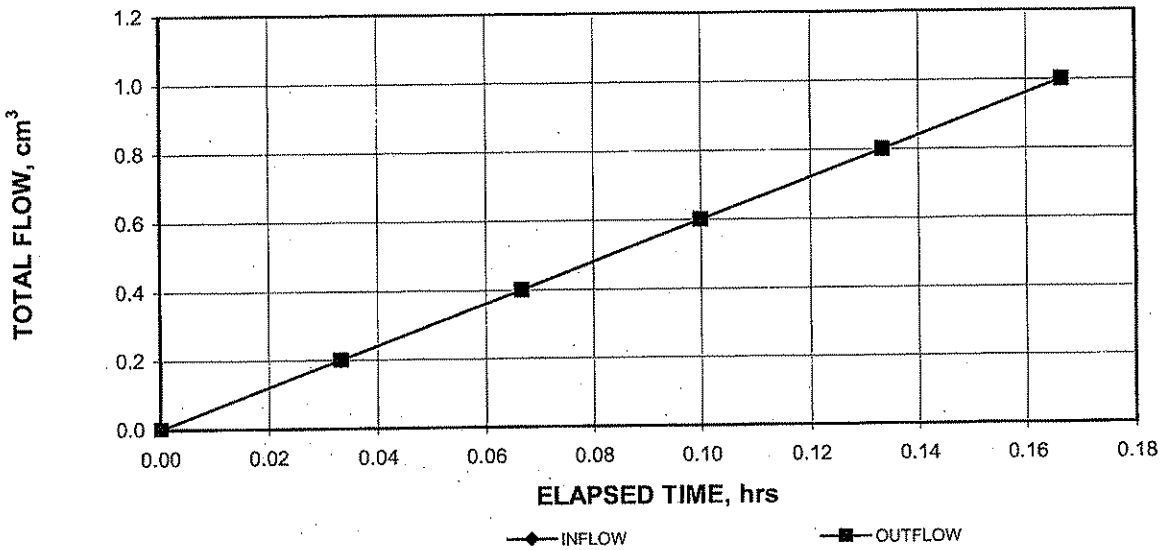
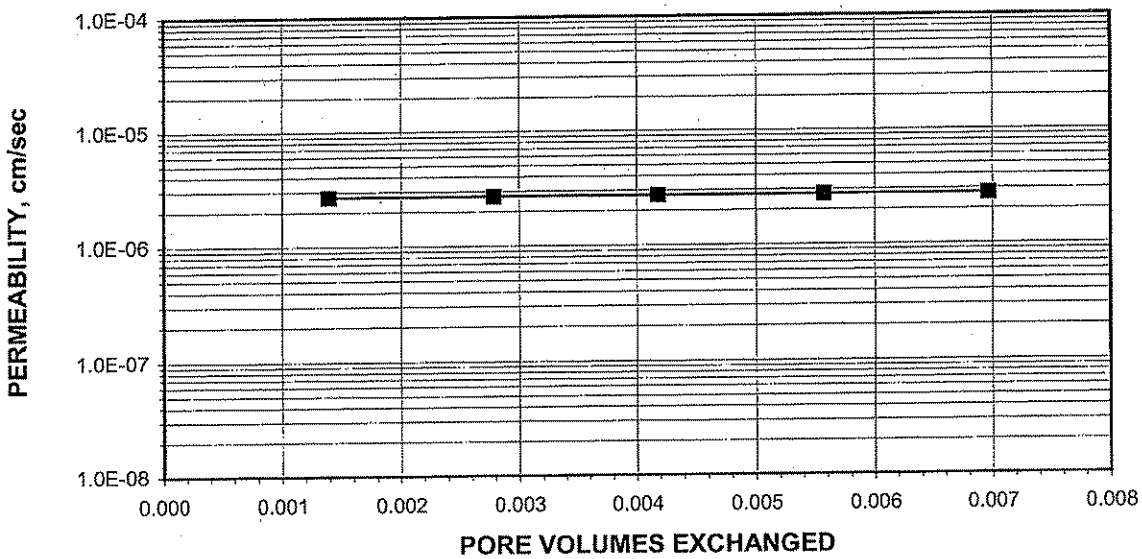
Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID No.	2009-666-09-10		

AVERAGE PERMEABILITY = 2.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.7E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/11/2009 Checked By: Gem Date: 11-13-09

DCN: CT-22 DATE: 01-03-09 REV: 0 [illegible] PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-08 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID No.	2009-666-09-10		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	202	802
Wt. of Tare & WS (gm.)	601.62	341.64
Wt. of Tare & DS (gm.)	521.39	282.02
Wt. of Tare (gm.)	197.38	104.23
Wt. of Water (gm.)	80.23	59.62
Wt. of DS (gm.)	324.01	177.79
Moisture Content (%)	**24.8**	**33.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	534.57	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	534.57	572.16
Length 1 (in.)	2.877	2.885
Length 2 (in.)	2.880	2.911
Length 3 (in.)	2.883	2.900
Top Diameter (in.)	2.859	2.807
Middle Diameter (in.)	2.859	2.841
Bottom Diameter (in.)	2.840	2.890
Average Length (in.)	2.88	2.90
Average Area (in.^{2})	6.39	6.36
Sample Volume (cm^3)	301.64	302.18
Unit Wet Wt. (gm./ cm^3)	1.77	1.89
Unit Wet Wt. (pcf)	110.6	118.2
Unit Dry Wt. (pcf)	88.7	88.5
Unit Dry Wt. (gm./ cm^3)	1.42	1.42
Void Ratio, e	0.90	0.90
Porosity, n	0.47	0.47
Pore Volume (cm^3)	142.9	143.5
Total Wgt. Of Sample After Test		559.81

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID No.	2009-666-09-10		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.9	Sample Length (cm), L	7.36
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.23
Cell (psi)	75.0	Sample Area (cm^2), A	41.04
Total Pressure Head (cm)	77.3	Inflow Burette Area (cm^2), a-in	0.877
Hydraulic Gradient	10.50	Outflow Burette Area (cm^2), a-out	0.886
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.7E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	11	23	0.0	0.0	0.0	103.8	0	22.5	NA
11/11/2009	11	25	0.0	0.2	0.2	103.3	0	22.5	2.7E-06
11/11/2009	11	27	0.1	0.4	0.4	102.9	0	22.5	2.7E-06
11/11/2009	11	29	0.1	0.6	0.6	102.4	0	22.5	2.7E-06
11/11/2009	11	31	0.1	0.8	0.8	102.0	0	22.5	2.7E-06
11/11/2009	11	33	0.2	1.0	1.0	101.5	1	22.5	2.7E-06

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID	2009-666-09-10	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

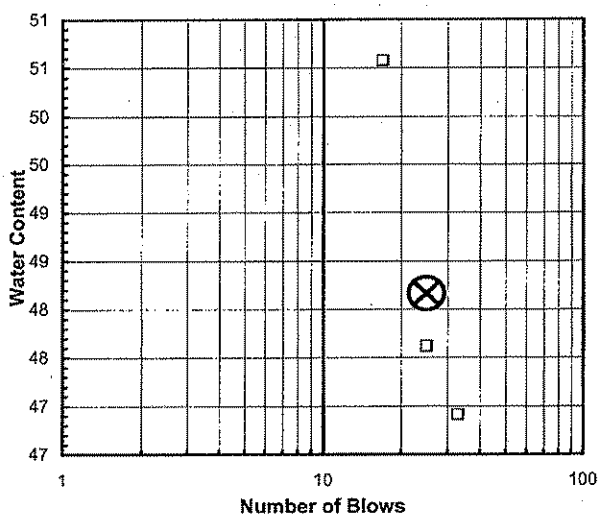
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	L	K-A	W	MULTIPOINT
Wt. of Tare & WS (gm)	28.43	30.68	28.20	
Wt. of Tare & DS (gm)	24.01	25.79	24.03	
Wt. of Tare (gm)	15.27	15.52	15.14	
Wt. of Water (gm)	4.4	4.9	4.2	
Wt. of DS (gm)	8.7	10.3	8.9	
Moisture Content (%)	**50.6**	**47.6**	**46.9**	
Number of Blows	**17**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-C	V	
Wt. of Tare & WS (gm)	22.00	21.57	
Wt. of Tare & DS (gm)	20.12	19.70	
Wt. of Tare (gm)	15.55	15.24	
Wt. of Water (gm)	1.9	1.9	
Wt. of DS (gm)	4.6	4.5	
Moisture Content (%)	**41.1**	**41.9**	**-0.8**

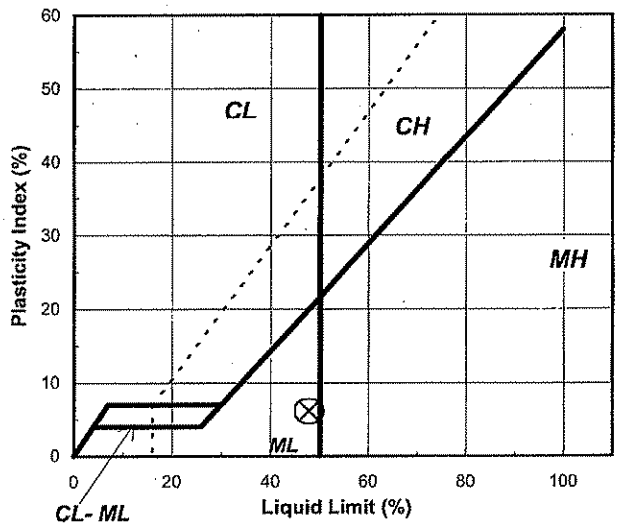
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**48**
Plastic Limit (%)	**42**
Plasticity Index (%)	**6**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/13/2009 *Checked By* GZM *Date* 11-16-09

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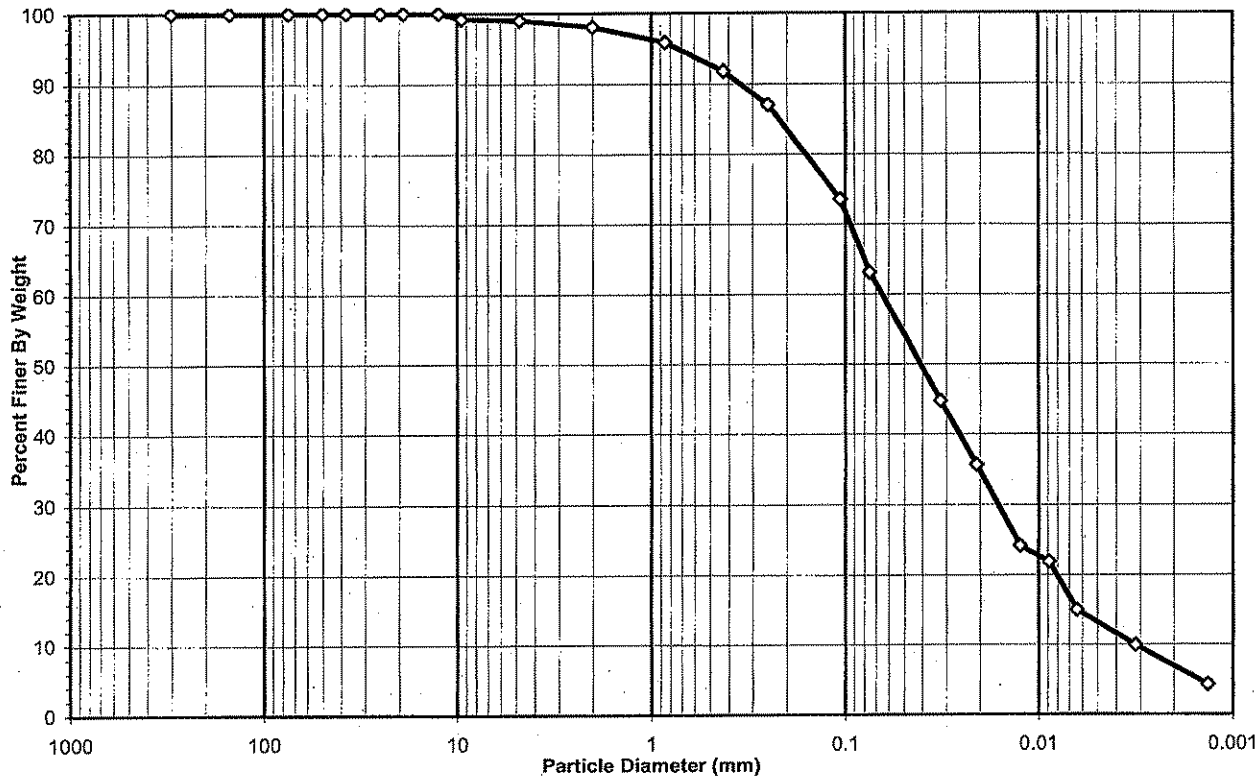
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID	2009-666-09-10	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel		sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	1.03
#4 To #200	*Sand*	35.81
Finer Than #200	*Silt & Clay*	63.16

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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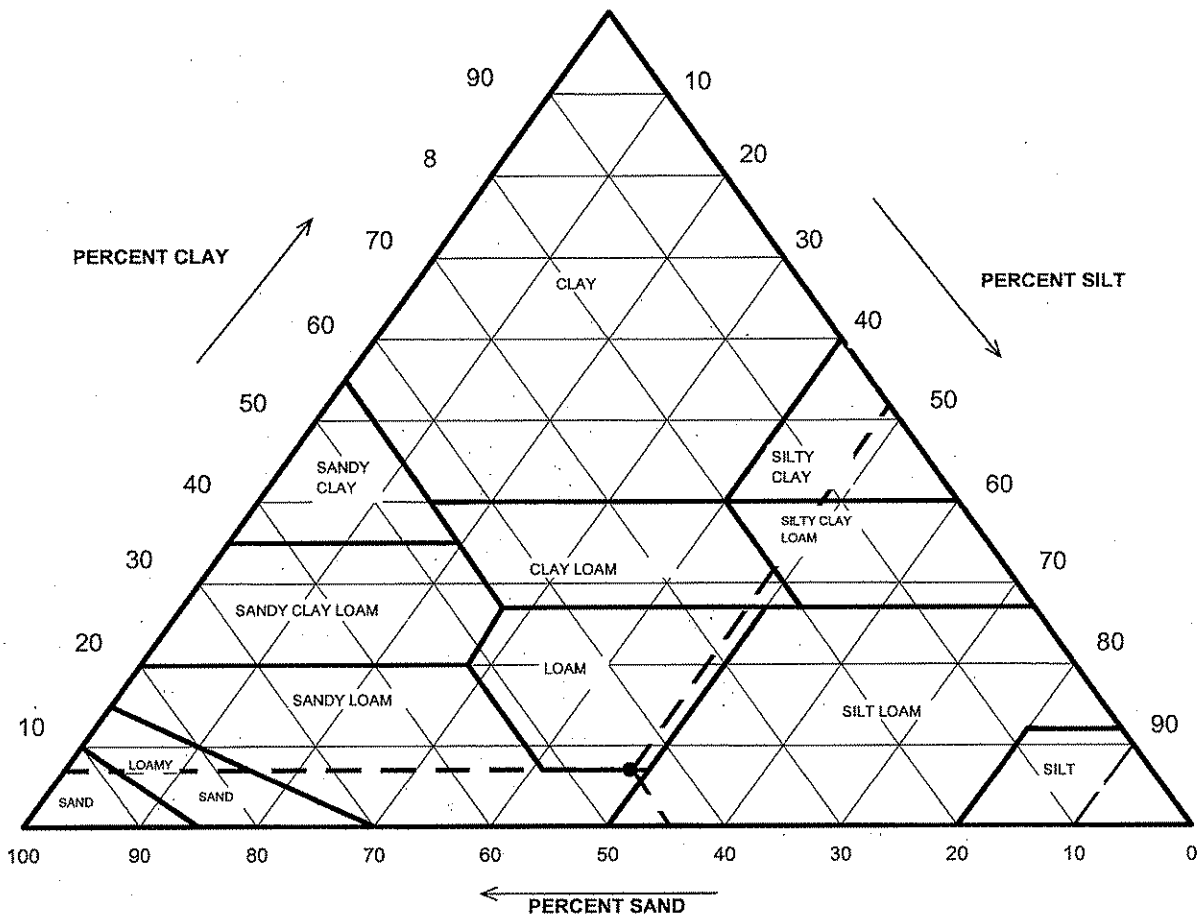
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID	2009-666-09-10	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.92	**0.00**
2	98.08	*Sand*	43.71	**44.57**
0.05	54.36	*Silt*	47.45	**48.38**
0.002	6.91	*Clay*	6.91	**7.05**

USDA Classification: ***LOAM***

 DCN: CT-53P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-10 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID	2009-666-09-10	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	202	Tare No.	U-1
Wgt.Tare + Wet Soil (gm)	601.62	Wgt.Tare + Wet Soil (gm)	53.90
Wgt.Tare + Dry Soil (gm)	521.39	Wgt.Tare + Dry Soil (gm)	48.05
Weight of Tare (gm)	197.38	Weight of Tare (gm)	15.68
Weight of Water (gm)	80.23	Weight of Water (gm)	5.85
Weight of Dry Soil (gm)	324.01	Weight of Dry Soil (gm)	32.37
Moisture Content (%)	**24.8**	**Moisture Content (%)**	**18.1**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	404.24	Weight of the Dry Sample (gm)	366.39
Dry Weight +#10 Material(gm)	324.0	Weight of minus #200 material (gm)	27.29
Wet Weight Hydro. Material.(gm)	50.04	Weight of plus #200 material (gm)	339.10
Dry Weight Hydro. Material (gm)	42.38		
Total Dry Weight Sample (gm)	366.39	**J-FACTOR (%FINER THAN #10)**	**0.9808**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	2.62	0.81	0.81	99.19	**99.19**
#4	4.75	0.72	0.22	1.03	98.97	**98.97**
#10	2.00	2.89	0.89	1.92	98.08	**98.08**
#20	0.85	0.95	2.24	2.24	97.76	**95.88**
#40	0.425	1.77	4.18	6.42	93.58	**91.78**
#60	0.250	2.05	4.84	11.26	88.74	**87.04**
#140	0.106	5.83	13.76	25.01	74.99	**73.55**
#200	0.075	4.49	10.59	35.61	64.39	**63.16**
Pan	-	27.29	64.39	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A5
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-29
Lab ID	2009-666-09-10	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	25.0	25.0	22.8	5.46	19.5	45.6	0.01300	0.0321	**44.8**
5		21.0	22.8	5.46	15.5	36.3	0.01300	0.0208	**35.6**
15		16.0	22.8	5.46	10.5	24.6	0.01300	0.0124	**24.1**
30		15.0	22.8	5.46	9.5	22.3	0.01300	0.0088	**21.9**
60		12.0	22.8	5.46	6.5	15.3	0.01300	0.0064	**15.0**
250		10.0	22.5	5.66	4.3	10.1	0.01305	0.0032	**9.9**
1440		8.0	21.8	6.13	1.9	4.4	0.01316	0.0013	**4.3**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	42.38	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.08
Weight of Dry Material (gm)	42.38		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GEM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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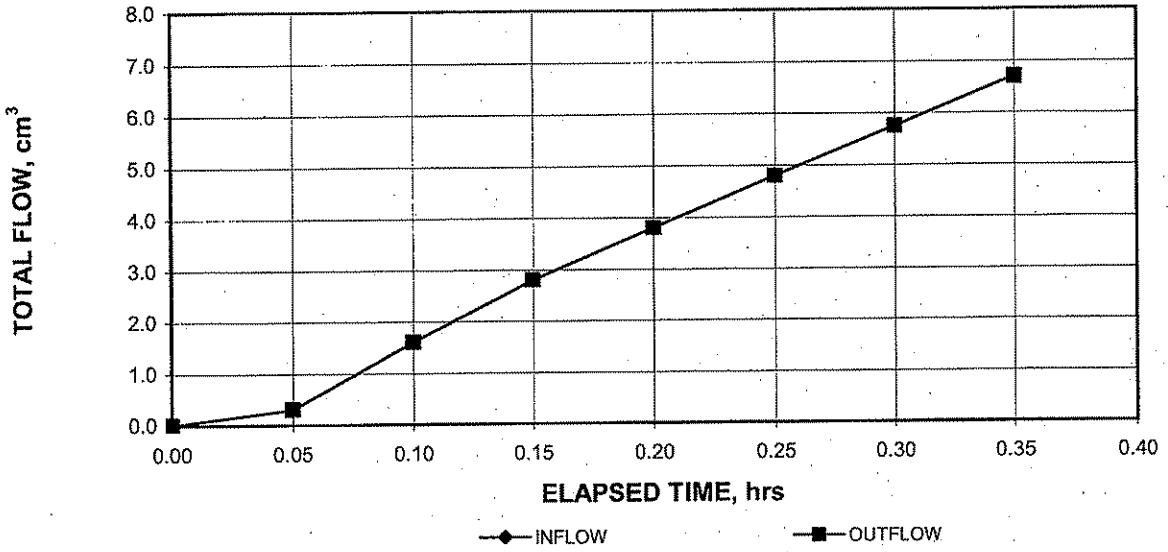
INTEGRITY IN TESTING

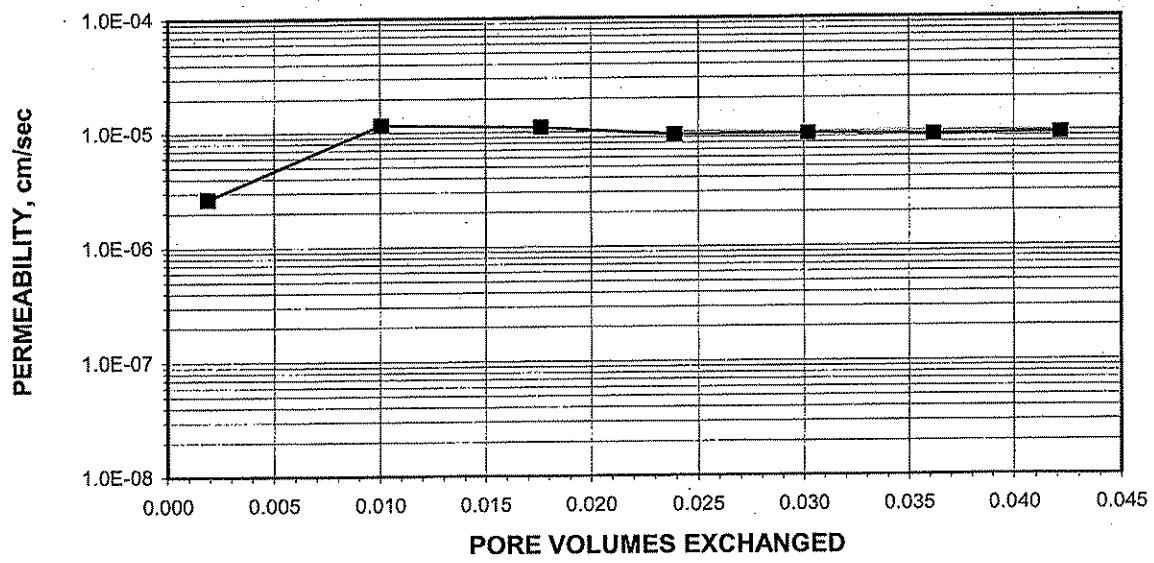
Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID No.	2009-666-10-05		

AVERAGE PERMEABILITY = 9.5E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.5E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 FILE: \\Server\data\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-05 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID No.	2009-666-10-05		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	213	813
Wt. of Tare & WS (gm.)	457.18	319.32
Wt. of Tare & DS (gm.)	407.78	273.15
Wt. of Tare (gm.)	173.20	113.92
Wt. of Water (gm.)	49.40	46.17
Wt. of DS (gm.)	234.58	159.23
Moisture Content (%)	**21.1**	**29.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	634.16	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	634.16	675.74
Length 1 (in.)	3.377	3.358
Length 2 (in.)	3.360	3.376
Length 3 (in.)	3.367	3.354
Top Diameter (in.)	2.849	2.889
Middle Diameter (in.)	2.832	2.830
Bottom Diameter (in.)	2.837	2.847
Average Length (in.)	3.37	3.36
Average Area (in.^{2})	6.33	6.40
Sample Volume (cm^3)	349.46	352.85
Unit Wet Wt. (gm./ cm^3)	1.81	1.92
Unit Wet Wt. (pcf)	113.3	119.5
Unit Dry Wt. (pcf)	93.6	92.7
Unit Dry Wt. (gm./ cm^3)	1.50	1.48
Void Ratio, e	0.80	0.82
Porosity, n	0.44	0.45
Pore Volume (cm^3)	155.4	158.8
Total Wgt. Of Sample After Test		672.29

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-05 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID No.	2009-666-10-05		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.7	Sample Length (cm), L	8.54
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.25
Cell (psi)	75.0	Sample Area (cm^2), A	41.31
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.897
Hydraulic Gradient	10.70	Outflow Burette Area (cm^2), a-out	0.878
		B Parameter (%)	95

AVERAGE PERMEABILITY = 9.5E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.5E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	11	4	0.00	0.0	0.0	118.1	0	23.8	NA
11/20/2009	11	7	0.05	0.3	0.3	117.4	0	23.8	2.7E-06
11/20/2009	11	10	0.10	1.6	1.6	114.5	0	23.8	1.2E-05
11/20/2009	11	13	0.15	2.8	2.8	111.8	0	23.8	1.1E-05
11/20/2009	11	16	0.20	3.8	3.8	109.6	0	23.8	9.4E-06
11/20/2009	11	19	0.25	4.8	4.8	107.3	0	23.8	9.6E-06
11/20/2009	11	22	0.30	5.8	5.8	105.2	0	23.8	9.3E-06
11/20/2009	11	25	0.35	6.7	6.7	103.1	1	23.8	9.5E-06

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 FILE LOCATION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-05 PERM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-30
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID	2009-666-10-05	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

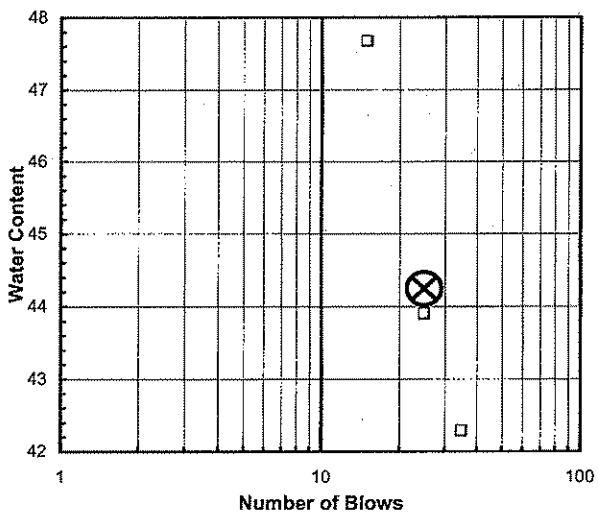
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	R	K	C	MULTIPOINT
Wt. of Tare & WS (gm)	28.80	26.06	27.97	
Wt. of Tare & DS (gm)	24.40	22.75	24.19	
Wt. of Tare (gm)	15.17	15.21	15.25	
Wt. of Water (gm)	4.4	3.3	3.8	
Wt. of DS (gm)	9.2	7.5	8.9	
Moisture Content (%)	**47.7**	**43.9**	**42.3**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	[	N	
Wt. of Tare & WS (gm)	23.30	21.50	
Wt. of Tare & DS (gm)	21.04	19.78	
Wt. of Tare (gm)	15.25	15.29	
Wt. of Water (gm)	2.3	1.7	
Wt. of DS (gm)	5.8	4.5	
Moisture Content (%)	**39.0**	**38.3**	**0.7**

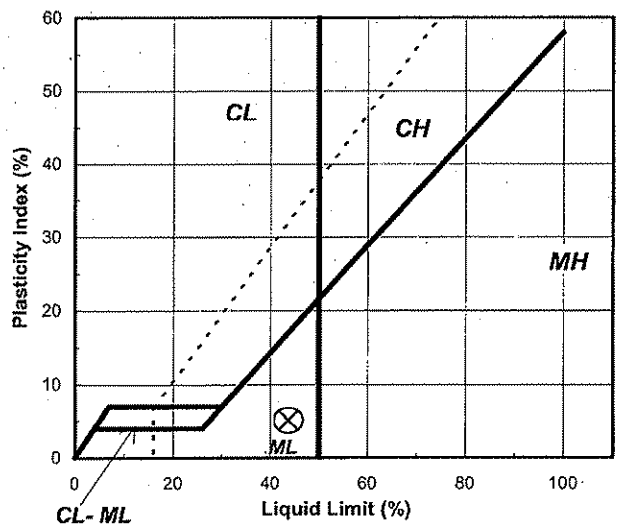
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**44**
Plastic Limit (%)	**39**
Plasticity Index (%)	**5**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By *JBD* *Date* *11/20/2009* *Checked By* GEM *Date* 11-23-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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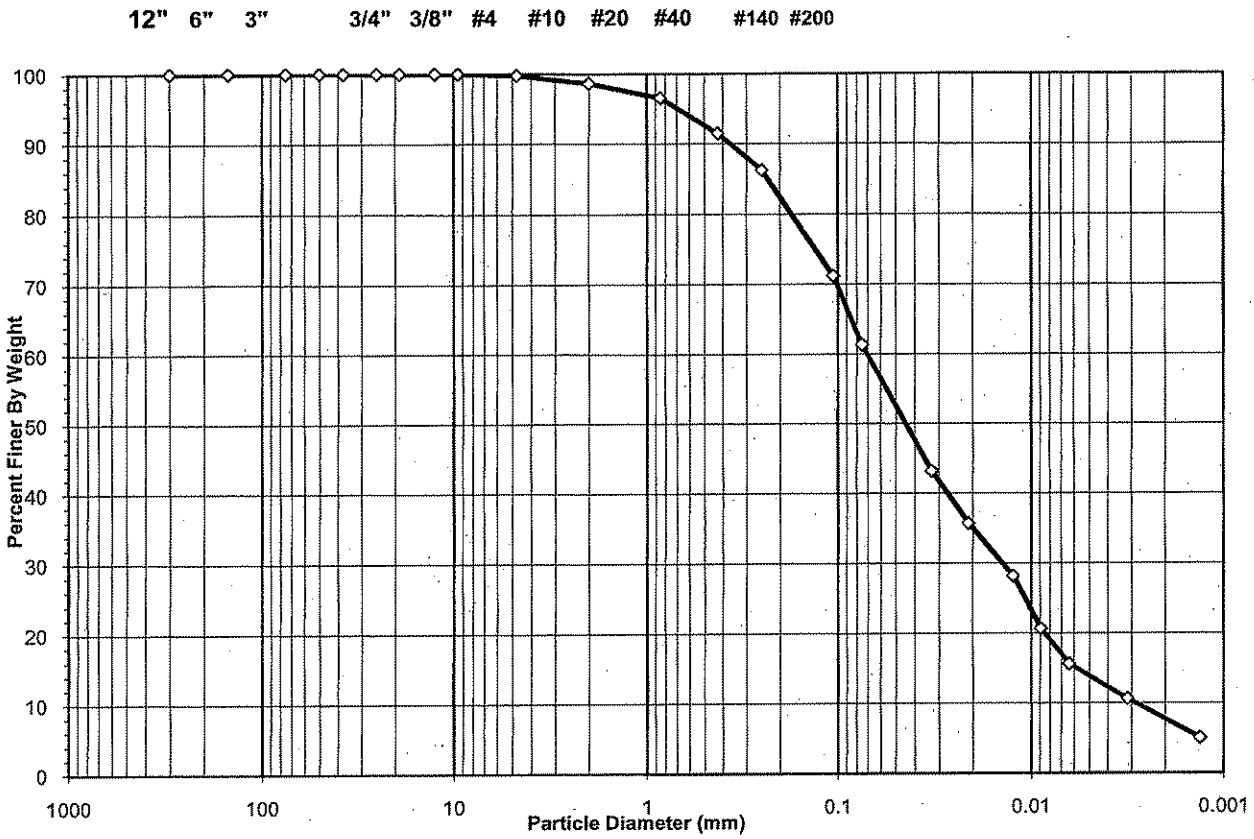
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID	2009-666-10-05	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.24
#4 To #200	*Sand*	38.41
Finer Than #200	*Silt & Clay*	61.35

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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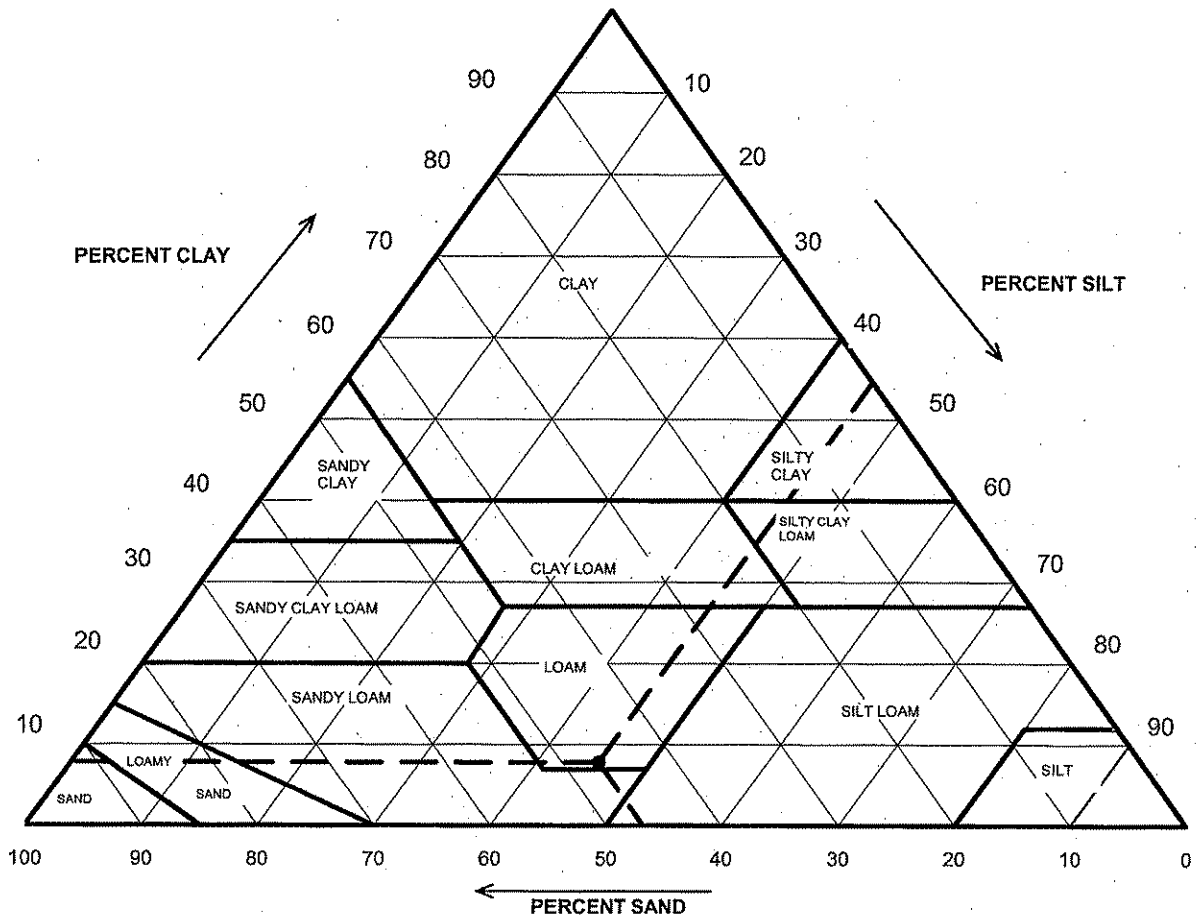
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID	2009-666-10-05	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.38	**0.00**
2	98.62	*Sand*	46.14	**46.78**
0.05	52.49	*Silt*	44.78	**45.40**
0.002	7.71	*Clay*	7.71	**7.82**

USDA Classification: ***LOAM***

 DCN: CT-83P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-05 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID	2009-666-10-05	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	213	Tare No.	V-1
Wgt.Tare + Wet Soil (gm)	457.18	Wgt.Tare + Wet Soil (gm)	61.68
Wgt.Tare + Dry Soil (gm)	407.78	Wgt.Tare + Dry Soil (gm)	51.52
Weight of Tare (gm)	173.23	Weight of Tare (gm)	15.61
Weight of Water (gm)	49.40	Weight of Water (gm)	10.16
Weight of Dry Soil (gm)	234.55	Weight of Dry Soil (gm)	35.91
Moisture Content (%)	**21.1**	**Moisture Content (%)**	**28.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	283.95	Weight of the Dry Sample (gm)	273.58
Dry Weight +#10 Material(gm)	234.6	Weight of minus #200 material (gm)	24.28
Wet Weight Hydro. Material.(gm)	50.07	Weight of plus #200 material (gm)	249.30
Dry Weight Hydro. Material (gm)	39.03		
Total Dry Weight Sample (gm)	273.58	**J-FACTOR (%FINER THAN #10)**	**0.9862**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.56	0.24	0.24	99.76	**99.76**
#10	2.00	2.67	1.14	1.38	98.62	**98.62**
#20	0.85	0.83	2.13	2.13	97.87	**96.53**
#40	0.425	2.00	5.12	7.25	92.75	**91.47**
#60	0.250	2.06	5.28	12.53	87.47	**86.27**
#140	0.106	5.97	15.30	27.83	72.17	**71.18**
#200	0.075	3.89	9.97	37.79	62.21	**61.35**
Pan	-	24.28	62.21	100.00	-	-

Notes :

Tested By DAW Date 11.25.09 Checked By JEB Date 11.25.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST30
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A5
Project No.	2009-666-10	Sample No.	L3
Lab ID	2009-666-10-05	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	22.4	5.73	17.3	43.8	0.01307	0.0327	**43.2**
5		20.0	22.4	5.73	14.3	36.2	0.01307	0.0211	**35.7**
15		17.0	22.4	5.73	11.3	28.6	0.01307	0.0124	**28.2**
30		14.0	22.4	5.73	8.3	21.0	0.01307	0.0089	**20.7**
60		12.0	22.4	5.73	6.3	15.9	0.01307	0.0064	**15.7**
250		10.0	22.4	5.73	4.3	10.8	0.01307	0.0032	**10.7**
1440		7.0	23.5	4.99	2.0	5.1	0.01290	0.0013	**5.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	39.03	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.62
Weight of Dry Material (gm)	39.03		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By JRB Date 11.25.09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

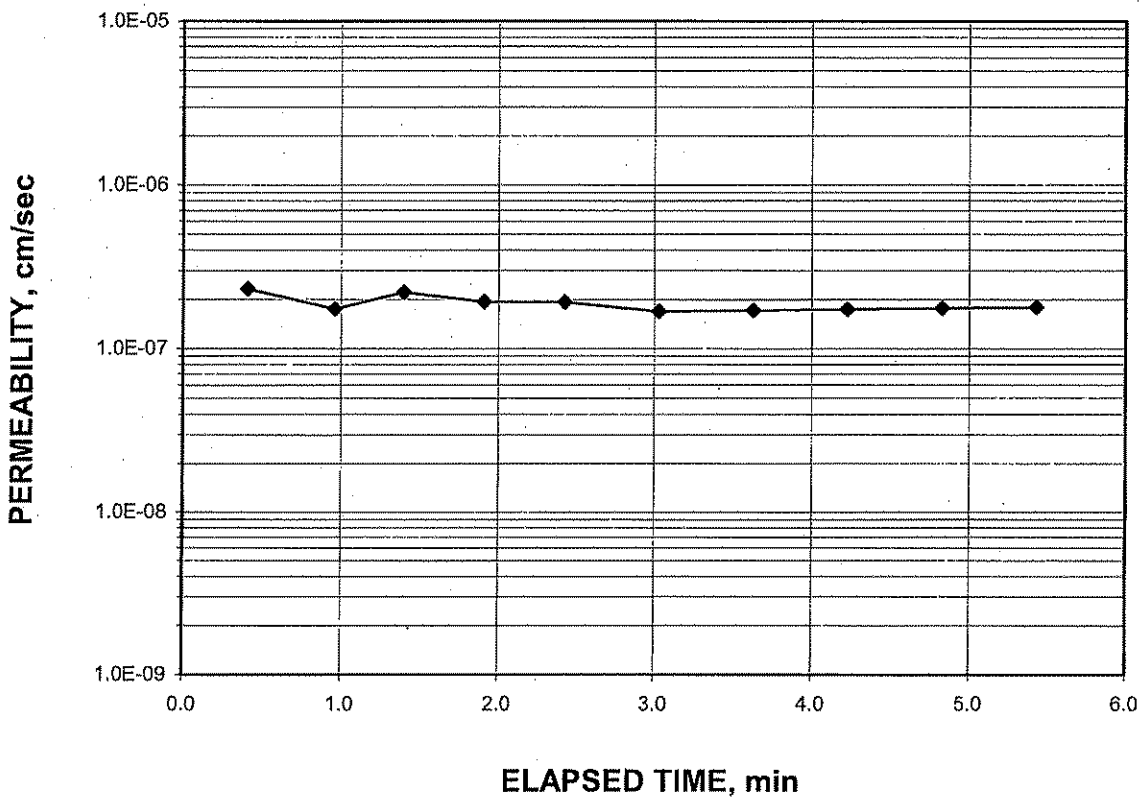
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID No.	2009-666-09-02		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 1.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

DCN: CT-22C DATE:12-21-09 REVISION: 1 \\Server\SDDrive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-02 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID No.	2009-666-09-02		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	838	809
Wt. of Tare & WS (gm.)	650.61	461.96
Wt. of Tare & DS (gm.)	575.44	389.47
Wt. of Tare (gm.)	261.64	115.53
Wt. of Water (gm.)	75.17	72.49
Wt. of DS (gm.)	313.80	273.94
Moisture Content (%)	**24.0**	**26.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	657.39	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	657.39	670.69
Length 1 (in.)	3.237	3.213
Length 2 (in.)	3.228	3.198
Length 3 (in.)	3.238	3.229
Top Diameter (in.)	2.857	2.855
Middle Diameter (in.)	2.844	2.854
Bottom Diameter (in.)	2.837	2.851
Average Length (in.)	3.23	3.21
Average Area (in.^{2})	6.36	6.39
Sample Volume (cm^3)	337.17	336.71
Unit Wet Wt. (gm./ cm^3)	1.950	1.992
Unit Wet Wt. (pcf)	121.7	124.3
Unit Dry Wt. (pcf)	98.2	98.3
Unit Dry Wt. (gm./ cm^3)	1.573	1.575
Void Ratio, e	0.717	0.714
Porosity, n	0.417	0.417
Pore Volume (cm^3)	140.7	140.3
Total Wt. Of Sample After Test		670.42

Tested By: TMS Date: 11/10/2009 Checked By: GEM Date: 11-11-09

DCN: CT-22C DATE:12-21-[illegible] \\Server\Data\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-02 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID No.	2009-666-09-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.16
Back Pressure(psi)	50.0	Sample Area (cm^2), A	41.25
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 1.8E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.8E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/10/2009	13	3.17	0.0	9.5	12.4	0	23.5	NA
11/10/2009	13	3.58	0.4	9.4	12.2	0	23.5	2.3E-07
11/10/2009	13	4.13	1.0	9.3	12.1	0	23.5	1.7E-07
11/10/2009	13	4.57	1.4	9.2	11.9	0	23.5	2.2E-07
11/10/2009	13	5.08	1.9	9.1	11.8	0	23.5	1.9E-07
11/10/2009	13	5.60	2.4	9.0	11.6	0	23.5	1.9E-07
11/10/2009	13	6.20	3.0	8.9	11.4	0	23.5	1.7E-07
11/10/2009	13	6.80	3.6	8.8	11.3	0	23.5	1.7E-07
11/10/2009	13	7.40	4.2	8.7	11.1	0	23.5	1.7E-07
11/10/2009	13	8.00	4.8	8.6	11.0	0	23.5	1.8E-07
11/10/2009	13	8.60	5.4	8.5	10.8	1	23.5	1.8E-07

Tested By: TMS Date: 11/10/2009 Checked By: GZM Date: 11-11-09

DCN: CT-22C DATE:12-21-[illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-02 PERMOM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH.III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID	2009-666-09-02	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

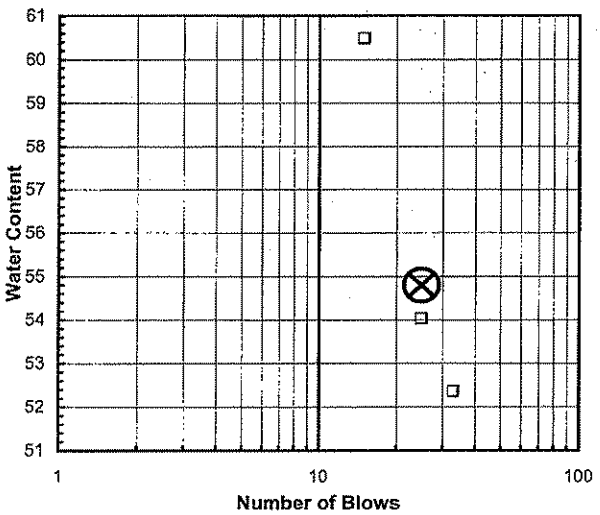
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	B-B	A-T	A-O	MULTIPOINT
Wt. of Tare & WS (gm)	26.32	28.43	26.11	
Wt. of Tare & DS (gm)	22.25	23.93	22.44	
Wt. of Tare (gm)	15.52	15.60	15.43	
Wt. of Water (gm)	4.1	4.5	3.7	
Wt. of DS (gm)	6.7	8.3	7.0	
Moisture Content (%)	**60.5**	**54.0**	**52.4**	
Number of Blows	**15**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-L	A-H	
Wt. of Tare & WS (gm)	21.77	21.56	
Wt. of Tare & DS (gm)	20.21	20.11	
Wt. of Tare (gm)	15.52	15.56	
Wt. of Water (gm)	1.6	1.5	
Wt. of DS (gm)	4.7	4.6	
Moisture Content (%)	**33.3**	**31.9**	**1.4**

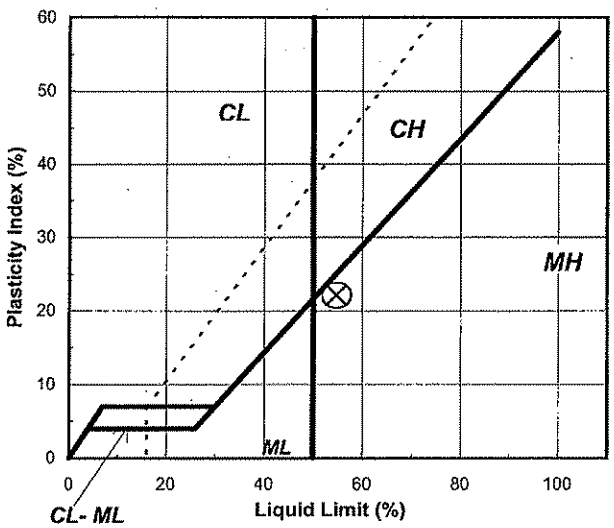
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**55**
Plastic Limit (%)	**33**
Plasticity Index (%)	**22**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/11/2009 *Checked By* GEM *Date* 11-13-09

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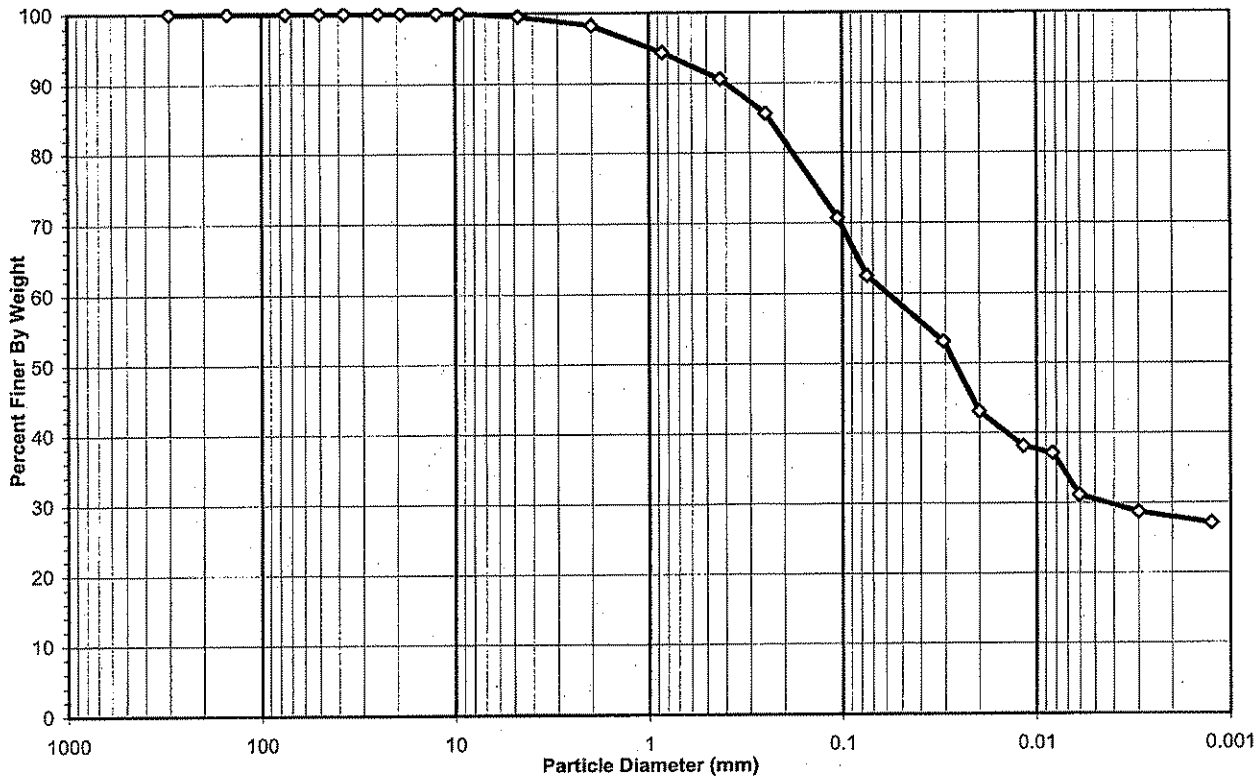
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID	2009-666-09-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.45
#4 To #200	*Sand*	37.06
Finer Than #200	*Silt & Clay*	62.49

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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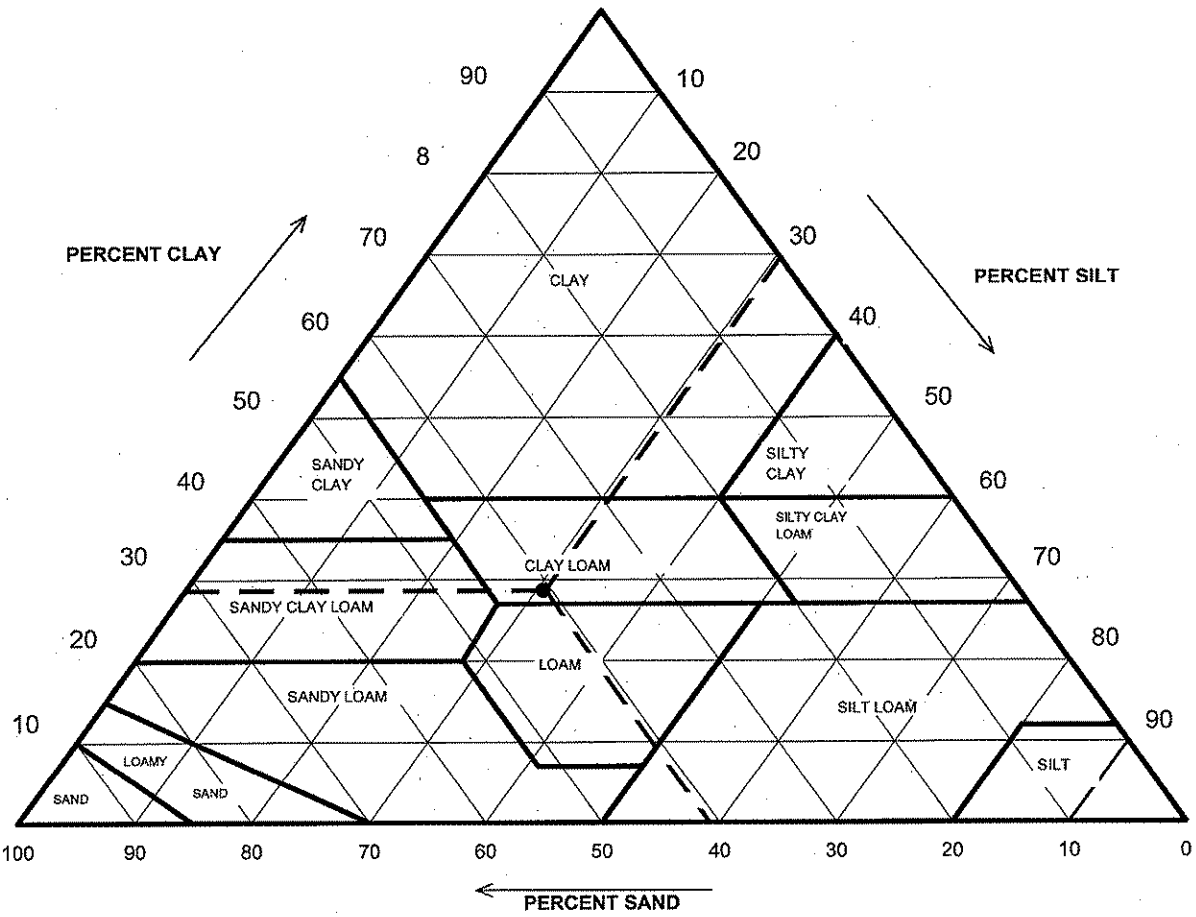
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID	2009-666-09-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.75	**0.00**
2	98.25	*Sand*	40.00	**40.71**
0.05	58.25	*Silt*	30.07	**30.60**
0.002	28.19	*Clay*	28.19	**28.69**

USDA Classification: ***CLAY LOAM***

 DCN: CT-53P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID	2009-666-09-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	838	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	650.61	Wgt.Tare + Wet Soil (gm)	47.30
Wgt.Tare + Dry Soil (gm)	575.44	Wgt.Tare + Dry Soil (gm)	46.42
Weight of Tare (gm)	261.64	Weight of Tare (gm)	15.72
Weight of Water (gm)	75.17	Weight of Water (gm)	0.88
Weight of Dry Soil (gm)	313.80	Weight of Dry Soil (gm)	30.70
Moisture Content (%)	**24.0**	**Moisture Content (%)**	**2.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	388.97	Weight of the Dry Sample (gm)	362.41
Dry Weight +#10 Material(gm)	313.8	Weight of minus #200 material (gm)	30.92
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	331.49
Dry Weight Hydro. Material (gm)	48.61		
Total Dry Weight Sample (gm)	362.41	**J-FACTOR (%FINER THAN #10)**	**0.9825**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.40	0.45	0.45	99.55	**99.55**
#10	2.00	4.09	1.30	1.75	98.25	**98.25**
#20	0.85	1.92	3.95	3.95	96.05	**94.37**
#40	0.425	1.88	3.87	7.82	92.18	**90.57**
#60	0.250	2.44	5.02	12.84	87.16	**85.64**
#140	0.106	7.39	15.20	28.04	71.96	**70.70**
#200	0.075	4.06	8.35	36.39	63.61	**62.49**
Pan	-	30.92	63.61	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By GAM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-21
Lab ID	2009-666-09-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	32.0	32.0	22.8	5.46	26.5	54.1	0.01300	0.0306	**53.1**
5		27.0	22.8	5.46	21.5	43.9	0.01300	0.0200	**43.1**
15		24.5	22.8	5.46	19.0	38.8	0.01300	0.0118	**38.1**
30		24.0	22.8	5.46	18.5	37.8	0.01300	0.0083	**37.1**
60		21.0	22.8	5.46	15.5	31.6	0.01300	0.0060	**31.1**
250		20.0	22.5	5.66	14.3	29.2	0.01305	0.0030	**28.7**
1440		19.0	22.8	5.46	13.5	27.6	0.01300	0.0012	**27.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	48.61	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.25
Weight of Dry Material (gm)	48.61		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GZM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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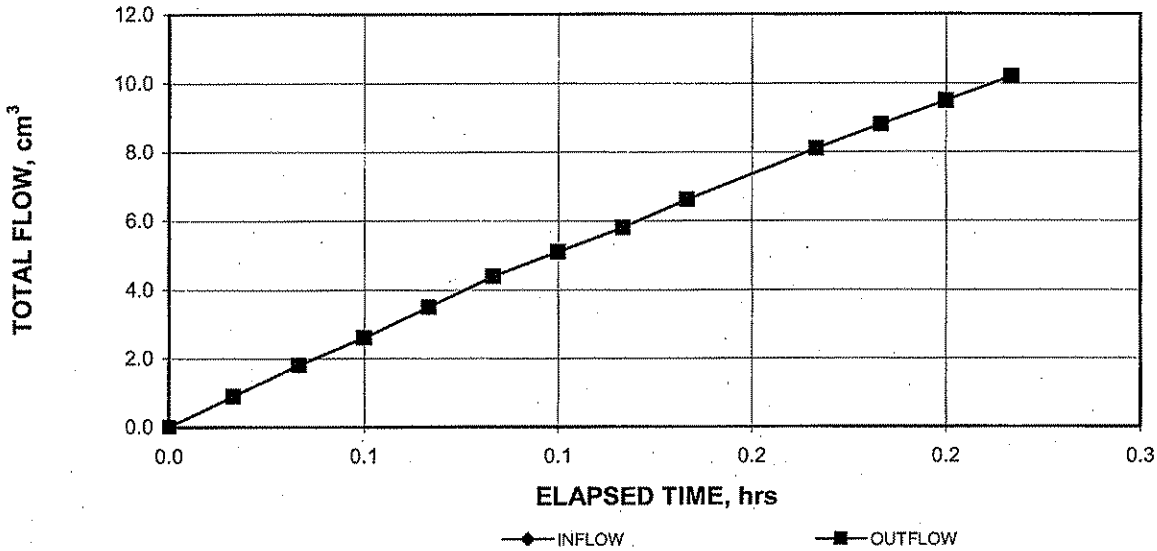
INTEGRITY IN TESTING

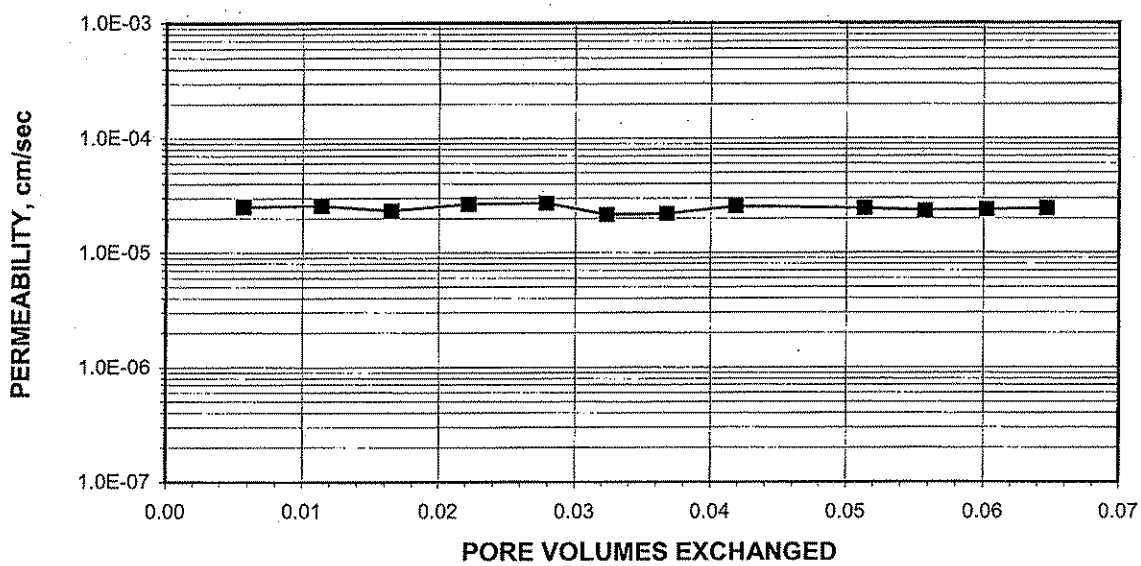
Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID No.	2009-666-09-03		

AVERAGE PERMEABILITY = 2.4E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.4E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/9/2009 Checked By: GEM Date: 11-13-09

DCN: CT-22 DATE: 01-05-09 REV: 0 [illegible]:\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID No.	2009-666-09-03		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	833	806
Wt. of Tare & WS (gm.)	505.01	345.38
Wt. of Tare & DS (gm.)	461.75	287.55
Wt. of Tare (gm.)	259.30	103.45
Wt. of Water (gm.)	43.26	57.83
Wt. of DS (gm.)	202.45	184.10
Moisture Content (%)	**21.4**	**31.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	618.18	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	618.18	669.34
Length 1 (in.)	3.280	3.287
Length 2 (in.)	3.271	3.240
Length 3 (in.)	3.269	3.253
Top Diameter (in.)	2.851	2.855
Middle Diameter (in.)	2.846	2.877
Bottom Diameter (in.)	2.854	2.887
Average Length (in.)	3.27	3.26
Average Area (in.^{2})	6.38	6.48
Sample Volume (cm^3)	342.27	346.32
Unit Wet Wt. (gm./ cm^3)	1.81	1.93
Unit Wet Wt. (pcf)	112.7	120.6
Unit Dry Wt. (pcf)	92.9	91.8
Unit Dry Wt. (gm./ cm^3)	1.49	1.47
Void Ratio, e	0.81	0.84
Porosity, n	0.45	0.46
Pore Volume (cm^3)	153.6	157.7
Total Wgt. Of Sample After Test		666.43

Tested By: TMS Date: 11/9/2009 Checked By: GZM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID No.	2009-666-09-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.28
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.30
Cell (psi)	75.0	Sample Area (cm^2), A	41.82
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.891
Hydraulic Gradient	10.19	Outflow Burette Area (cm^2), a-out	0.883
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.4E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.4E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	10	6	0.0	0.0	0.0	111.0	0	22.5	NA
11/11/2009	10	7	0.0	0.9	0.9	109.0	0	22.5	2.5E-05
11/11/2009	10	8	0.0	1.8	1.8	107.0	0	22.5	2.6E-05
11/11/2009	10	9	0.1	2.6	2.6	105.2	0	22.5	2.3E-05
11/11/2009	10	10	0.1	3.5	3.5	103.2	0	22.5	2.7E-05
11/11/2009	10	11	0.1	4.4	4.4	101.2	0	22.5	2.7E-05
11/11/2009	10	12	0.1	5.1	5.1	99.6	0	22.5	2.1E-05
11/11/2009	10	13	0.1	5.8	5.8	98.1	0	22.5	2.2E-05
11/11/2009	10	14	0.1	6.6	6.6	96.3	0	22.5	2.5E-05
11/11/2009	10	16	0.2	8.1	8.1	92.9	0	22.5	2.4E-05
11/11/2009	10	17	0.2	8.8	8.8	91.3	0	22.5	2.3E-05
11/11/2009	10	18	0.2	9.5	9.5	89.8	0	22.5	2.4E-05
11/11/2009	10	19	0.2	10.2	10.2	88.2	1	22.5	2.4E-05

Tested By: TMS Date: 11/9/2009 Checked By: GCM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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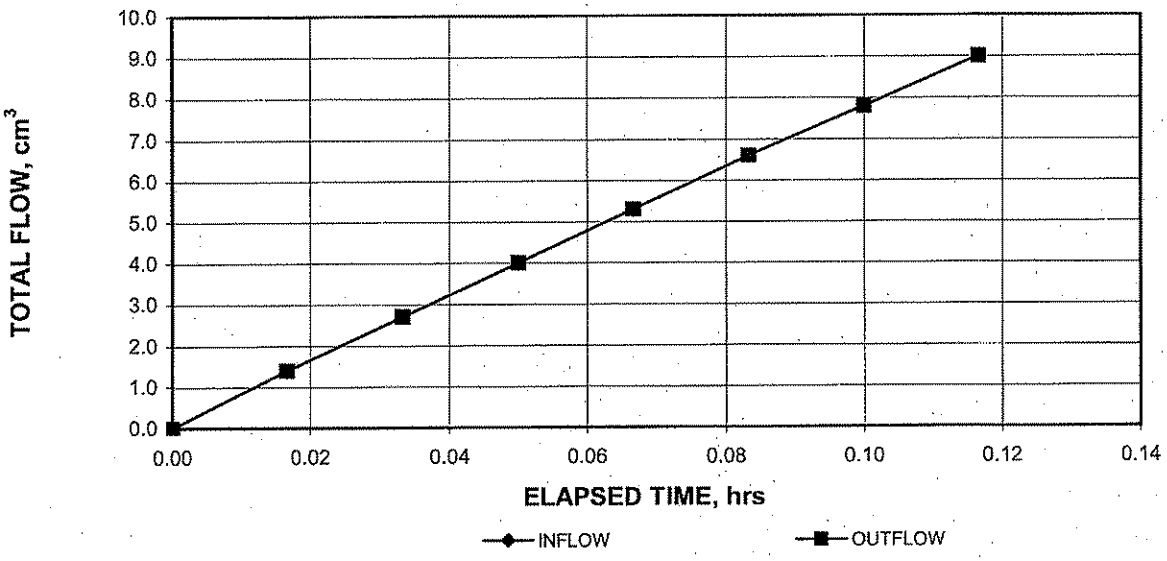
INTEGRITY IN TESTING

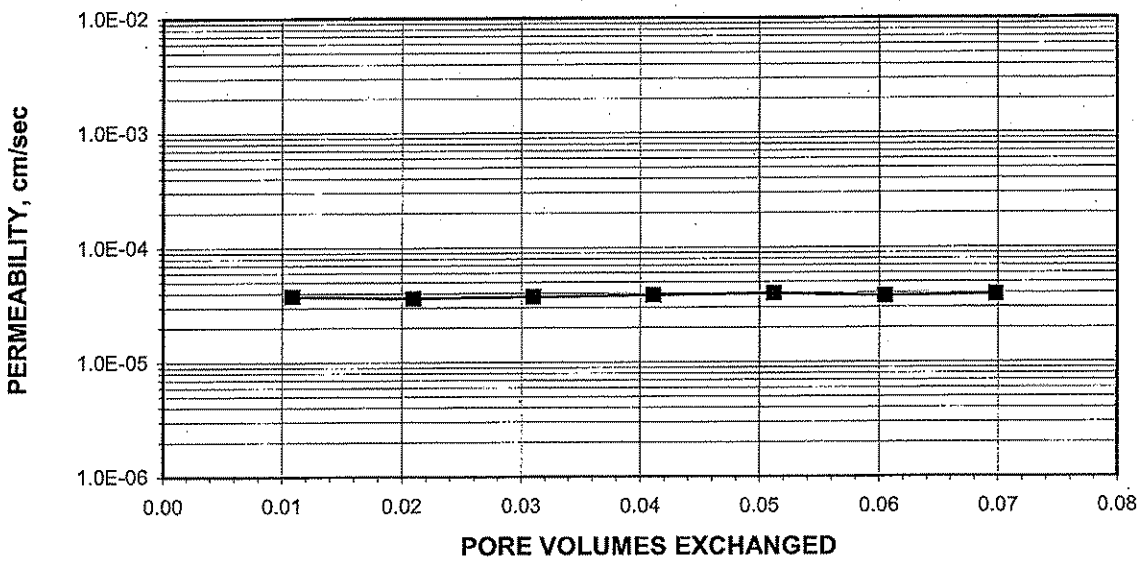
Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-22 BACK UP
Lab ID No.	2009-666-09-03		

AVERAGE PERMEABILITY = 3.9E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.9E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/16/2009 Checked By: GEM Date: 11-17-09

DCN: CT-22C DATE: [illegible] FILE: [illegible]\2009-666 JOYCE WHITE OAK\[2009-666-09-03 PERM BACKUP.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-22 BACK UP
Lab ID No.	2009-666-09-03		

Specific Gravity	2.70 Assumed
Sample Condition	Undisturbed

Visual Description: ORANGE SANDY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	820	806
Wt. of Tare & WS (gm.)	252.77	425.70
Wt. of Tare & DS (gm.)	234.11	356.13
Wt. of Tare (gm.)	136.19	102.60
Wt. of Water (gm.)	18.66	69.57
Wt. of DS (gm.)	97.92	253.53
Moisture Content (%)	**19.1**	**27.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	546.64	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	546.64	585.14
Length 1 (in.)	2.885	2.868
Length 2 (in.)	2.874	2.864
Length 3 (in.)	2.879	2.888
Top Diameter (in.)	2.835	2.861
Middle Diameter (in.)	2.823	2.849
Bottom Diameter (in.)	2.828	2.819
Average Length (in.)	2.88	2.87
Average Area (in.^{2})	6.28	6.35
Sample Volume (cm^3)	296.51	298.90
Unit Wet Wt. (gm./ cm^3)	1.84	1.96
Unit Wet Wt. (pcf)	115.1	122.2
Unit Dry Wt. (pcf)	96.7	95.9
Unit Dry Wt. (gm./ cm^3)	1.55	1.54
Void Ratio, e	0.74	0.76
Porosity, n	0.43	0.43
Pore Volume (cm^3)	126.5	128.9
Total Wgt. Of Sample After Test		580.6

Tested By: TMS Date: 11/16/2009 Checked By: GEM Date: 11-17-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-22 BACK UP
Lab ID No.	2009-666-09-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.9	Sample Length (cm), L	7.30
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.22
Cell (psi)	75.0	Sample Area (cm^2), A	40.96
Total Pressure Head (cm)	77.3	Inflow Burette Area (cm^2), a-in	0.891
Hydraulic Gradient	10.60	Outflow Burette Area (cm^2), a-out	0.883
		B Parameter (%)	95

AVERAGE PERMEABILITY = 3.9E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.9E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/16/2009	11	18	0.00	0.0	0.0	102.4	0	23.5	NA
11/16/2009	11	19	0.02	1.4	1.4	99.3	0	23.5	3.8E-05
11/16/2009	11	20	0.03	2.7	2.7	96.4	0	23.5	3.6E-05
11/16/2009	11	21	0.05	4.0	4.0	93.5	0	23.5	3.7E-05
11/16/2009	11	22	0.07	5.3	5.3	90.6	0	23.5	3.8E-05
11/16/2009	11	23	0.08	6.6	6.6	87.7	0	23.5	4.0E-05
11/16/2009	11	24	0.10	7.8	7.8	85.0	0	23.5	3.8E-05
11/16/2009	11	25	0.12	9.0	9.0	82.3	1	23.5	3.9E-05

Tested By: TMS Date: 11/16/2009 Checked By: GEM Date: 11-17-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID	2009-666-09-03	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

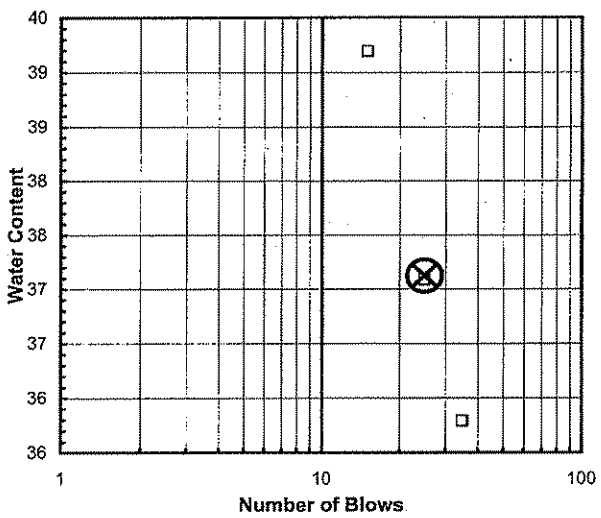
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-P	A-N	A-Q	M U L T I P O I N T
Wt. of Tare & WS (gm)	31.34	27.82	32.29	
Wt. of Tare & DS (gm)	26.90	24.46	27.87	
Wt. of Tare (gm)	15.57	15.40	15.52	
Wt. of Water (gm)	4.4	3.4	4.4	
Wt. of DS (gm)	11.3	9.1	12.4	
Moisture Content (%)	**39.2**	**37.1**	**35.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-D	A-U	
Wt. of Tare & WS (gm)	21.26	21.51	
Wt. of Tare & DS (gm)	19.84	20.00	
Wt. of Tare (gm)	15.37	15.23	
Wt. of Water (gm)	1.4	1.5	
Wt. of DS (gm)	4.5	4.8	
Moisture Content (%)	**31.8**	**31.7**	**0.1**

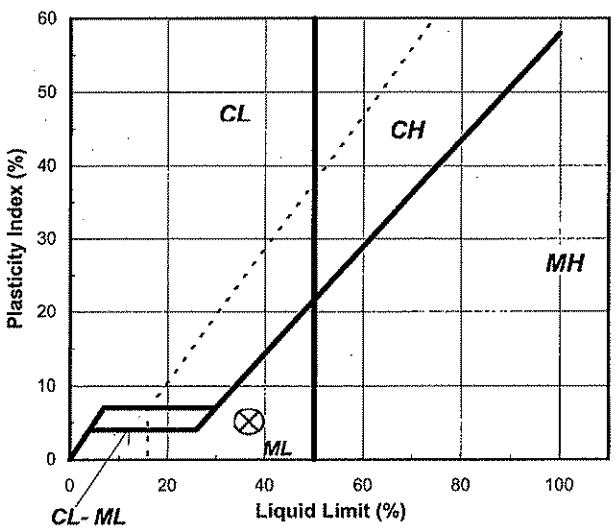
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**37**
Plastic Limit (%)	**32**
Plasticity Index (%)	**5**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/3/2009 *Checked By* GEM *Date* 11-16-09

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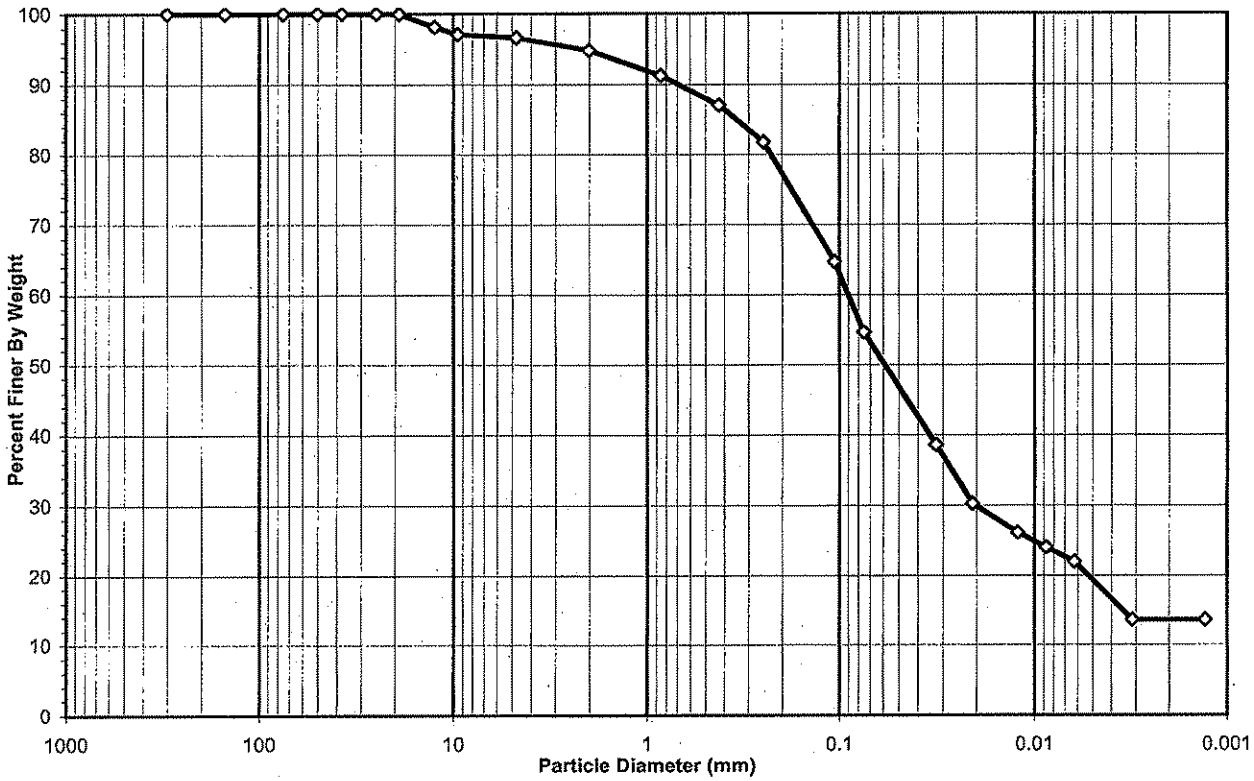
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID	2009-666-09-03	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	3.38
#4 To #200	*Sand*	42.02
Finer Than #200	*Silt & Clay*	54.60

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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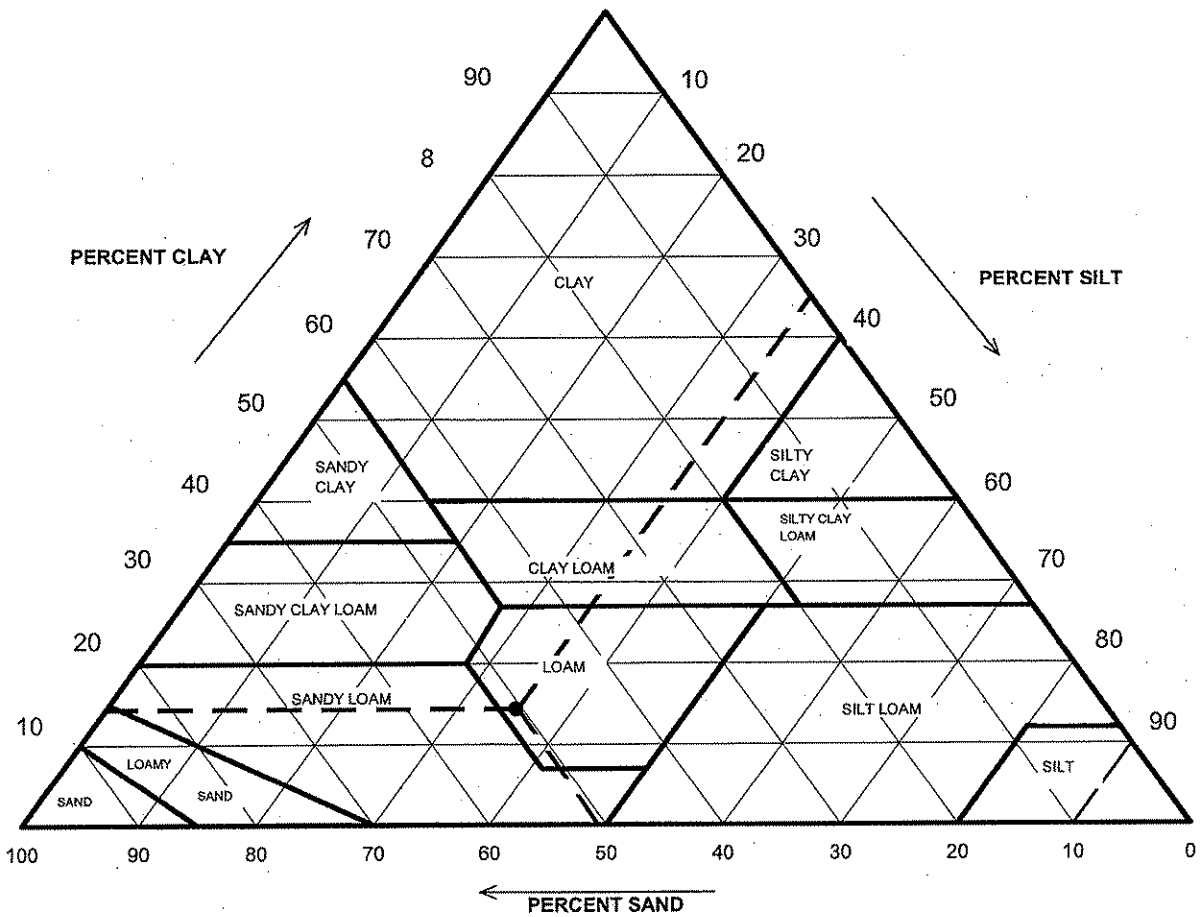
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID	2009-666-09-03	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	5.18	**0.00**
2	94.82	*Sand*	47.92	**50.54**
0.05	46.89	*Silt*	33.28	**35.09**
0.002	13.62	*Clay*	13.62	**14.36**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:05/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-03 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID	2009-666-09-03	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	833	Tare No.	M-1
Wgt.Tare + Wet Soil (gm)	505.01	Wgt.Tare + Wet Soil (gm)	43.03
Wgt.Tare + Dry Soil (gm)	461.75	Wgt.Tare + Dry Soil (gm)	40.33
Weight of Tare (gm)	259.30	Weight of Tare (gm)	15.87
Weight of Water (gm)	43.26	Weight of Water (gm)	2.70
Weight of Dry Soil (gm)	202.45	Weight of Dry Soil (gm)	24.46
Moisture Content (%)	**21.4**	**Moisture Content (%)**	**11.0**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	245.71	Weight of the Dry Sample (gm)	247.52
Dry Weight +#10 Material(gm)	202.5	Weight of minus #200 material (gm)	25.95
Wet Weight Hydro. Material.(gm)	50.05	Weight of plus #200 material (gm)	221.57
Dry Weight Hydro. Material (gm)	45.07		
Total Dry Weight Sample (gm)	247.52	**J-FACTOR (%FINER THAN #10)**	**0.9482**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	3.70	1.83	1.83	98.17	**98.17**
3/8"	9.50	2.20	1.09	2.91	97.09	**97.09**
#4	4.75	0.95	0.47	3.38	96.62	**96.62**
#10	2.00	3.64	1.80	5.18	94.82	**94.82**
#20	0.85	1.70	3.77	3.77	96.23	**91.24**
#40	0.425	1.99	4.41	8.19	91.81	**87.06**
#60	0.250	2.51	5.57	13.76	86.24	**81.78**
#140	0.106	8.12	18.01	31.77	68.23	**64.69**
#200	0.075	4.80	10.65	42.42	57.58	**54.60**
Pan	-	25.95	57.58	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-22
Lab ID	2009-666-09-03	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	22.8	5.46	18.5	40.7	0.01300	0.0323	**38.6**
5		20.0	22.8	5.46	14.5	31.9	0.01300	0.0210	**30.3**
15		18.0	22.8	5.46	12.5	27.5	0.01300	0.0123	**26.1**
30		17.0	22.8	5.46	11.5	25.3	0.01300	0.0087	**24.0**
60		16.0	22.8	5.46	10.5	23.1	0.01300	0.0062	**21.9**
250		12.0	22.8	5.46	6.5	14.4	0.01300	0.0031	**13.6**
1440		12.0	22.8	5.46	6.5	14.4	0.01300	0.0013	**13.6**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	45.07	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	94.82
Weight of Dry Material (gm)	45.07		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GEM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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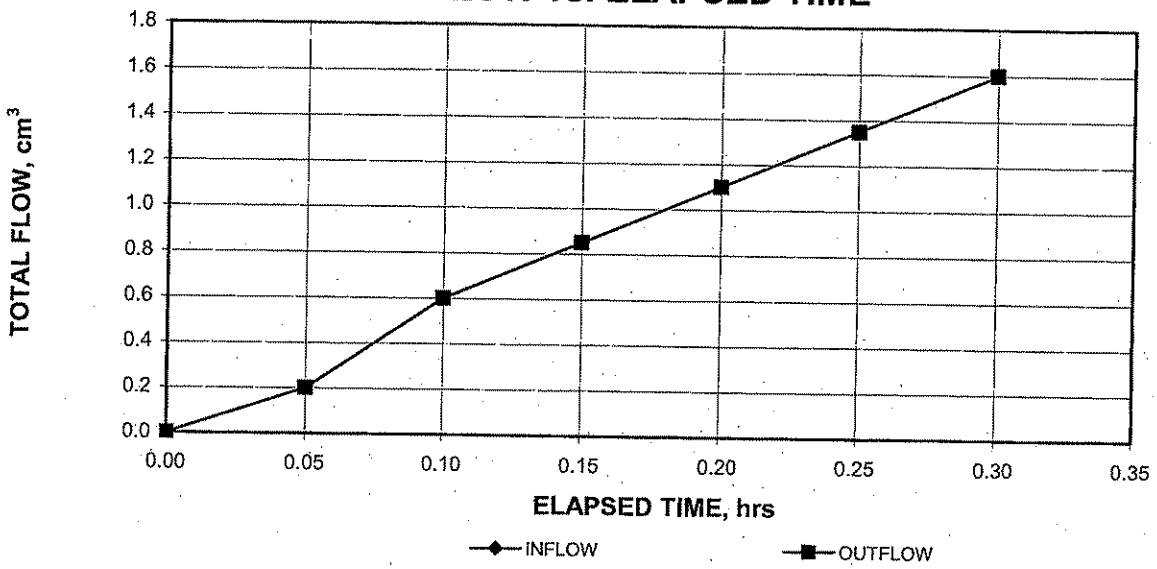
INTEGRITY IN TESTING

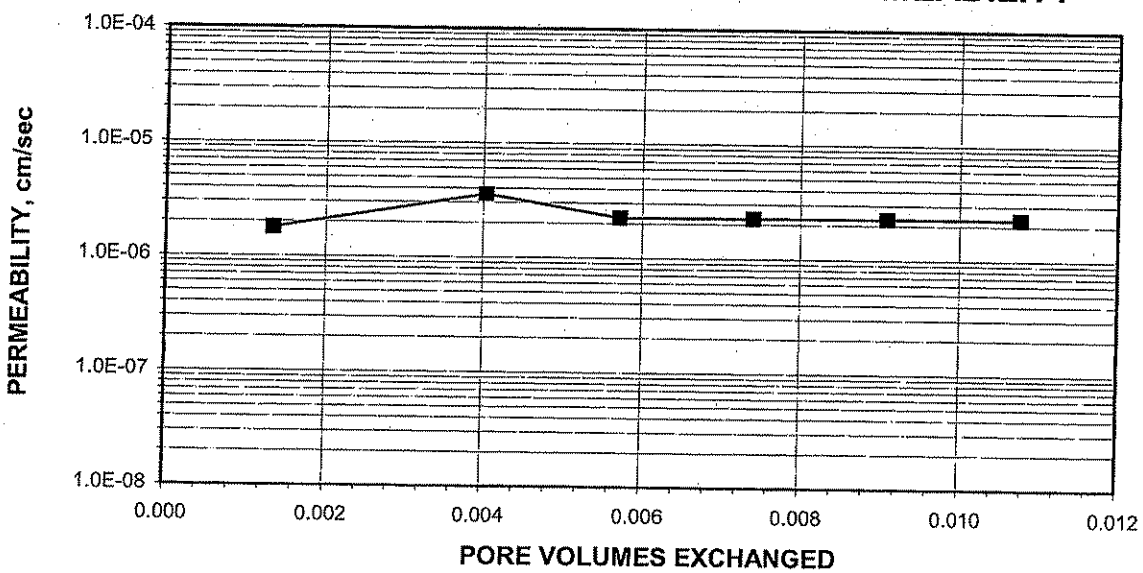
Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-03		

AVERAGE PERMEABILITY = 2.3E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.3E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: GZM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 REVISION: 0 \\Server\Data\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-03		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	203	805
Wt. of Tare & WS (gm.)	609.03	311.43
Wt. of Tare & DS (gm.)	521.89	264.07
Wt. of Tare (gm.)	171.09	106.89
Wt. of Water (gm.)	87.14	47.36
Wt. of DS (gm.)	350.80	157.18
Moisture Content (%)	**24.8**	**30.1**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	574.28	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	574.28	598.62
Length 1 (in.)	2.978	3.031
Length 2 (in.)	2.976	2.960
Length 3 (in.)	2.991	3.006
Top Diameter (in.)	2.849	2.883
Middle Diameter (in.)	2.839	2.873
Bottom Diameter (in.)	2.835	2.867
Average Length (in.)	2.98	3.00
Average Area (in.^{2})	6.34	6.49
Sample Volume (cm^3)	309.74	318.89
Unit Wet Wt. (gm./ cm^3)	1.85	1.88
Unit Wet Wt. (pcf)	115.7	117.2
Unit Dry Wt. (pcf)	92.7	90.0
Unit Dry Wt. (gm./ cm^3)	1.49	1.44
Void Ratio, e	0.82	0.87
Porosity, n	0.45	0.47
Pore Volume (cm^3)	139.4	148.5
Total Wgt. Of Sample After Test		596.13

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.9	Sample Length (cm), L	7.62
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.30
Cell (psi)	75.0	Sample Area (cm^2), A	41.86
Total Pressure Head (cm)	77.3	Inflow Burette Area (cm^2), a-in	0.891
Hydraulic Gradient	10.15	Outflow Burette Area (cm^2), a-out	0.883
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.3E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.3E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	11	5	0.00	0.0	0.0	104.0	0	23.8	NA
11/20/2009	11	8	0.05	0.2	0.2	103.6	0	23.8	1.8E-06
11/20/2009	11	11	0.10	0.6	0.6	102.7	0	23.8	3.6E-06
11/20/2009	11	14	0.15	0.9	0.8	102.1	0	23.8	2.2E-06
11/20/2009	11	17	0.20	1.1	1.1	101.5	0	23.8	2.3E-06
11/20/2009	11	20	0.25	1.4	1.4	101.0	0	23.8	2.3E-06
11/20/2009	11	23	0.30	1.6	1.6	100.4	1	23.8	2.3E-06

Tested By: TMS Date: 11/20/2009 Checked By: GZM Date: 11-23-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-03	Soil Description	**REDDISH BROWN SILT**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

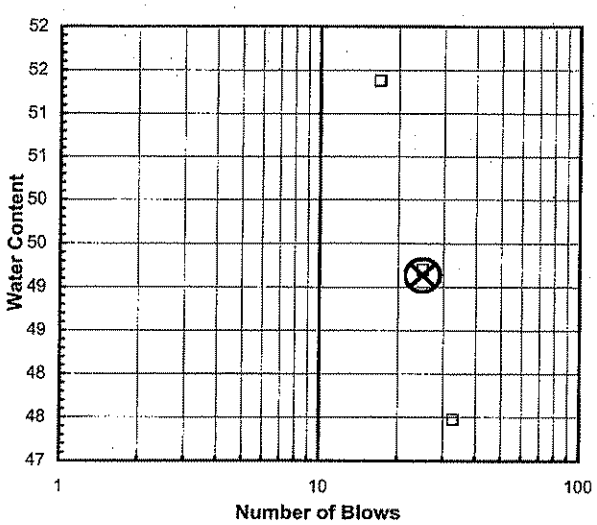
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-P	A-N	A-Q	MULTIPOINT
Wt. of Tare & WS (gm)	27.70	28.36	28.62	
Wt. of Tare & DS (gm)	23.58	24.09	24.40	
Wt. of Tare (gm)	15.56	15.41	15.51	
Wt. of Water (gm)	4.1	4.3	4.2	
Wt. of DS (gm)	8.0	8.7	8.9	
Moisture Content (%)	**51.4**	**49.2**	**47.5**	
Number of Blows	**17**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-D	P-1	
Wt. of Tare & WS (gm)	21.39	21.70	
Wt. of Tare & DS (gm)	19.62	19.84	
Wt. of Tare (gm)	15.37	15.20	
Wt. of Water (gm)	1.8	1.9	
Wt. of DS (gm)	4.3	4.6	
Moisture Content (%)	**41.6**	**40.1**	**1.6**

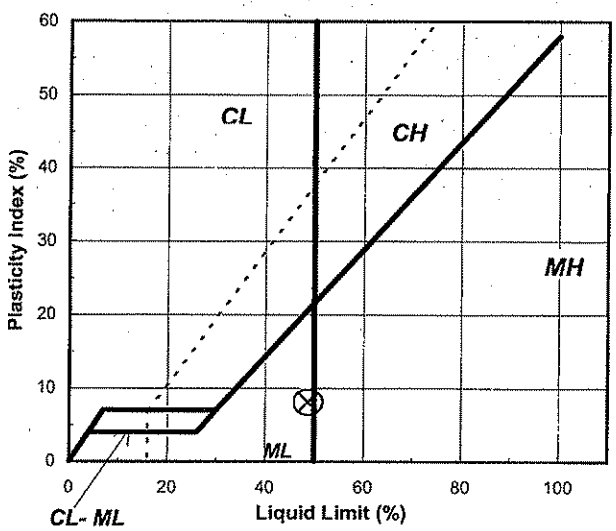
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**49**
Plastic Limit (%)	**41**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/20/2009 *Checked By* GZM *Date* 11-23-09

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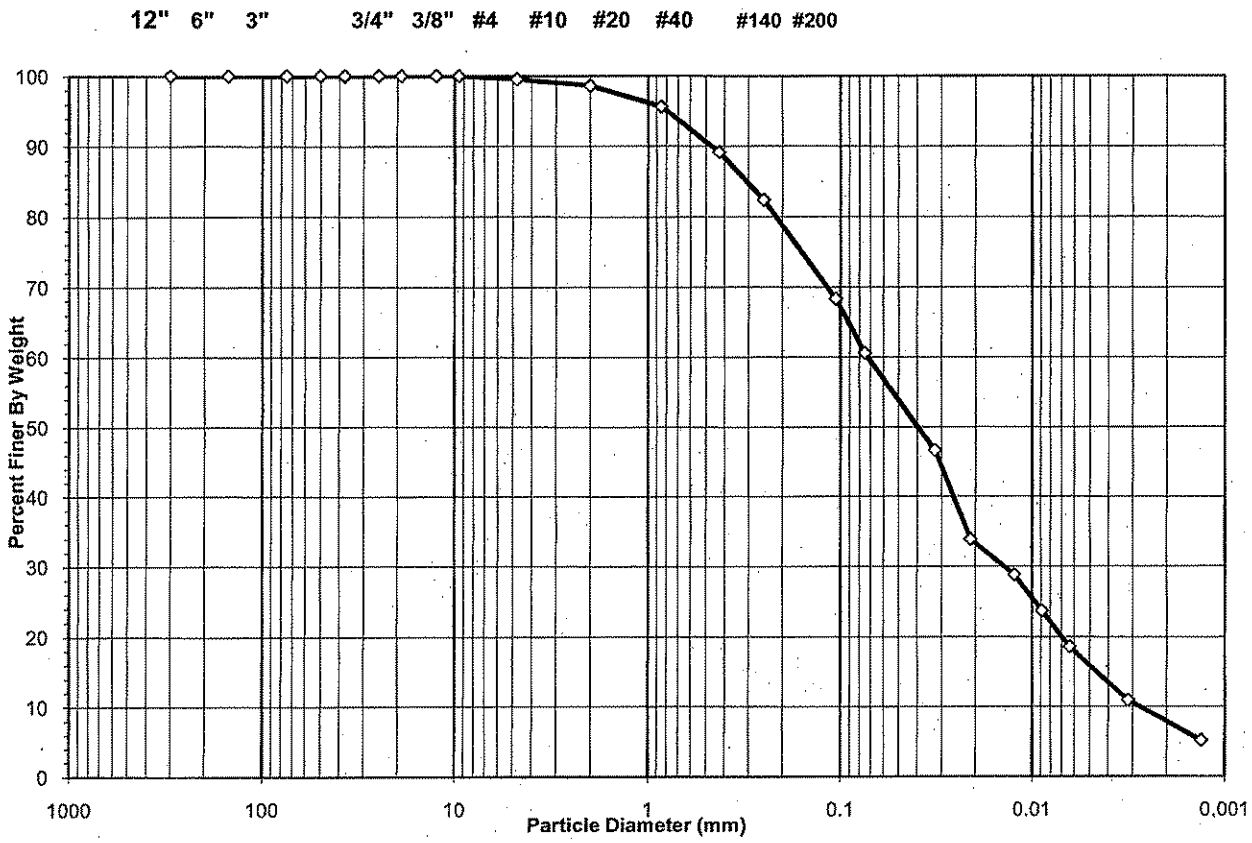
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-03	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	**cobbles**	**gravel**	**sand**			**silt and clay fraction**
USDA	**cobbles**	**gravel**		**sand**	**silt**	**clay**



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.45
#4 To #200	*Sand*	38.94
Finer Than #200	*Silt & Clay*	60.61

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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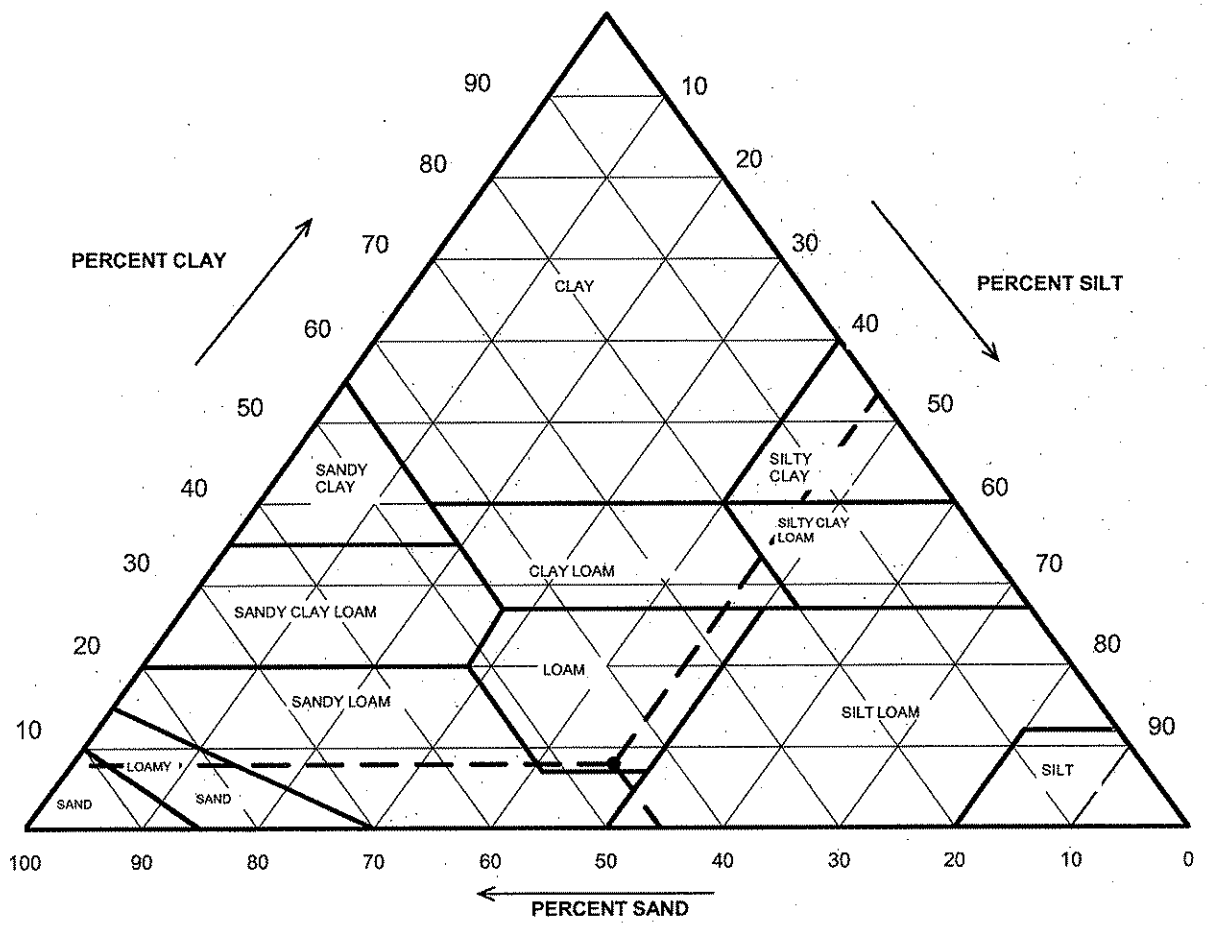
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-03	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.38	**0.00**
2	98.62	*Sand*	44.76	**45.39**
0.05	53.86	*Silt*	45.98	**46.63**
0.002	7.87	*Clay*	7.87	**7.98**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-03 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-03	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	203	Tare No.	E-2
Wgt.Tare + Wet Soil (gm)	609.03	Wgt.Tare + Wet Soil (gm)	54.68
Wgt.Tare + Dry Soil (gm)	521.89	Wgt.Tare + Dry Soil (gm)	45.45
Weight of Tare (gm)	171.09	Weight of Tare (gm)	15.66
Weight of Water (gm)	87.14	Weight of Water (gm)	9.23
Weight of Dry Soil (gm)	350.80	Weight of Dry Soil (gm)	29.79
Moisture Content (%)	**24.8**	**Moisture Content (%)**	**31.0**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	437.94	Weight of the Dry Sample (gm)	389.02
Dry Weight +#10 Material(gm)	350.8	Weight of minus #200 material (gm)	23.49
Wet Weight Hydro. Material.(gm)	50.06	Weight of plus #200 material (gm)	365.53
Dry Weight Hydro. Material (gm)	38.22		
Total Dry Weight Sample (gm)	389.02	**J-FACTOR (%FINER THAN #10)**	**0.9862**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.58	0.45	0.45	99.55	**99.55**
#10	2.00	3.27	0.93	1.38	98.62	**98.62**
#20	0.85	1.16	3.04	3.04	96.96	**95.62**
#40	0.425	2.51	6.57	9.60	90.40	**89.15**
#60	0.250	2.62	6.86	16.46	83.54	**82.39**
#140	0.106	5.45	14.26	30.72	69.28	**68.32**
#200	0.075	2.99	7.82	38.54	61.46	**60.61**
Pan	-	23.49	61.46	100.00	-	**-**

Notes :

Tested By JRB Date 11.25.09 Checked By JRB Date 11.25.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST22A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A6
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-03	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	22.4	5.73	18.3	47.3	0.01307	0.0325	**46.7**
5		19.0	22.4	5.73	13.3	34.4	0.01307	0.0212	**33.9**
15		17.0	22.4	5.73	11.3	29.2	0.01307	0.0124	**28.8**
30		15.0	22.4	5.73	9.3	24.0	0.01307	0.0089	**23.7**
60		13.0	22.4	5.73	7.3	18.8	0.01307	0.0063	**18.6**
250		10.0	22.4	5.73	4.3	11.1	0.01307	0.0032	**10.9**
1440		7.0	23.5	4.99	2.0	5.2	0.01290	0.0013	**5.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	38.22	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.62
Weight of Dry Material (gm)	38.22		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By JRB Date 11.25.09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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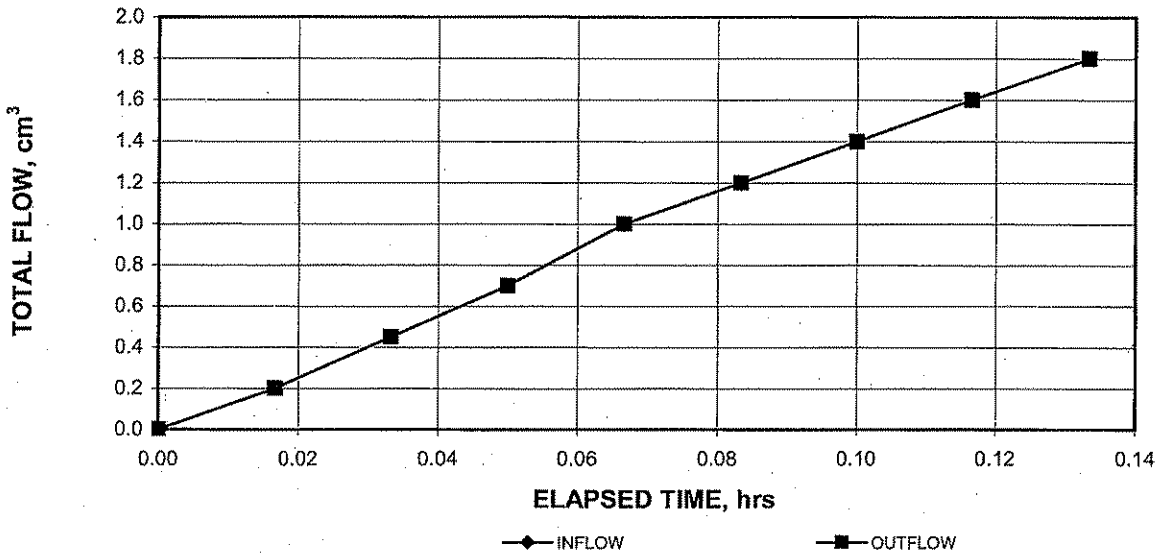
INTEGRITY IN TESTING

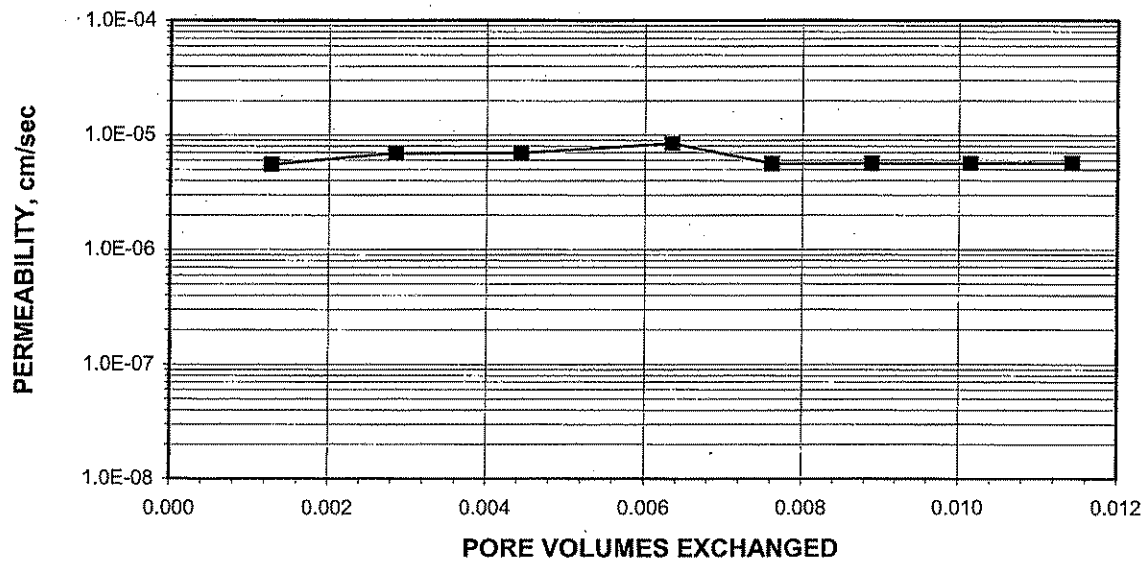
Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID No.	2009-666-09-04		

AVERAGE PERMEABILITY = 5.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.7E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/9/2009 Checked By: GEM Date: 11-13-09

DCN: CT-22 DATE: 01/06/06 REV: 1 2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-08 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID No.	2009-666-09-04		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	840	805
Wt. of Tare & WS (gm.)	506.48	366.18
Wt. of Tare & DS (gm.)	452.03	297.93
Wt. of Tare (gm.)	262.70	106.70
Wt. of Water (gm.)	54.45	68.25
Wt. of DS (gm.)	189.33	191.23
Moisture Content (%)	**28.8**	**35.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	580.80	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	580.80	612.06
Length 1 (in.)	3.106	3.171
Length 2 (in.)	3.207	3.104
Length 3 (in.)	3.161	3.152
Top Diameter (in.)	2.824	2.849
Middle Diameter (in.)	2.839	2.808
Bottom Diameter (in.)	2.815	2.843
Average Length (in.)	3.16	3.14
Average Area (in.^{2})	6.27	6.31
Sample Volume (cm^3)	324.60	324.67
Unit Wet Wt. (gm./ cm^3)	1.79	1.89
Unit Wet Wt. (pcf)	111.7	117.7
Unit Dry Wt. (pcf)	86.7	86.7
Unit Dry Wt. (gm./ cm^3)	1.39	1.39
Void Ratio, e	0.94	0.94
Porosity, n	0.49	0.49
Pore Volume (cm^3)	157.5	157.6
Total Wgt. Of Sample After Test		606.41

Tested By: TMS Date: 11/9/2009 Checked By: GEM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID No.	2009-666-09-04		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	7.98
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	75.0	Sample Area (cm^2), A	40.68
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.852
Hydraulic Gradient	10.57	Outflow Burette Area (cm^2), a-out	0.972
		B Parameter (%)	95

AVERAGE PERMEABILITY = 5.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.7E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	10	5.5	0.0	0.0	0.0	111.6	0	22.5	NA
11/11/2009	10	6.5	0.0	0.2	0.2	111.1	0	22.5	5.5E-06
11/11/2009	10	7.5	0.0	0.5	0.4	110.6	0	22.5	6.9E-06
11/11/2009	10	8.5	0.1	0.7	0.7	110.0	0	22.5	6.9E-06
11/11/2009	10	9.5	0.1	1.0	1.0	109.4	0	22.5	8.4E-06
11/11/2009	10	10.5	0.1	1.2	1.2	108.9	0	22.5	5.6E-06
11/11/2009	10	11.5	0.1	1.4	1.4	108.5	0	22.5	5.6E-06
11/11/2009	10	12.5	0.1	1.6	1.6	108.1	0	22.5	5.7E-06
11/11/2009	10	13.5	0.1	1.8	1.8	107.6	1	22.5	5.7E-06

Tested By: TMS Date: 11/9/2009 Checked By: GEM Date: 11-13-09

DCN: CT-22 DATE: 01-08-99 [illegible]:\[illegible]drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-04 PERM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID	2009-666-09-04	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

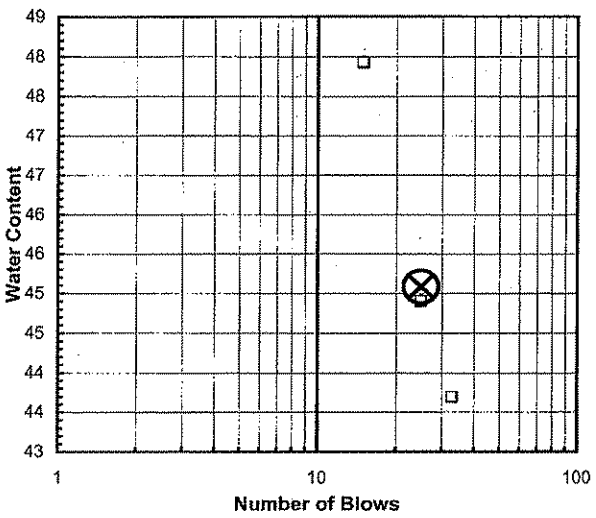
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	H	A-F	R	MULTIPOINT
Wt. of Tare & WS (gm)	24.39	28.52	27.68	
Wt. of Tare & DS (gm)	20.00	24.47	23.87	
Wt. of Tare (gm)	10.84	15.45	15.15	
Wt. of Water (gm)	4.4	4.1	3.8	
Wt. of DS (gm)	9.2	9.0	8.7	
Moisture Content (%)	**47.9**	**44.9**	**43.7**	
Number of Blows	**15**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-I	A-B	
Wt. of Tare & WS (gm)	22.01	21.84	
Wt. of Tare & DS (gm)	20.20	20.11	
Wt. of Tare (gm)	15.46	15.56	
Wt. of Water (gm)	1.8	1.7	
Wt. of DS (gm)	4.7	4.6	
Moisture Content (%)	**38.2**	**38.0**	**0.2**

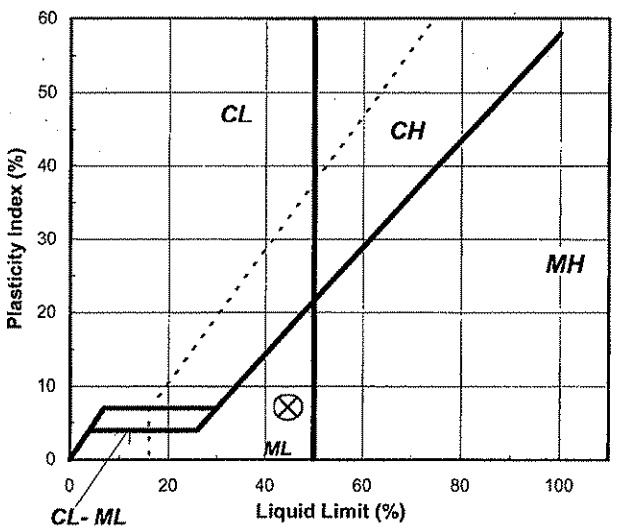
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**38**
Plasticity Index (%)	**7**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/13/2009 *Checked By* GEM *Date* 11-16-09

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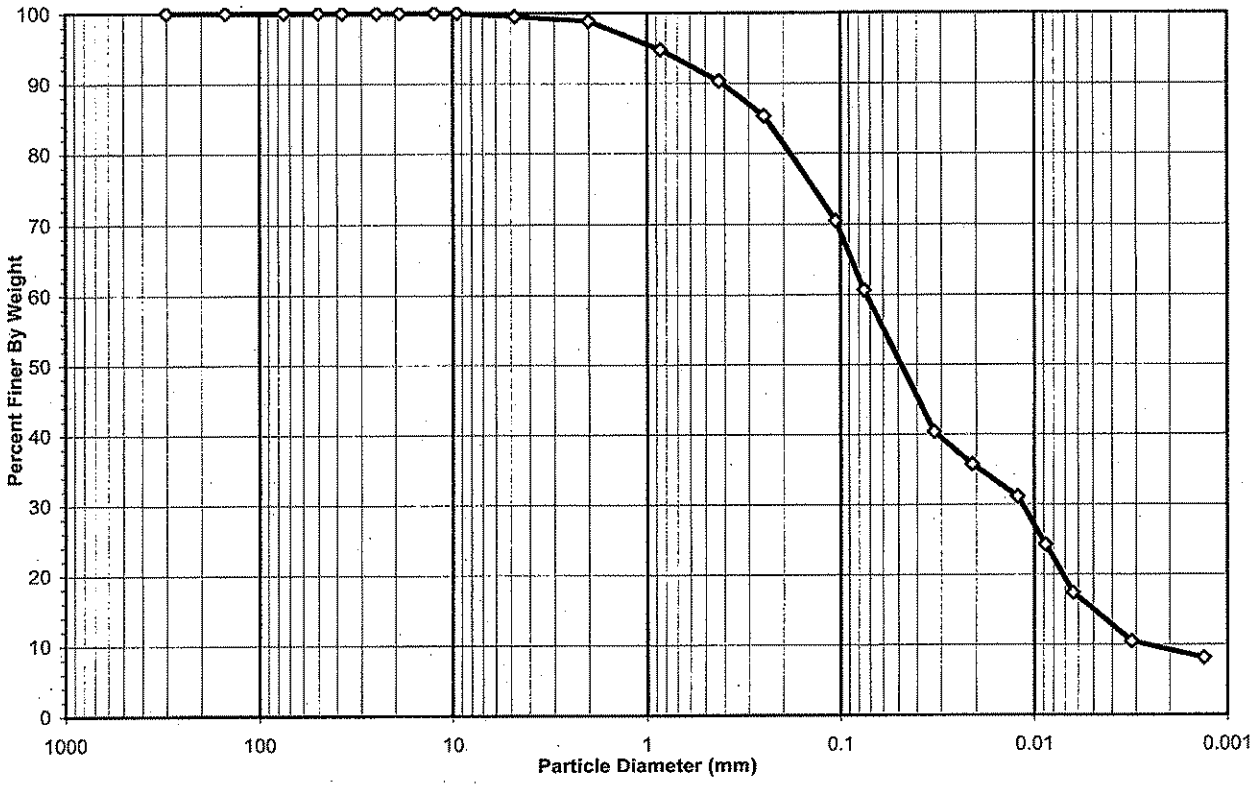
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID	2009-666-09-04	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.50
#4 To #200	*Sand*	38.85
Finer Than #200	*Silt & Clay*	60.64

USCS Symbol *ML, TESTED*

USCS Classification *SANDY SILT*

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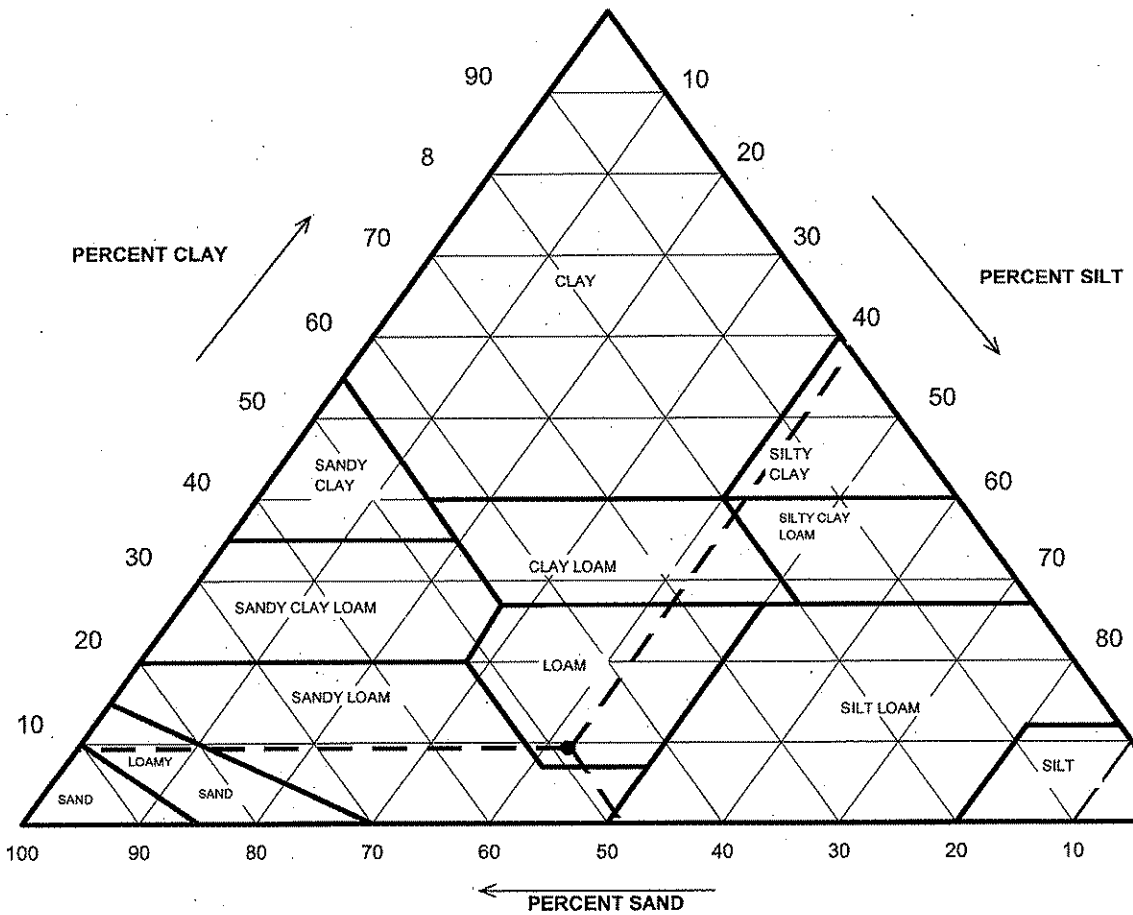
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID	2009-666-09-04	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.13	**0.00**
2	98.87	*Sand*	48.08	**48.63**
0.05	50.79	*Silt*	41.55	**42.02**
0.002	9.24	*Clay*	9.24	**9.35**

USDA Classification: ***LOAM***

 DCN: CT-SSP DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-04 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID	2009-666-09-04	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	840	Tare No.	C-2
Wgt.Tare + Wet Soil (gm)	506.48	Wgt.Tare + Wet Soil (gm)	51.34
Wgt.Tare + Dry Soil (gm)	452.03	Wgt.Tare + Dry Soil (gm)	45.99
Weight of Tare (gm)	262.70	Weight of Tare (gm)	15.67
Weight of Water (gm)	54.45	Weight of Water (gm)	5.35
Weight of Dry Soil (gm)	189.33	Weight of Dry Soil (gm)	30.32
Moisture Content (%)	**28.8**	**Moisture Content (%)**	**17.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	243.78	Weight of the Dry Sample (gm)	231.87
Dry Weight +#10 Material(gm)	189.3	Weight of minus #200 material (gm)	26.09
Wet Weight Hydro. Material.(gm)	50.05	Weight of plus #200 material (gm)	205.78
Dry Weight Hydro. Material (gm)	42.54		
Total Dry Weight Sample (gm)	231.87	**J-FACTOR (%FINER THAN #10)**	**0.9887**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.95	0.50	0.50	99.50	**99.50**
#10	2.00	1.18	0.62	1.13	98.87	**98.87**
#20	0.85	1.76	4.14	4.14	95.86	**94.78**
#40	0.425	1.94	4.56	8.70	91.30	**90.28**
#60	0.250	2.13	5.01	13.70	86.30	**85.33**
#140	0.106	6.38	15.00	28.70	71.30	**70.50**
#200	0.075	4.24	9.97	38.67	61.33	**60.64**
Pan	-	26.09	61.33	100.00	-	**-**

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A6
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L3
Project No.	2009-666-09	Sample No.	ST-23
Lab ID	2009-666-09-04	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	22.8	5.46	17.5	40.8	0.01300	0.0325	**40.4**
5		21.0	22.8	5.46	15.5	36.2	0.01300	0.0208	**35.8**
15		19.0	22.8	5.46	13.5	31.5	0.01300	0.0122	**31.2**
30		16.0	22.8	5.46	10.5	24.5	0.01300	0.0088	**24.2**
60		13.0	22.8	5.46	7.5	17.5	0.01300	0.0063	**17.3**
250		10.0	22.8	5.46	4.5	10.6	0.01300	0.0031	**10.4**
1440		9.0	22.8	5.46	3.5	8.2	0.01300	0.0013	**8.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	42.54	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.87
Weight of Dry Material (gm)	42.54		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GZM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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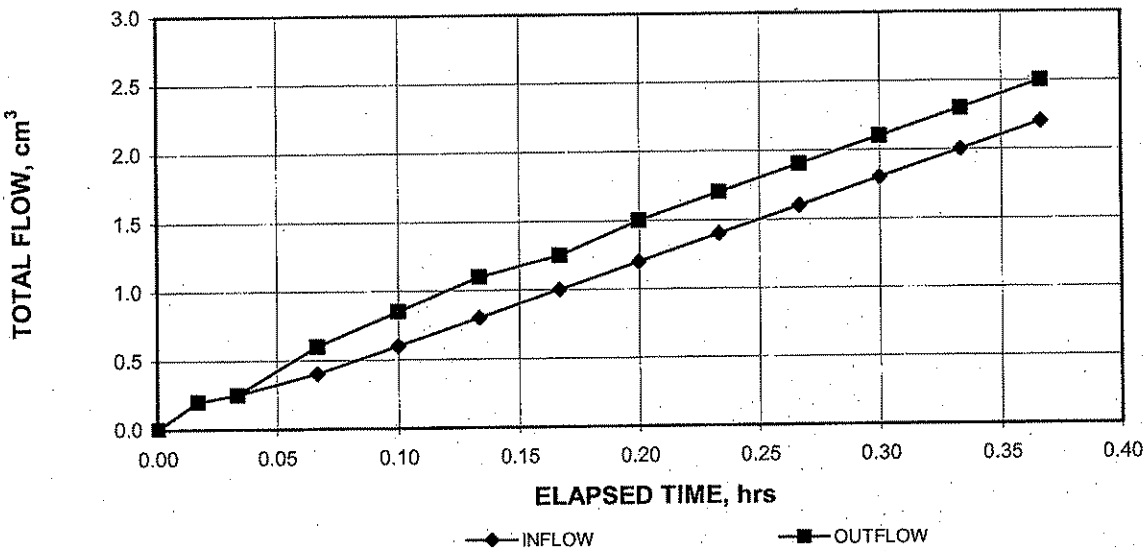
INTEGRITY IN TESTING

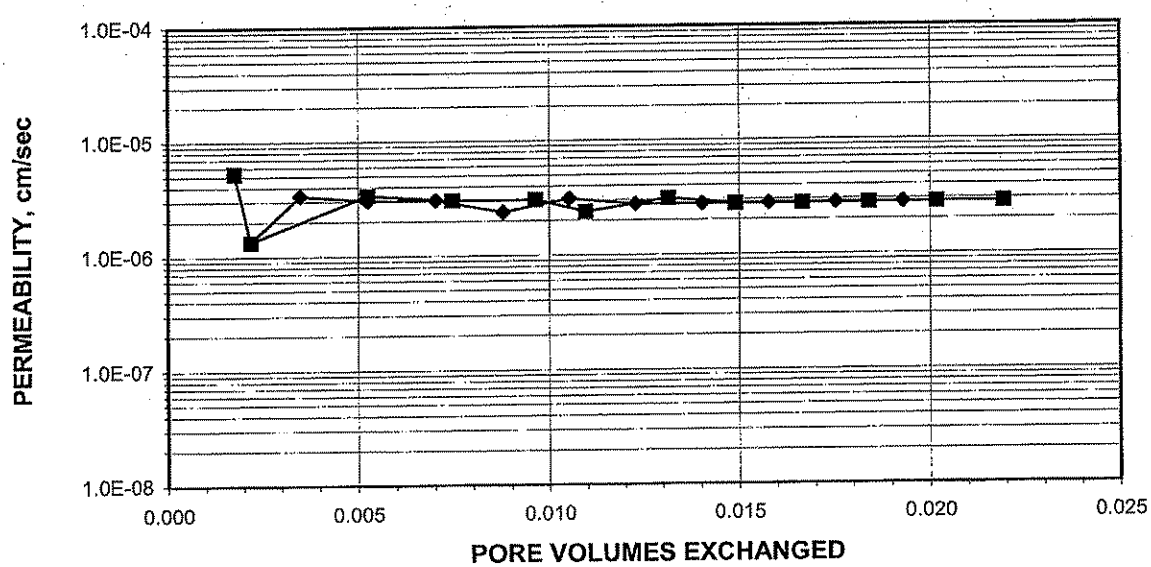
Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID No.	2009-666-11-01		

AVERAGE PERMEABILITY = 2.8E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.8E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/23/2009 Checked By: GEM Date: 11-24-09

DCN: CT-22C DATE: 11/23/2009 FILE: [2009-666-11-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID No.	2009-666-11-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	216	814
Wt. of Tare & WS (gm.)	567.18	209.78
Wt. of Tare & DS (gm.)	480.82	185.37
Wt. of Tare (gm.)	170.73	112.83
Wt. of Water (gm.)	86.36	24.41
Wt. of DS (gm.)	310.09	72.54
Moisture Content (%)	**27.8**	**33.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	453.42	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	453.42	473.99
Length 1 (in.)	2.506	2.447
Length 2 (in.)	2.521	2.452
Length 3 (in.)	2.517	2.441
Top Diameter (in.)	2.834	2.816
Middle Diameter (in.)	2.843	2.779
Bottom Diameter (in.)	2.838	2.779
Average Length (in.)	2.51	2.45
Average Area (in.^{2})	6.33	6.12
Sample Volume (cm^3)	260.73	245.35
Unit Wet Wt. (gm./ cm^3)	1.74	1.93
Unit Wet Wt. (pcf)	108.6	120.6
Unit Dry Wt. (pcf)	84.9	90.2
Unit Dry Wt. (gm./ cm^3)	1.36	1.45
Void Ratio, e	0.99	0.87
Porosity, n	0.50	0.46
Pore Volume (cm^3)	129.4	114.0
Total Wgt. Of Sample After Test		468.73

Tested By: TMS Date: 11/23/2009 Checked By: GEM Date: 11-24-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID No.	2009-666-11-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.1	Sample Length (cm), L	6.21
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.09
Cell (psi)	75.0	Sample Area (cm^2), A	39.48
Total Pressure Head (cm)	63.3	Inflow Burette Area (cm^2), a-in	0.878
Hydraulic Gradient	10.18	Outflow Burette Area (cm^2), a-out	0.871
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.8E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.8E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/23/2009	12	35	0.00	0.0	0.0	90.1	0	23.1	NA
11/23/2009	12	36	0.02	0.2	0.2	89.6	0	23.1	5.3E-06
11/23/2009	12	37	0.03	0.3	0.3	89.5	0	23.1	1.3E-06
11/23/2009	12	39	0.07	0.4	0.6	89.0	0	23.1	3.4E-06
11/23/2009	12	41	0.10	0.6	0.9	88.4	0	23.1	3.0E-06
11/23/2009	12	43	0.13	0.8	1.1	87.9	0	23.1	3.0E-06
11/23/2009	12	45	0.17	1.0	1.3	87.5	0	23.1	2.4E-06
11/23/2009	12	47	0.20	1.2	1.5	87.0	0	23.1	3.1E-06
11/23/2009	12	49	0.23	1.4	1.7	86.6	0	23.1	2.8E-06
11/23/2009	12	51	0.27	1.6	1.9	86.1	0	23.1	2.8E-06
11/23/2009	12	53	0.30	1.8	2.1	85.7	0	23.1	2.8E-06
11/23/2009	12	55	0.33	2.0	2.3	85.3	0	23.1	2.8E-06
11/23/2009	12	57	0.37	2.2	2.5	84.8	1	23.1	2.8E-06

Tested By: TMS Date: 11/23/2009 Checked By: GEM Date: 11-24-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-11-01 PERM.xls]Sheet1

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID	2009-666-11-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

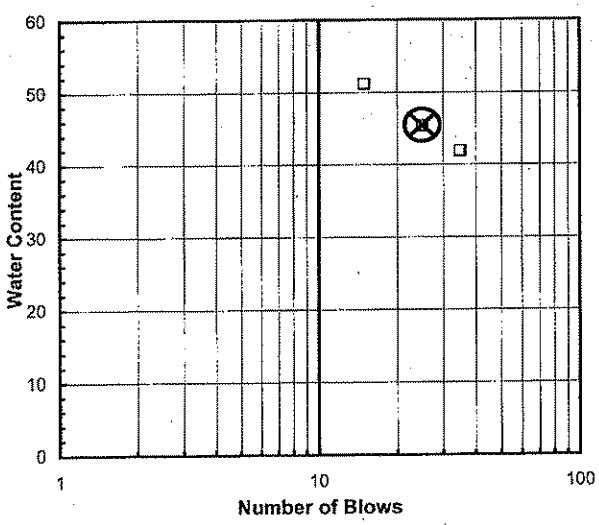
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	W	L	V	MULTIPOINT
Wt. of Tare & WS (gm)	27.69	28.41	31.24	
Wt. of Tare & DS (gm)	23.46	24.31	26.54	
Wt. of Tare (gm)	15.19	15.27	15.30	
Wt. of Water (gm)	4.2	4.1	4.7	
Wt. of DS (gm)	8.3	9.0	11.2	
Moisture Content (%)	**51.1**	**45.4**	**41.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-C	K-A	
Wt. of Tare & WS (gm)	22.49	21.85	
Wt. of Tare & DS (gm)	20.58	20.14	
Wt. of Tare (gm)	15.56	15.57	
Wt. of Water (gm)	1.9	1.7	
Wt. of DS (gm)	5.0	4.6	
Moisture Content (%)	**38.0**	**37.4**	**0.6**

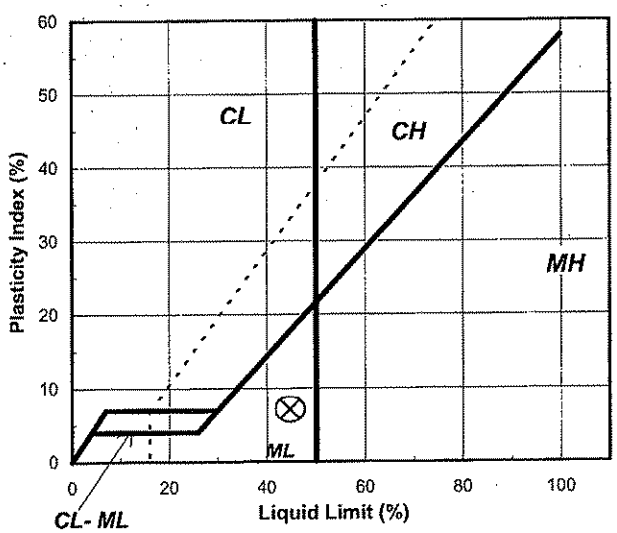
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**38**
Plasticity Index (%)	**7**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/25/2009 *Checked By* GZM *Date* 11-30-09

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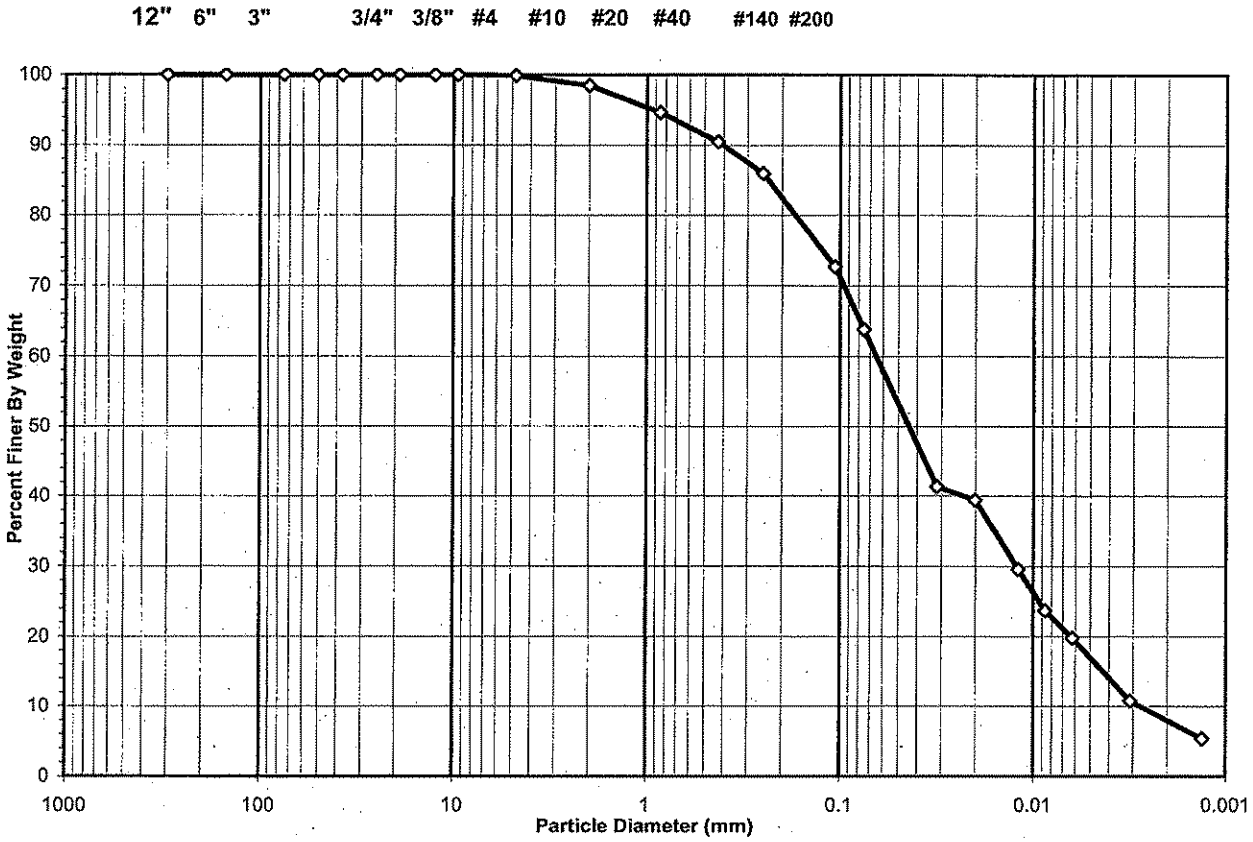
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID	2009-666-11-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.15
#4 To #200	*Sand*	36.03
Finer Than #200	*Silt & Clay*	63.82

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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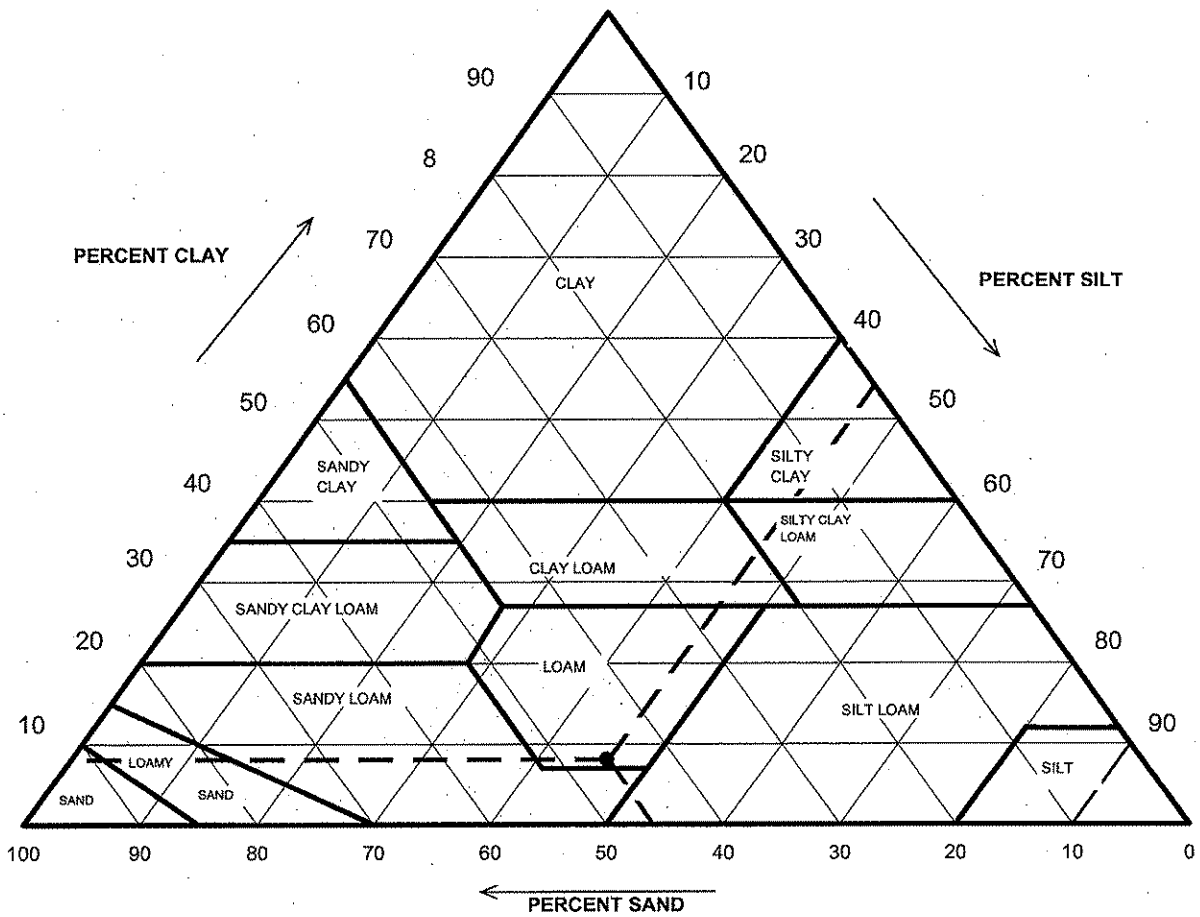
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID	2009-666-11-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.54	**0.00**
2	98.46	*Sand*	45.19	**45.90**
0.05	53.27	*Silt*	45.28	**45.99**
0.002	7.99	*Clay*	7.99	**8.12**

USDA Classification: ***LOAM***

 DCN: CT-SSP DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-11-01 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID	2009-666-11-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	216	Tare No.	A-L
Wgt.Tare + Wet Soil (gm)	567.18	Wgt.Tare + Wet Soil (gm)	32.65
Wgt.Tare + Dry Soil (gm)	480.82	Wgt.Tare + Dry Soil (gm)	32.55
Weight of Tare (gm)	170.73	Weight of Tare (gm)	15.54
Weight of Water (gm)	86.36	Weight of Water (gm)	0.10
Weight of Dry Soil (gm)	310.09	Weight of Dry Soil (gm)	17.01
Moisture Content (%)	**27.8**	**Moisture Content (%)**	**0.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	396.45	Weight of the Dry Sample (gm)	359.80
Dry Weight +#10 Material(gm)	310.1	Weight of minus #200 material (gm)	32.22
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	327.58
Dry Weight Hydro. Material (gm)	49.71		
Total Dry Weight Sample (gm)	359.80	**J-FACTOR (%FINER THAN #10)**	**0.9846**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.47	0.15	0.15	99.85	**99.85**
#10	2.00	4.31	1.39	1.54	98.46	**98.46**
#20	0.85	1.92	3.86	3.86	96.14	**94.66**
#40	0.425	2.12	4.26	8.13	91.87	**90.46**
#60	0.250	2.27	4.57	12.69	87.31	**85.96**
#140	0.106	6.71	13.50	26.19	73.81	**72.67**
#200	0.075	4.47	8.99	35.19	64.81	**63.82**
Pan	-	32.22	64.81	100.00	-	-

Notes :

Tested By SD Date 12/3/2009 Checked By GZM Date 12-3-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-23A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A6
Project No.	2009-666-11	Sample No.	L3
Lab ID	2009-666-11-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	26.0	26.0	23.6	4.92	21.1	42.0	0.01288	0.0316	**41.3**
5		25.0	23.6	4.92	20.1	40.0	0.01288	0.0201	**39.4**
15		20.0	23.6	4.92	15.1	30.0	0.01288	0.0120	**29.6**
30		17.0	23.6	4.92	12.1	24.1	0.01288	0.0086	**23.7**
60		15.0	23.6	4.92	10.1	20.1	0.01288	0.0062	**19.8**
250		10.0	24.2	4.52	5.5	10.9	0.01279	0.0031	**10.8**
1440		8.0	23.1	5.26	2.7	5.5	0.01296	0.0013	**5.4**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	49.71	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.46
Weight of Dry Material (gm)	49.71		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12/1/2009 Checked By aem Date 12-3-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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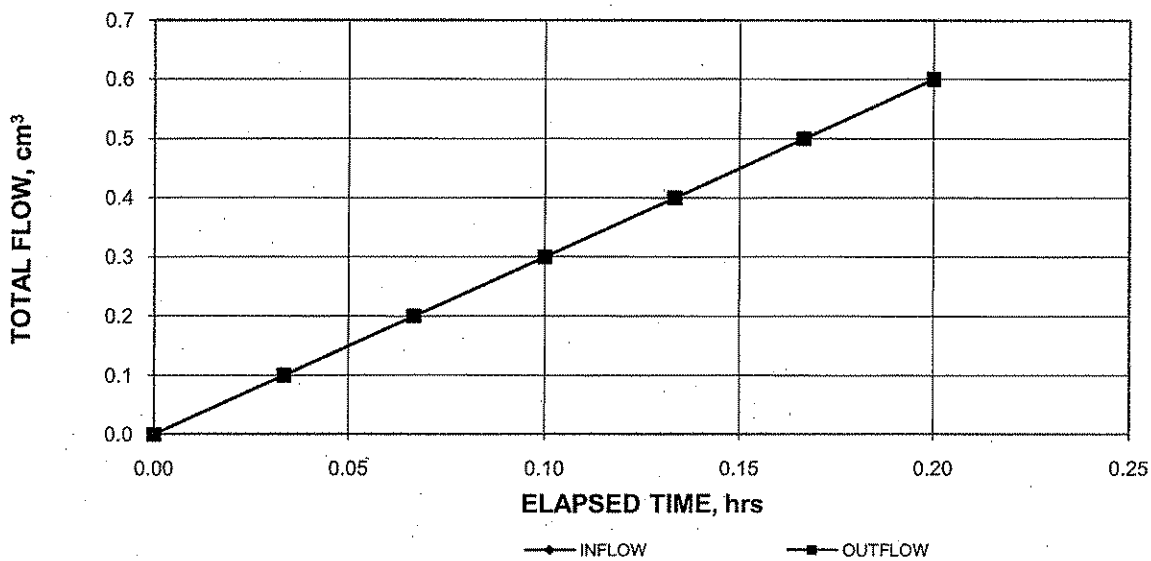
INTEGRITY IN TESTING

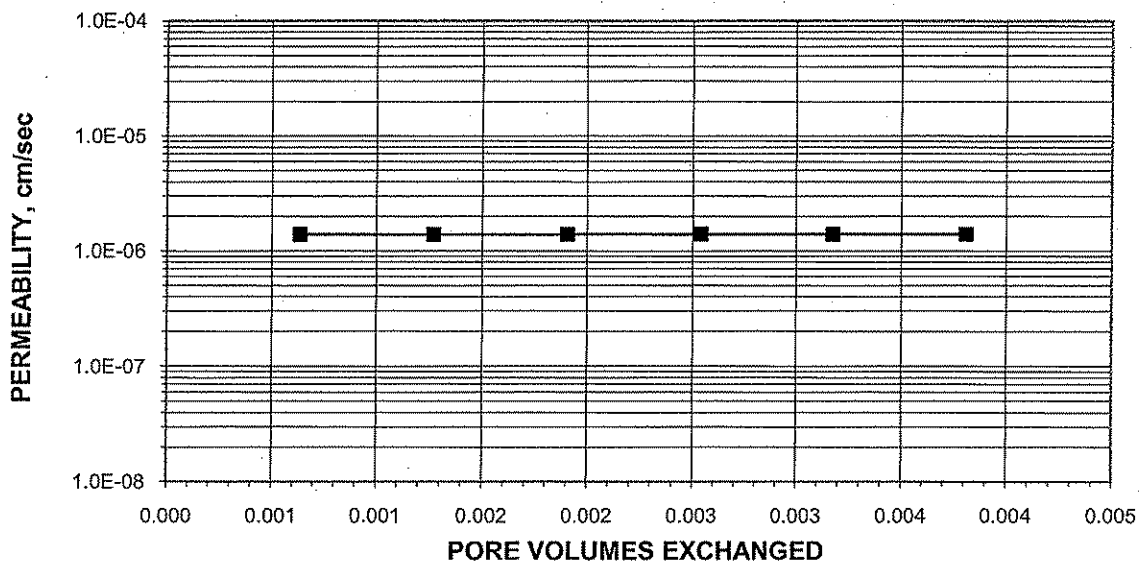
Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID No.	2009-666-09-06		

AVERAGE PERMEABILITY = 1.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

DCN: CT-22 DATE: 07/09/09 REVISION: 2 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-06 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID No.	2009-666-09-06		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	815	804
Wt. of Tare & WS (gm.)	327.63	457.54
Wt. of Tare & DS (gm.)	295.16	380.90
Wt. of Tare (gm.)	172.28	107.04
Wt. of Water (gm.)	32.47	76.64
Wt. of DS (gm.)	122.88	273.86
Moisture Content (%)	**26.4**	**28.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	656.51	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	656.51	664.62
Length 1 (in.)	3.472	3.398
Length 2 (in.)	3.373	3.365
Length 3 (in.)	3.392	3.372
Top Diameter (in.)	2.836	2.841
Middle Diameter (in.)	2.835	2.834
Bottom Diameter (in.)	2.847	2.834
Average Length (in.)	3.41	3.38
Average Area (in.^{2})	6.33	6.32
Sample Volume (cm^3)	354.06	349.79
Unit Wet Wt. (gm./ cm^3)	1.85	1.90
Unit Wet Wt. (pcf)	115.7	118.6
Unit Dry Wt. (pcf)	91.6	92.7
Unit Dry Wt. (gm./ cm^3)	1.47	1.48
Void Ratio, e	0.84	0.82
Porosity, n	0.46	0.45
Pore Volume (cm^3)	161.7	157.5
Total Wgt. Of Sample After Test		671.66

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID No.	2009-666-09-06		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.7	Sample Length (cm), L	8.58
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	75.0	Sample Area (cm^2), A	40.76
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.888
Hydraulic Gradient	10.65	Outflow Burette Area (cm^2), a-out	0.869
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	12	35	0.0	0.0	0.0	117.4	0	22.5	NA
11/11/2009	12	37	0.0	0.1	0.1	117.2	0	22.5	1.4E-06
11/11/2009	12	39	0.1	0.2	0.2	116.9	0	22.5	1.4E-06
11/11/2009	12	41	0.1	0.3	0.3	116.7	0	22.5	1.4E-06
11/11/2009	12	43	0.1	0.4	0.4	116.5	0	22.5	1.4E-06
11/11/2009	12	45	0.2	0.5	0.5	116.3	0	22.5	1.4E-06
11/11/2009	12	47	0.2	0.6	0.6	116.0	1	22.5	1.4E-06

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID	2009-666-09-06	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

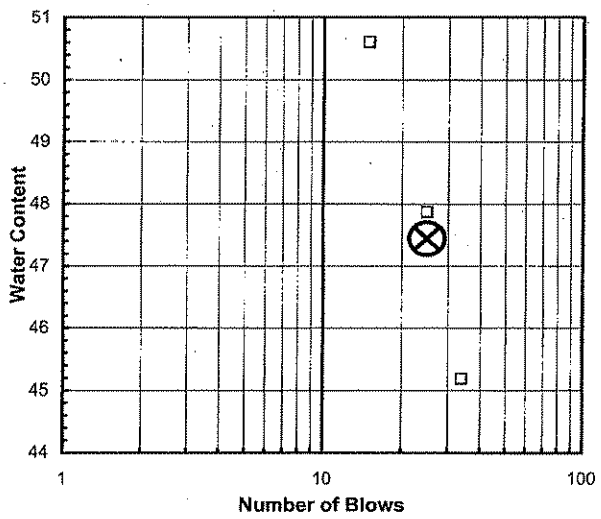
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A	E	Y	MULTIPOINT
Wt. of Tare & WS (gm)	27.81	29.18	28.54	
Wt. of Tare & DS (gm)	23.59	24.69	24.51	
Wt. of Tare (gm)	15.25	15.31	15.59	
Wt. of Water (gm)	4.2	4.5	4.0	
Wt. of DS (gm)	8.3	9.4	8.9	
Moisture Content (%)	**50.6**	**47.9**	**45.2**	
Number of Blows	**15**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	N	C	
Wt. of Tare & WS (gm)	22.62	21.89	
Wt. of Tare & DS (gm)	20.55	20.00	
Wt. of Tare (gm)	15.30	15.22	
Wt. of Water (gm)	2.1	1.9	
Wt. of DS (gm)	5.3	4.8	
Moisture Content (%)	**39.4**	**39.5**	**-0.1**

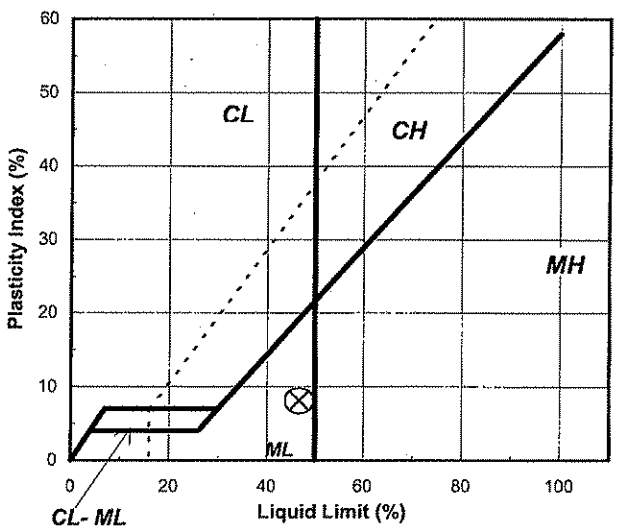
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**39**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/13/2009 *Checked By* GEM *Date* 11-16-09

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SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID	2009-666-09-06	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200

USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	2.16
#4 To #200	*Sand*	43.03
Finer Than #200	*Silt & Clay*	54.81

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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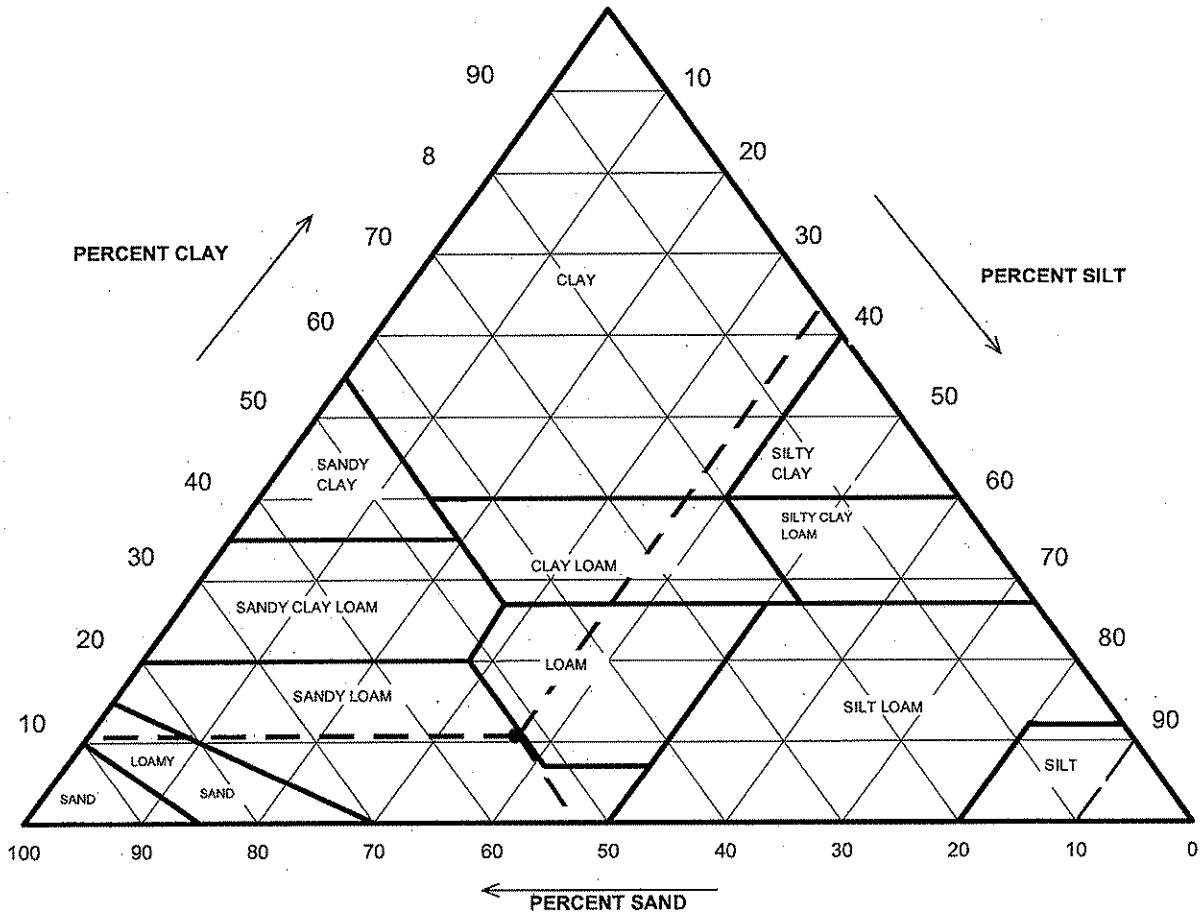
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID	2009-666-09-06	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	5.29	**0.00**
2	94.71	*Sand*	49.85	**52.63**
0.05	44.86	*Silt*	34.68	**36.62**
0.002	10.18	*Clay*	10.18	**10.75**

USDA Classification: ***SANDY LOAM***

 DCN: CT-63P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-06 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID	2009-666-09-06	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	215	Tare No.	V-1
Wgt.Tare + Wet Soil (gm)	327.63	Wgt.Tare + Wet Soil (gm)	48.54
Wgt.Tare + Dry Soil (gm)	295.16	Wgt.Tare + Dry Soil (gm)	43.30
Weight of Tare (gm)	172.28	Weight of Tare (gm)	15.62
Weight of Water (gm)	32.47	Weight of Water (gm)	5.24
Weight of Dry Soil (gm)	122.88	Weight of Dry Soil (gm)	27.68
Moisture Content (%)	**26.4**	**Moisture Content (%)**	**18.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	155.35	Weight of the Dry Sample (gm)	164.94
Dry Weight +#10 Material(gm)	122.9	Weight of minus #200 material (gm)	24.34
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	140.60
Dry Weight Hydro. Material (gm)	42.06		
Total Dry Weight Sample (gm)	164.94	**J-FACTOR (%FINER THAN #10)**	**0.9471**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.04	0.85	0.85	99.15	**99.15**
#4	4.75	1.62	1.32	2.16	97.84	**97.84**
#10	2.00	3.84	3.13	5.29	94.71	**94.71**
#20	0.85	1.62	3.85	3.85	96.15	**91.06**
#40	0.425	2.36	5.61	9.46	90.54	**85.75**
#60	0.250	2.53	6.02	15.48	84.52	**80.05**
#140	0.106	6.97	16.57	32.05	67.95	**64.35**
#200	0.075	4.24	10.08	42.13	57.87	**54.81**
Pan	-	24.34	57.87	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-25
Lab ID	2009-666-09-06	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	21.0	21.0	22.8	5.46	15.5	36.6	0.01300	0.0330	**34.6**
5		20.0	22.8	5.46	14.5	34.2	0.01300	0.0210	**32.4**
15		17.0	22.8	5.46	11.5	27.2	0.01300	0.0123	**25.7**
30		16.0	22.8	5.46	10.5	24.8	0.01300	0.0088	**23.5**
60		13.0	22.8	5.46	7.5	17.7	0.01300	0.0063	**16.8**
250		11.0	22.5	5.66	5.3	12.6	0.01305	0.0031	**11.9**
1440		10.0	21.8	6.13	3.9	9.1	0.01316	0.0013	**8.6**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	42.06	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	94.71
Weight of Dry Material (gm)	42.06		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GDM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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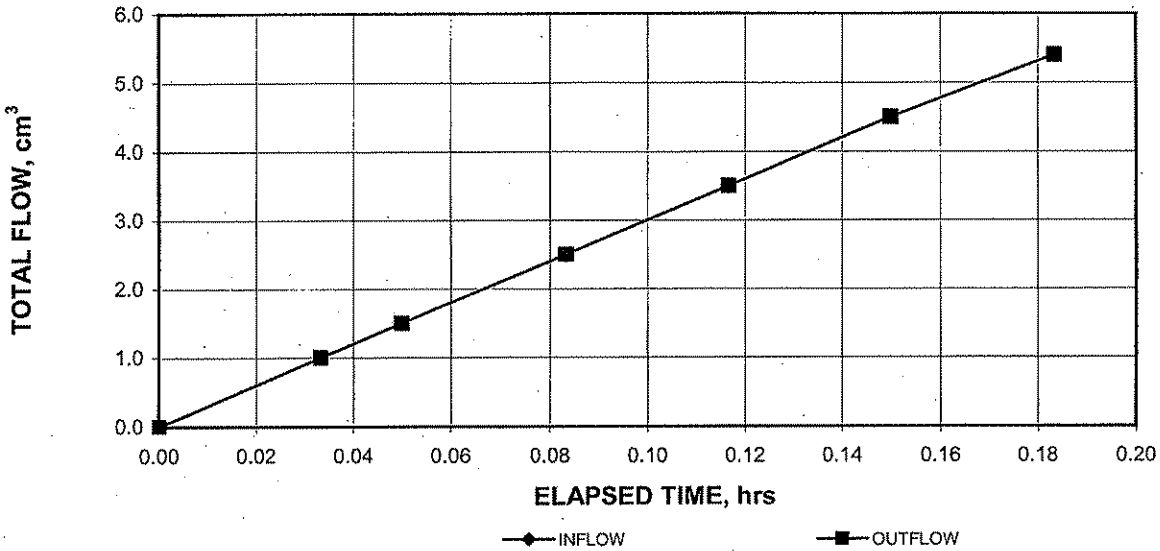
INTEGRITY IN TESTING

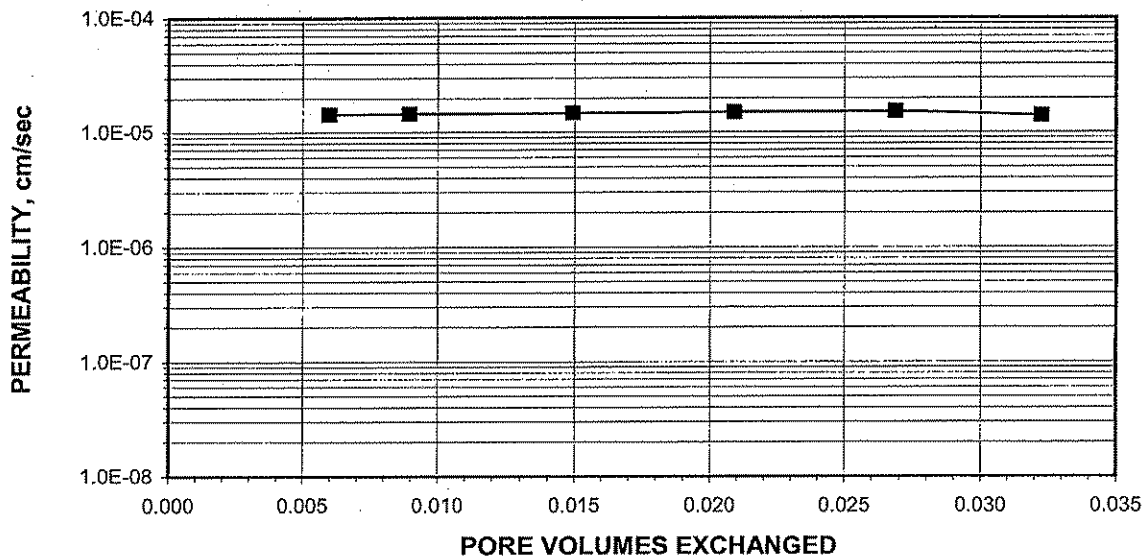
Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID No.	2009-666-09-08		

AVERAGE PERMEABILITY = 1.5E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.5E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/11/2009 Checked By: MMS Date: 11-12-09

DCN: CT-22 DATE: 01/05/09 REV: 5/2009 P:\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-08 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID No.	2009-666-09-08		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	212	803
Wt. of Tare & WS (gm.)	458.95	313.13
Wt. of Tare & DS (gm.)	407.10	258.47
Wt. of Tare (gm.)	171.54	104.35
Wt. of Water (gm.)	51.85	54.66
Wt. of DS (gm.)	235.56	154.12
Moisture Content (%)	**22.0**	**35.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	574.64	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	574.64	638.01
Length 1 (in.)	3.385	3.339
Length 2 (in.)	3.286	3.337
Length 3 (in.)	3.345	3.303
Top Diameter (in.)	2.845	2.856
Middle Diameter (in.)	2.839	2.807
Bottom Diameter (in.)	2.821	2.814
Average Length (in.)	3.34	3.33
Average Area (in.^{2})	6.31	6.27
Sample Volume (cm^3)	345.36	341.82
Unit Wet Wt. (gm./ cm^3)	1.66	1.87
Unit Wet Wt. (pcf)	103.9	116.5
Unit Dry Wt. (pcf)	85.1	86.0
Unit Dry Wt. (gm./ cm^3)	1.36	1.38
Void Ratio, e	0.98	0.96
Porosity, n	0.49	0.49
Pore Volume (cm^3)	170.9	167.4
Total Wgt. Of Sample After Test		628.32

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID No.	2009-666-09-08		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.7	Sample Length (cm), L	8.45
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.18
Cell (psi)	75.0	Sample Area (cm^2), A	40.46
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.959
Hydraulic Gradient	10.82	Outflow Burette Area (cm^2), a-out	0.983
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.5E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.5E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	11	19	0.0	0.0	0.0	115.6	0	22.5	NA
11/11/2009	11	21	0.0	1.0	1.0	113.5	0	22.5	1.4E-05
11/11/2009	11	22	0.1	1.5	1.5	112.5	0	22.5	1.4E-05
11/11/2009	11	24	0.1	2.5	2.5	110.4	0	22.5	1.5E-05
11/11/2009	11	26	0.1	3.5	3.5	108.4	0	22.5	1.5E-05
11/11/2009	11	28	0.2	4.5	4.5	106.3	0	22.5	1.5E-05
11/11/2009	11	30	0.2	5.4	5.4	104.5	1	22.5	1.4E-05

Tested By: TMS Date: 11/11/2009 Checked By: GM Date: 11-13-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	NA
Project No.	2009-666-09	Sample No.	SAMPLE 1
Lab ID	2009-666-09-08	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

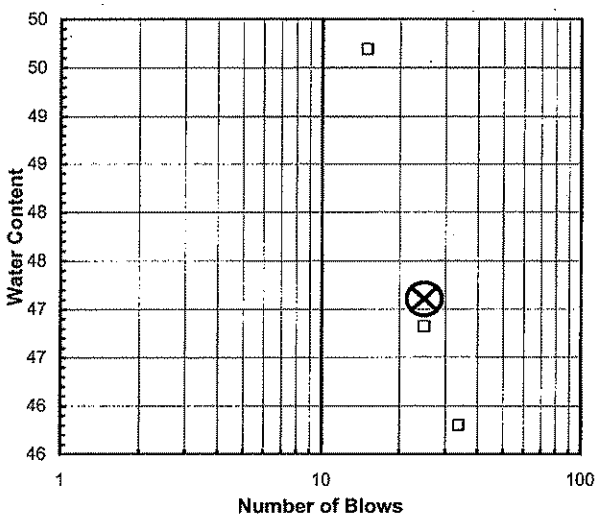
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	T	I	U	MULTIPOINT
Wt. of Tare & WS (gm)	29.47	28.15	28.01	
Wt. of Tare & DS (gm)	24.73	24.03	23.98	
Wt. of Tare (gm)	15.19	15.23	15.18	
Wt. of Water (gm)	4.7	4.1	4.0	
Wt. of DS (gm)	9.5	8.8	8.8	
Moisture Content (%)	**49.7**	**46.8**	**45.8**	
Number of Blows	**15**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	B	O	
Wt. of Tare & WS (gm)	21.57	22.06	
Wt. of Tare & DS (gm)	19.67	20.00	
Wt. of Tare (gm)	15.19	15.20	
Wt. of Water (gm)	1.9	2.1	
Wt. of DS (gm)	4.5	4.8	
Moisture Content (%)	**42.4**	**42.9**	**-0.5**

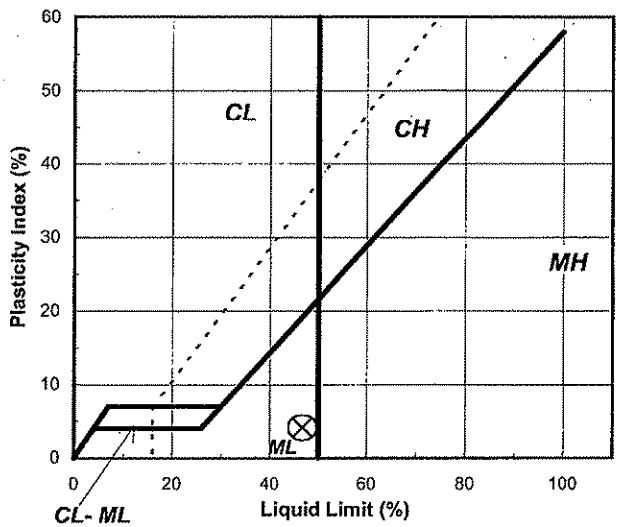
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**43**
Plasticity Index (%)	**4**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/13/2009 *Checked By* GEM *Date* 11-16-09

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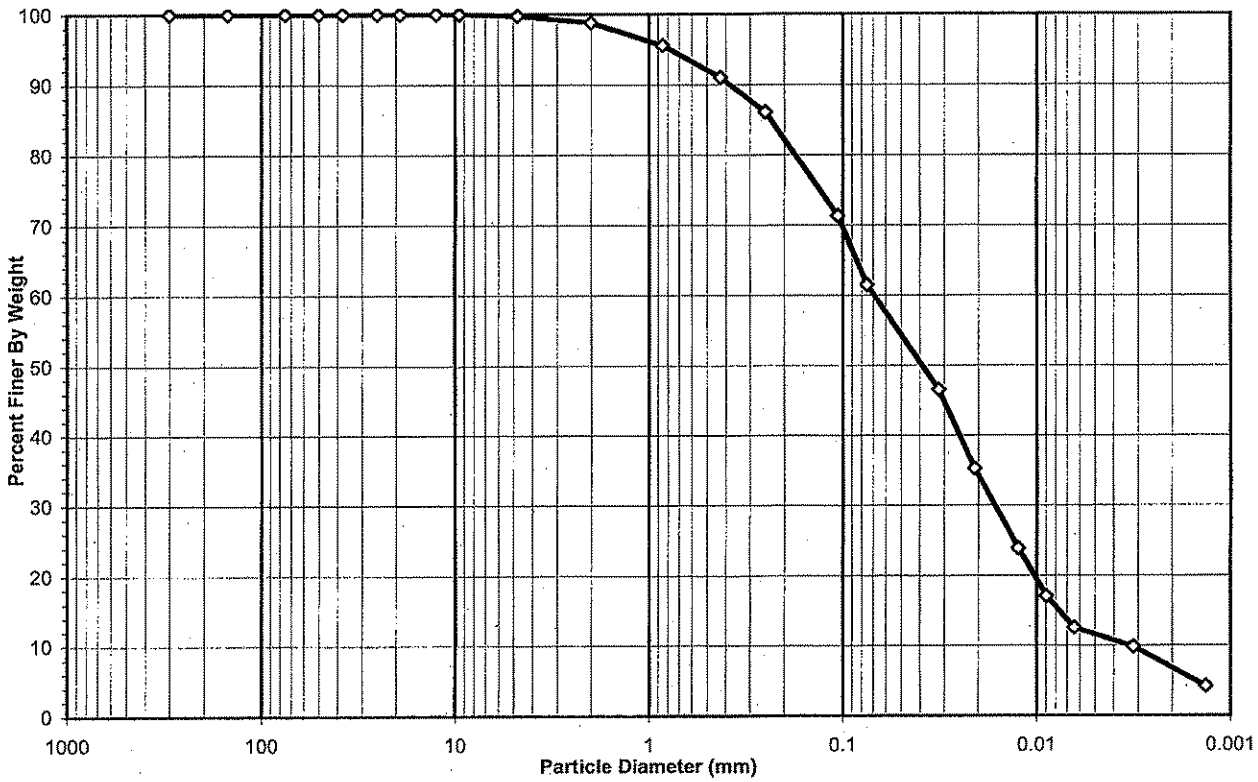
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID	2009-666-09-08	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.22
#4 To #200	*Sand*	38.28
Finer Than #200	*Silt & Clay*	61.50

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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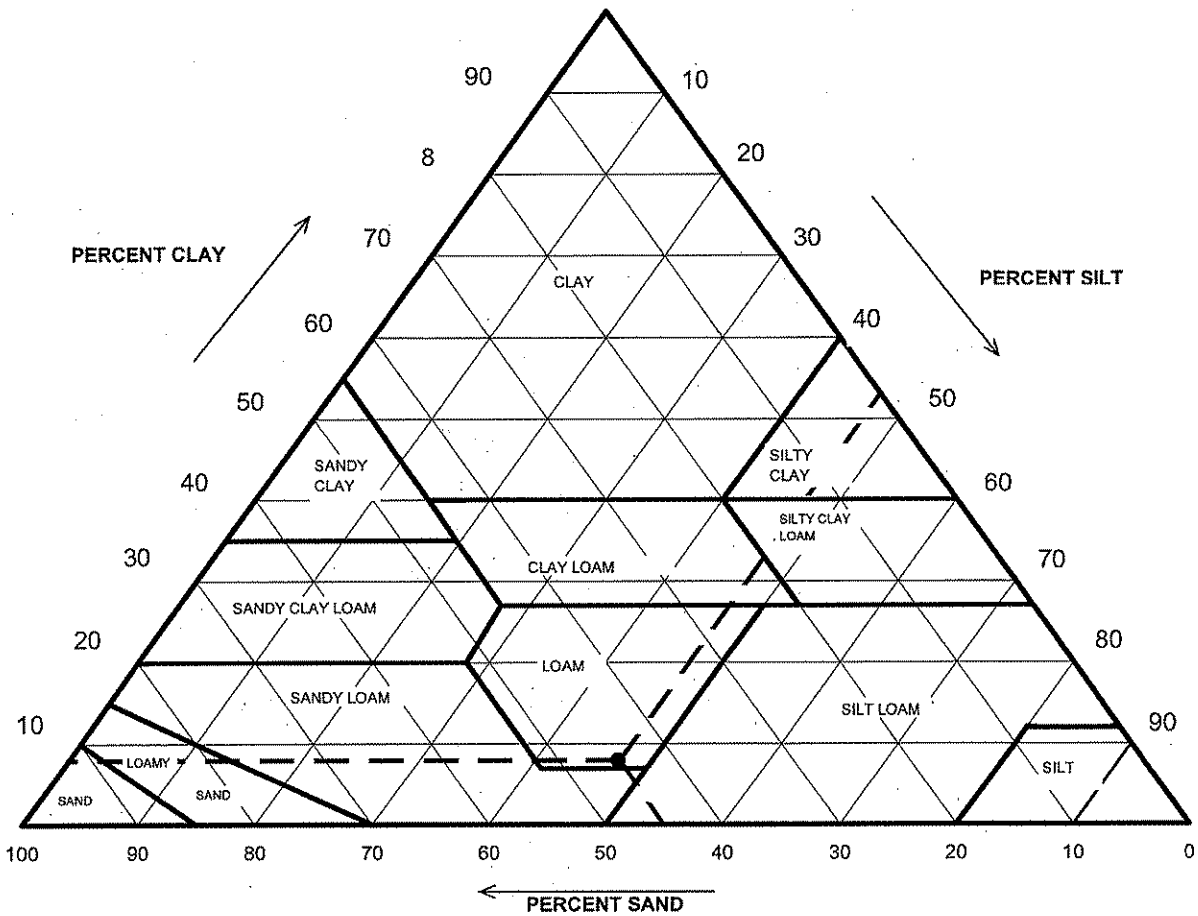
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID	2009-666-09-08	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.17	**0.00**
2	98.83	*Sand*	44.41	**44.94**
0.05	54.42	*Silt*	46.51	**47.06**
0.002	7.91	*Clay*	7.91	**8.01**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-08 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID	2009-666-09-08	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	212	Tare No.	M-1
Wgt.Tare + Wet Soil (gm)	458.95	Wgt.Tare + Wet Soil (gm)	57.53
Wgt.Tare + Dry Soil (gm)	407.10	Wgt.Tare + Dry Soil (gm)	51.81
Weight of Tare (gm)	171.54	Weight of Tare (gm)	15.88
Weight of Water (gm)	51.85	Weight of Water (gm)	5.72
Weight of Dry Soil (gm)	235.56	Weight of Dry Soil (gm)	35.93
Moisture Content (%)	**22.0**	**Moisture Content (%)**	**15.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	287.41	Weight of the Dry Sample (gm)	278.71
Dry Weight +#10 Material(gm)	235.6	Weight of minus #200 material (gm)	26.85
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	251.86
Dry Weight Hydro. Material (gm)	43.15		
Total Dry Weight Sample (gm)	278.71	**J-FACTOR (%FINER THAN #10)**	**0.9883**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.52	0.22	0.22	99.78	**99.78**
#10	2.00	2.24	0.95	1.17	98.83	**98.83**
#20	0.85	1.42	3.29	3.29	96.71	**95.58**
#40	0.425	1.99	4.61	7.90	92.10	**91.02**
#60	0.250	2.15	4.98	12.89	87.11	**86.09**
#140	0.106	6.45	14.95	27.83	72.17	**71.32**
#200	0.075	4.29	9.94	37.77	62.23	**61.50**
Pan	-	26.85	62.23	100.00	-	**-**

Notes :

Tested By DAW Date 11/16/2009 Checked By GEM Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A7
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-27
Lab ID	2009-666-09-08	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	26.0	26.0	22.8	5.46	20.5	47.1	0.01300	0.0319	**46.6**
5		21.0	22.8	5.46	15.5	35.7	0.01300	0.0208	**35.2**
15		16.0	22.8	5.46	10.5	24.2	0.01300	0.0124	**23.9**
30		13.0	22.8	5.46	7.5	17.3	0.01300	0.0089	**17.1**
60		11.0	22.8	5.46	5.5	12.7	0.01300	0.0064	**12.6**
250		10.0	22.5	5.66	4.3	10.0	0.01305	0.0032	**9.8**
1440		8.0	21.8	6.13	1.9	4.3	0.01316	0.0013	**4.2**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	43.15	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.83
Weight of Dry Material (gm)	43.15		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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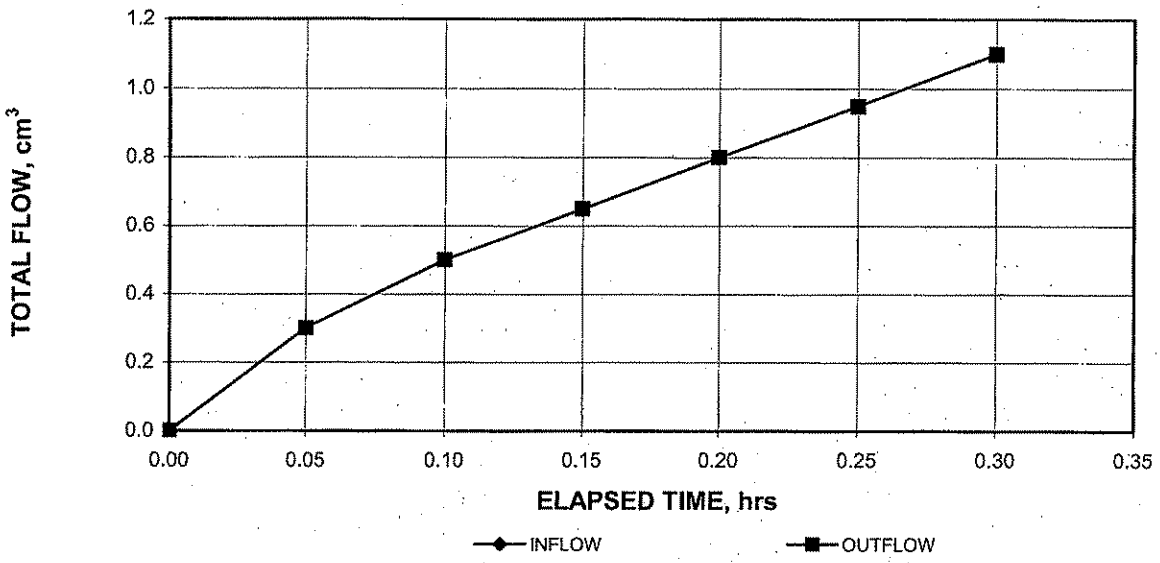
INTEGRITY IN TESTING

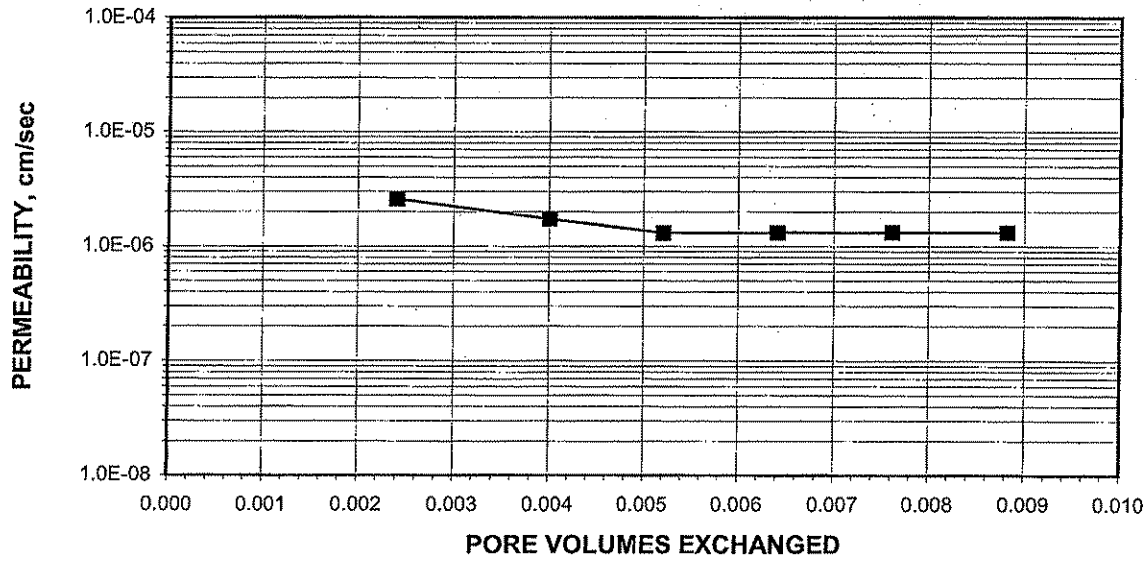
Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-04		

AVERAGE PERMEABILITY = 1.3E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.3E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 FILE: \\Server\data\DOCS\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-04		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	212	804
Wt. of Tare & WS (gm.)	525.59	319.73
Wt. of Tare & DS (gm.)	450.68	275.27
Wt. of Tare (gm.)	171.50	106.97
Wt. of Water (gm.)	74.91	44.46
Wt. of DS (gm.)	279.18	168.30
Moisture Content (%)	**26.8**	**26.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	538.29	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	538.29	536.53
Length 1 (in.)	2.714	2.701
Length 2 (in.)	2.691	2.701
Length 3 (in.)	2.704	2.680
Top Diameter (in.)	2.860	2.867
Middle Diameter (in.)	2.841	2.843
Bottom Diameter (in.)	2.831	2.844
Average Length (in.)	2.70	2.69
Average Area (in.^{2})	6.35	6.39
Sample Volume (cm^3)	281.38	281.89
Unit Wet Wt. (gm./ cm^3)	1.91	1.90
Unit Wet Wt. (pcf)	119.4	118.8
Unit Dry Wt. (pcf)	94.2	94.0
Unit Dry Wt. (gm./ cm^3)	1.51	1.51
Void Ratio, e	0.79	0.79
Porosity, n	0.44	0.44
Pore Volume (cm^3)	124.2	124.7
Total Wgt. Of Sample After Test		556.14

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID No.	2009-666-10-04		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.0	Sample Length (cm), L	6.84
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.24
Cell (psi)	75.0	Sample Area (cm^2), A	41.20
Total Pressure Head (cm)	70.3	Inflow Burette Area (cm^2), a-in	0.877
Hydraulic Gradient	10.27	Outflow Burette Area (cm^2), a-out	0.886
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.3E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.3E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	11	4.5	0.00	0.0	0.0	97.2	0	23.8	NA
11/20/2009	11	7.5	0.05	0.3	0.3	96.5	0	23.8	2.6E-06
11/20/2009	11	10.5	0.10	0.5	0.5	96.1	0	23.8	1.7E-06
11/20/2009	11	13.5	0.15	0.7	0.6	95.7	0	23.8	1.3E-06
11/20/2009	11	16.5	0.20	0.8	0.8	95.4	0	23.8	1.3E-06
11/20/2009	11	19.5	0.25	1.0	0.9	95.1	0	23.8	1.3E-06
11/20/2009	11	22.5	0.30	1.1	1.1	94.7	1	23.8	1.3E-06

Tested By: TMS Date: 11/20/2009 Checked By: GZM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-04 PERM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-04	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

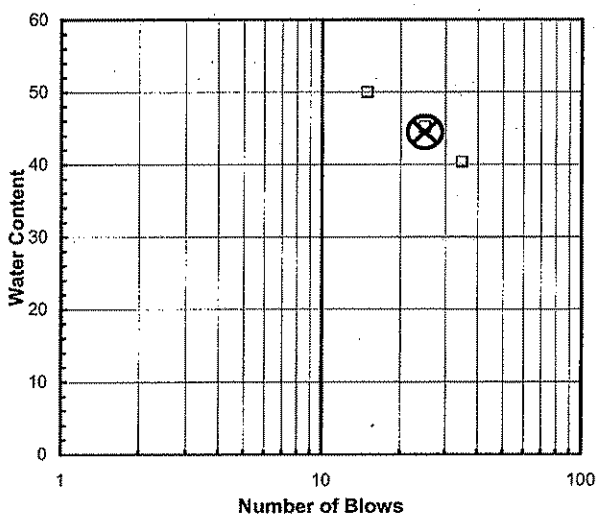
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	R	K	C	MULTIPOINT
Wt. of Tare & WS (gm)	30.87	30.36	29.27	
Wt. of Tare & DS (gm)	25.64	25.65	25.24	
Wt. of Tare (gm)	15.16	15.22	15.23	
Wt. of Water (gm)	5.2	4.7	4.0	
Wt. of DS (gm)	10.5	10.4	10.0	
Moisture Content (%)	**49.9**	**45.2**	**40.3**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	P	N	
Wt. of Tare & WS (gm)	22.23	22.34	
Wt. of Tare & DS (gm)	20.28	20.40	
Wt. of Tare (gm)	15.18	15.29	
Wt. of Water (gm)	2.0	1.9	
Wt. of DS (gm)	5.1	5.1	
Moisture Content (%)	**38.2**	**38.0**	**0.3**

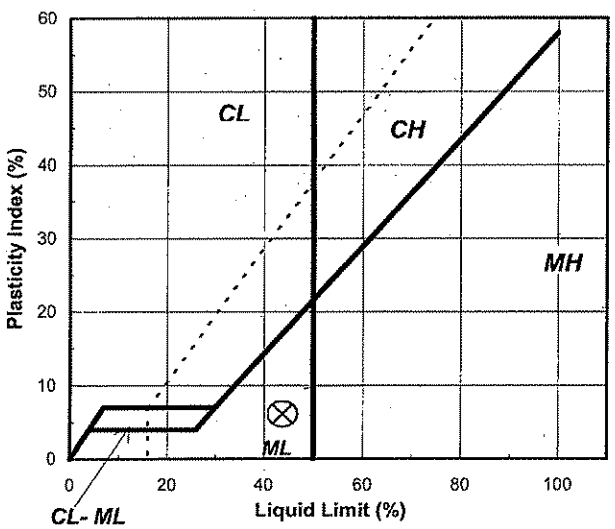
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**44**
Plastic Limit (%)	**38**
Plasticity Index (%)	**6**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/25/2009 *Checked By* GEM *Date* 11-30-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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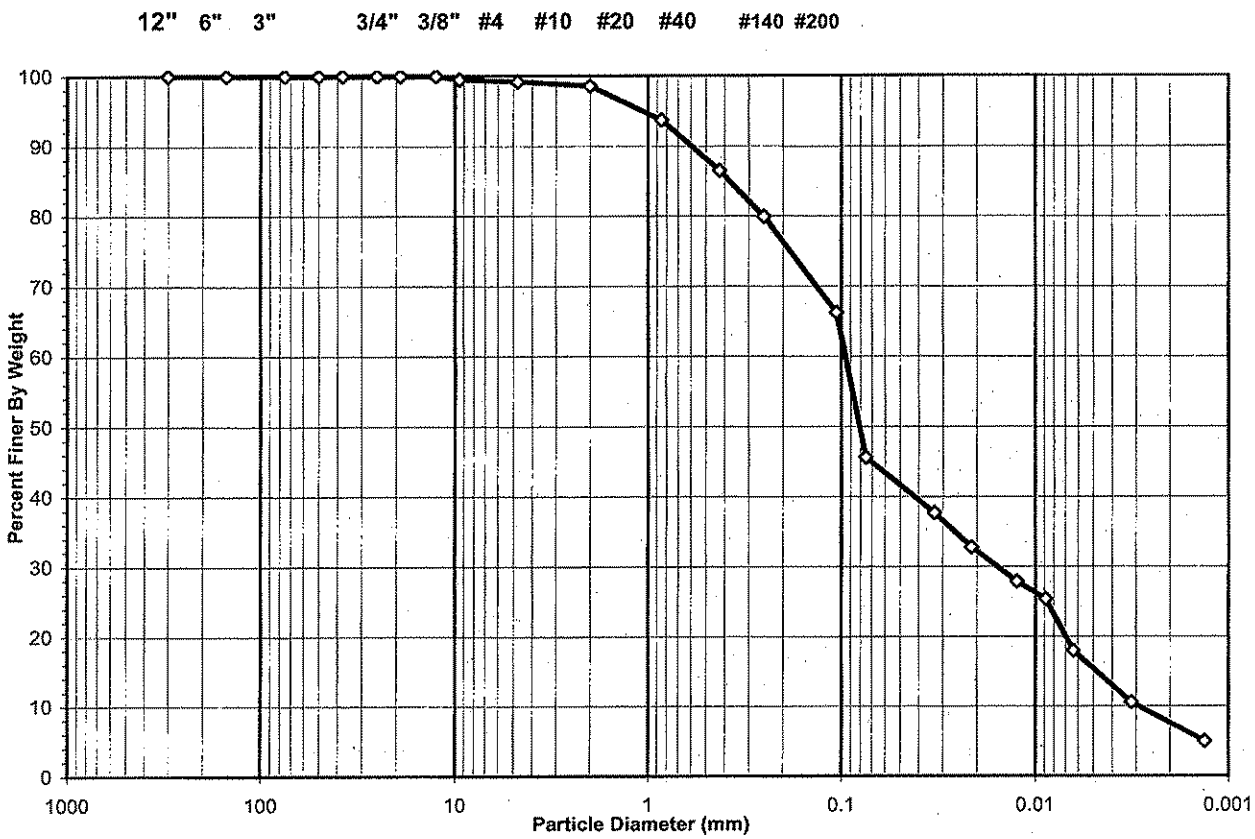
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-04	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.79
#4 To #200	*Sand*	53.63
Finer Than #200	*Silt & Clay*	45.58

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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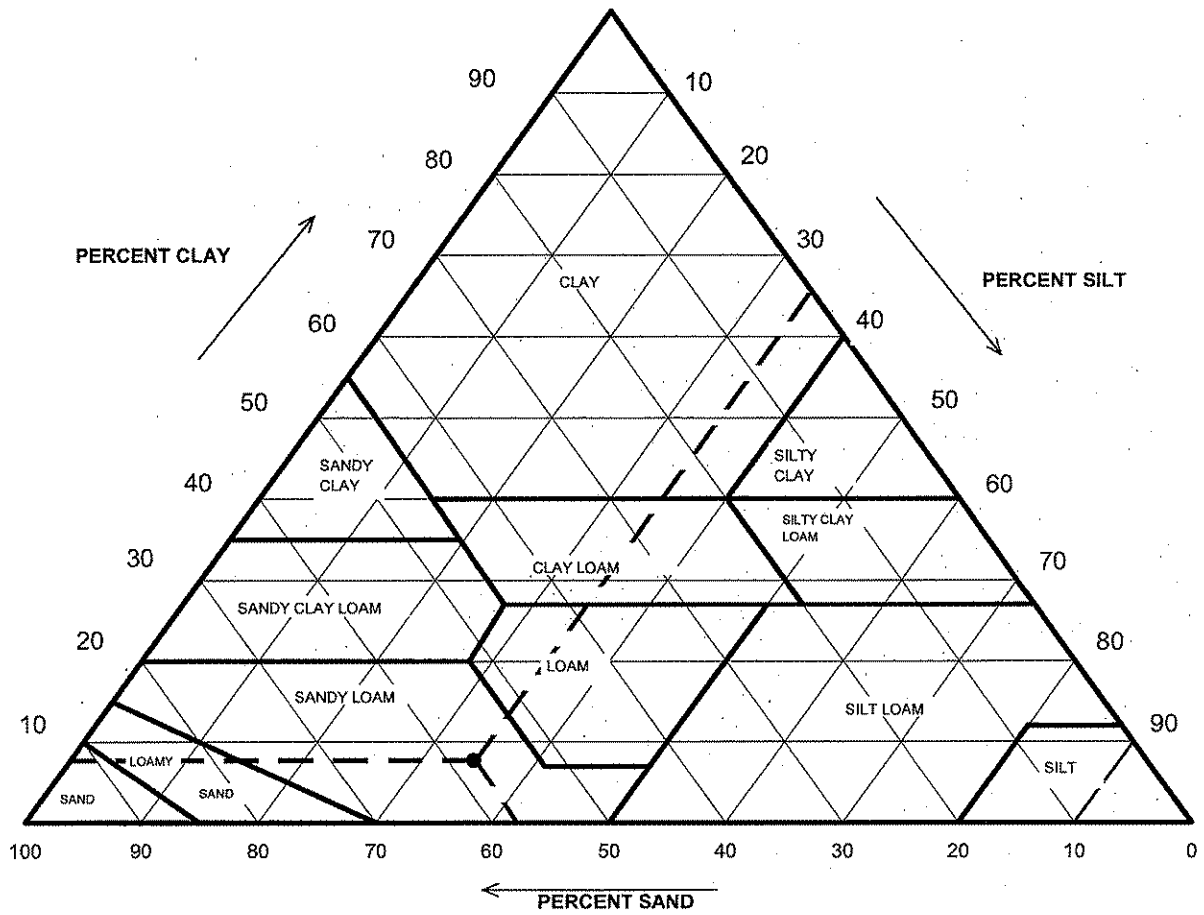
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-04	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.43	**0.00**
2	98.57	*Sand*	56.90	**57.73**
0.05	41.67	*Silt*	34.06	**34.55**
0.002	7.61	*Clay*	7.61	**7.72**

USDA Classification: ***SANDY LOAM***

 DCN: CT-93P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-04 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-04	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	212	Tare No.	C-2
Wgt.Tare + Wet Soil (gm)	525.59	Wgt.Tare + Wet Soil (gm)	57.77
Wgt.Tare + Dry Soil (gm)	450.68	Wgt.Tare + Dry Soil (gm)	48.92
Weight of Tare (gm)	171.50	Weight of Tare (gm)	15.67
Weight of Water (gm)	74.91	Weight of Water (gm)	8.85
Weight of Dry Soil (gm)	279.18	Weight of Dry Soil (gm)	33.25
Moisture Content (%)	**26.8**	**Moisture Content (%)**	**26.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	354.09	Weight of the Dry Sample (gm)	318.71
Dry Weight +#10 Material(gm)	279.2	Weight of minus #200 material (gm)	18.28
Wet Weight Hydro. Material.(gm)	50.05	Weight of plus #200 material (gm)	300.43
Dry Weight Hydro. Material (gm)	39.53		
Total Dry Weight Sample (gm)	318.71	**J-FACTOR (%FINER THAN #10)**	**0.9857**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.36	0.49	0.49	99.51	**99.51**
#4	4.75	0.84	0.30	0.79	99.21	**99.21**
#10	2.00	1.78	0.64	1.43	98.57	**98.57**
#20	0.85	1.94	4.91	4.91	95.09	**93.74**
#40	0.425	2.89	7.31	12.22	87.78	**86.53**
#60	0.250	2.65	6.70	18.92	81.08	**79.92**
#140	0.106	5.49	13.89	32.81	67.19	**66.23**
#200	0.075	8.28	20.95	53.76	46.24	**45.58**
Pan	-	18.28	46.24	100.00	-	-

Notes :

Tested By JRB Date 11.25.09 Checked By GEM Date 11-30-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST27A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A7
Project No.	2009-666-10	Sample No.	L2
Lab ID	2009-666-10-04	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	21.0	21.0	22.4	5.73	15.3	38.2	0.01307	0.0331	**37.7**
5		19.0	22.4	5.73	13.3	33.2	0.01307	0.0212	**32.8**
15		17.0	22.4	5.73	11.3	28.2	0.01307	0.0124	**27.8**
30		16.0	22.4	5.73	10.3	25.7	0.01307	0.0088	**25.4**
60		13.0	22.4	5.73	7.3	18.2	0.01307	0.0063	**17.9**
250		10.0	22.4	5.73	4.3	10.7	0.01307	0.0032	**10.5**
1440		7.0	23.5	4.99	2.0	5.0	0.01290	0.0013	**5.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	39.53	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.57
Weight of Dry Material (gm)	39.53		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By GJM Date 11-30-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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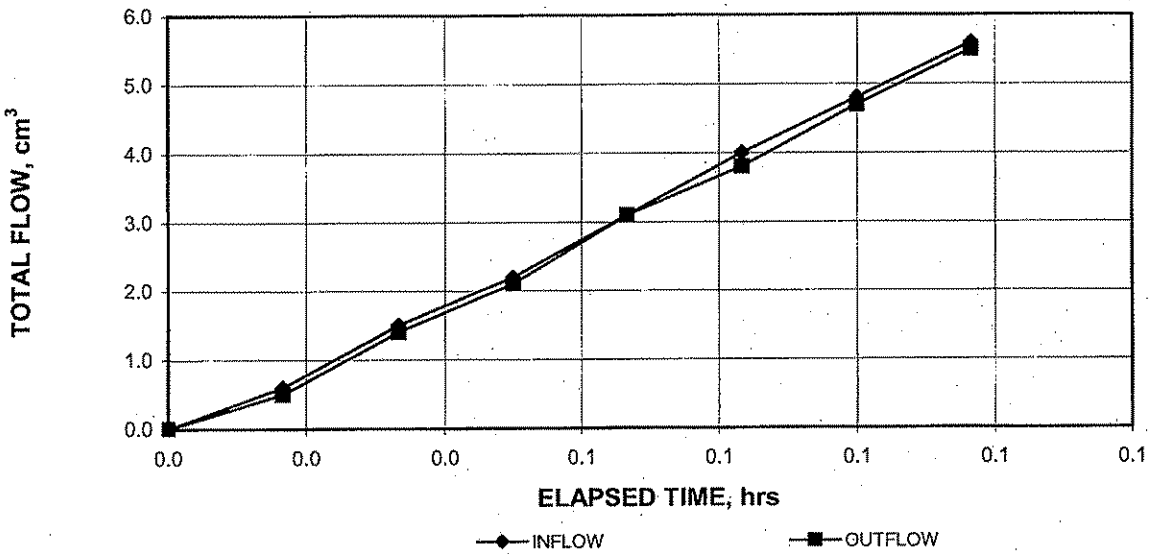
INTEGRITY IN TESTING

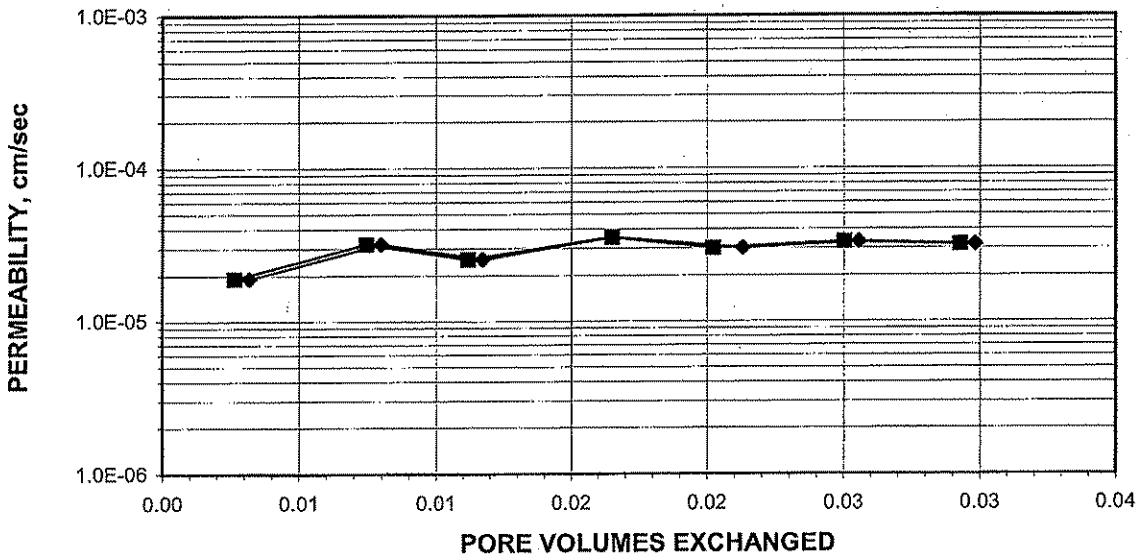
Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-04		

AVERAGE PERMEABILITY = 3.2E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.2E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

DCN: CT-22C DATE: 11/18/2009 FILE: \\Server\data\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-04		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	214	806
Wt. of Tare & WS (gm.)	456.81	230.11
Wt. of Tare & DS (gm.)	400.29	201.10
Wt. of Tare (gm.)	171.21	102.59
Wt. of Water (gm.)	56.52	29.01
Wt. of DS (gm.)	229.08	98.51
Moisture Content (%)	**24.7**	**29.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	537.02	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	537.02	557.59
Length 1 (in.)	3.070	3.404
Length 2 (in.)	3.064	3.401
Length 3 (in.)	3.077	3.364
Top Diameter (in.)	2.839	2.813
Middle Diameter (in.)	2.824	2.831
Bottom Diameter (in.)	2.820	2.820
Average Length (in.)	3.07	3.39
Average Area (in.^{2})	6.28	6.25
Sample Volume (cm^3)	315.96	347.26
Unit Wet Wt. (gm./ cm^3)	1.70	1.61
Unit Wet Wt. (pcf)	106.1	100.2
Unit Dry Wt. (pcf)	85.1	77.4
Unit Dry Wt. (gm./ cm^3)	1.36	1.24
Void Ratio, e	0.98	1.18
Porosity, n	0.50	0.54
Pore Volume (cm^3)	156.4	187.7
Total Wgt. Of Sample After Test		681.7

Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-04		

Pressure Heads (Constant)	
Top Cap (psi)	48.8
Bottom Cap (psi)	50.0
Cell (psi)	75.0
Total Pressure Head (cm)	84.4
Hydraulic Gradient	9.80

Final Sample Dimensions	
Sample Length (cm), L	8.61
Sample Diameter (cm)	7.17
Sample Area (cm^2), A	40.33
Inflow Burette Area (cm^2), a-in	0.977
Outflow Burette Area (cm^2), a-out	0.868
B Parameter (%)	98

AVERAGE PERMEABILITY = 3.2E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.2E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/25/2009	12	53	0.0	0.0	0.0	94.1	0	23.6	NA
11/25/2009	12	54	0.0	0.6	0.5	92.9	0	23.6	1.9E-05
11/25/2009	12	55	0.0	1.5	1.4	91.0	0	23.6	3.2E-05
11/25/2009	12	56	0.1	2.2	2.1	89.4	0	23.6	2.5E-05
11/25/2009	12	57	0.1	3.1	3.1	87.4	0	23.6	3.5E-05
11/25/2009	12	58	0.1	4.0	3.8	85.6	0	23.6	3.0E-05
11/25/2009	12	59	0.1	4.8	4.7	83.8	0	23.6	3.3E-05
11/25/2009	12	60	0.1	5.6	5.5	82.0	1	23.6	3.2E-05

Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-04	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

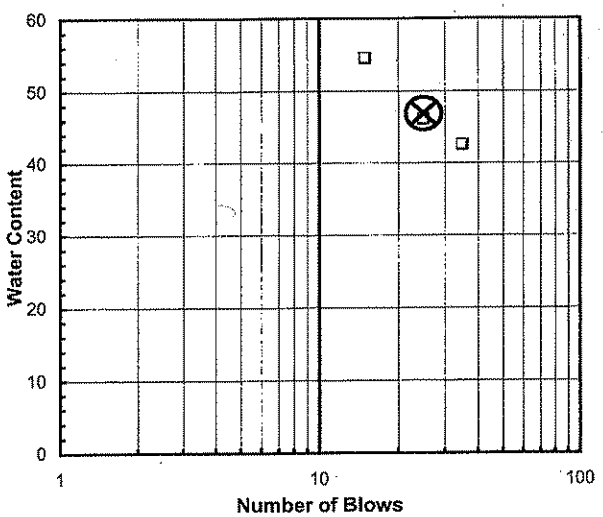
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	W	L	V	MULTIPOINT
Wt. of Tare & WS (gm)	31.51	28.60	28.56	
Wt. of Tare & DS (gm)	25.75	24.39	24.59	
Wt. of Tare (gm)	15.18	15.26	15.25	
Wt. of Water (gm)	5.8	4.2	4.0	
Wt. of DS (gm)	10.6	9.1	9.3	
Moisture Content (%)	**54.5**	**46.1**	**42.5**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	K-A	A-C	
Wt. of Tare & WS (gm)	21.92	22.66	
Wt. of Tare & DS (gm)	20.13	20.65	
Wt. of Tare (gm)	15.57	15.56	
Wt. of Water (gm)	1.8	2.0	
Wt. of DS (gm)	4.6	5.1	
Moisture Content (%)	**39.3**	**39.5**	**-0.2**

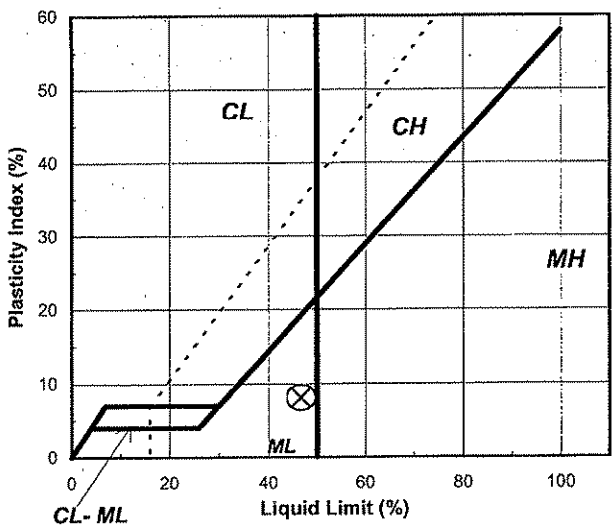
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**39**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By *JBD* *Date* *11/30/2009* *Checked By* GEM *Date* 12-1-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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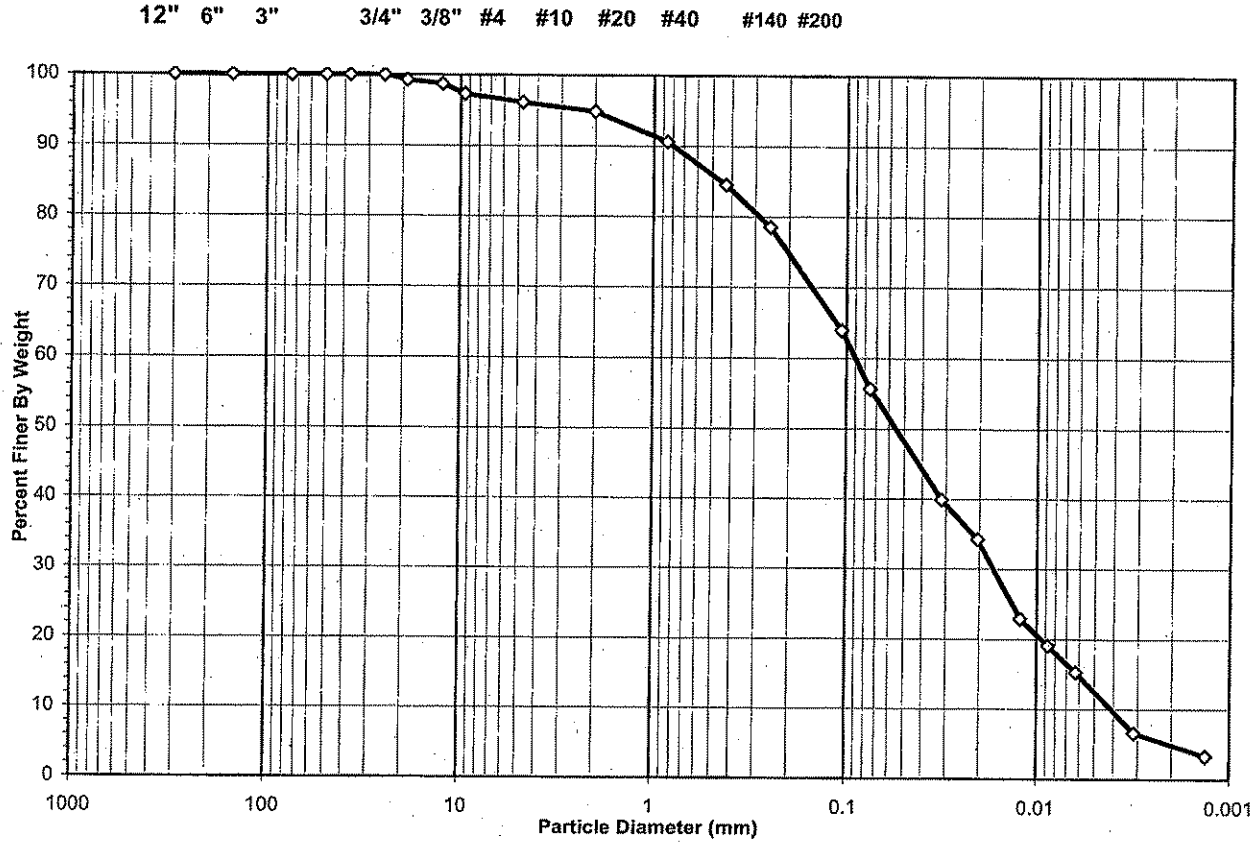
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-04	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	3.87
#4 To #200	*Sand*	40.50
Finer Than #200	*Silt & Clay*	55.63

USCS Symbol ***ml, ASSUMED***

USCS Classification ***SANDY SILT***

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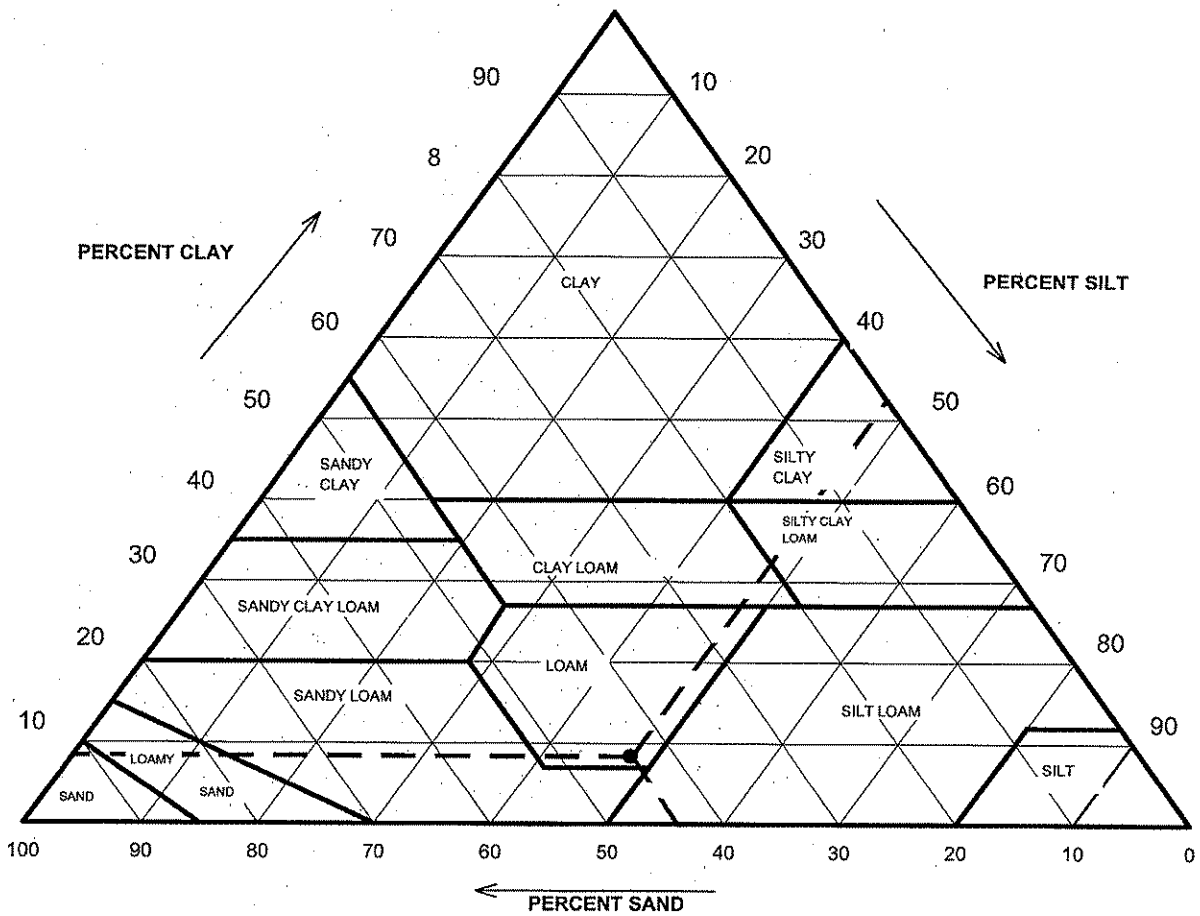
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-04	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	5.12	**0.00**
2	94.88	*Sand*	41.61	**43.86**
0.05	53.27	*Silt*	45.28	**47.72**
0.002	7.99	*Clay*	7.99	**8.42**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-04 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-04	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	214	Tare No.	A-T
Wgt.Tare + Wet Soil (gm)	456.81	Wgt.Tare + Wet Soil (gm)	36.89
Wgt.Tare + Dry Soil (gm)	400.29	Wgt.Tare + Dry Soil (gm)	36.73
Weight of Tare (gm)	171.26	Weight of Tare (gm)	15.58
Weight of Water (gm)	56.52	Weight of Water (gm)	0.16
Weight of Dry Soil (gm)	229.03	Weight of Dry Soil (gm)	21.15
Moisture Content (%)	**24.7**	**Moisture Content (%)**	**0.8**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	285.55	Weight of the Dry Sample (gm)	278.65
Dry Weight +#10 Material(gm)	229.0	Weight of minus #200 material (gm)	29.09
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	249.56
Dry Weight Hydro. Material (gm)	49.62		
Total Dry Weight Sample (gm)	278.65	**J-FACTOR (%FINER THAN #10)**	**0.9488**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	1.95	0.70	0.70	99.30	**99.30**
1/2"	12.5	2.95	1.29	1.29	98.71	**98.71**
3/8"	9.50	3.18	1.39	2.68	97.32	**97.32**
#4	4.75	2.74	1.20	3.87	96.13	**96.13**
#10	2.00	2.86	1.25	5.12	94.88	**94.88**
#20	0.85	2.24	4.51	4.51	95.49	**90.60**
#40	0.425	3.18	6.41	10.92	89.08	**84.52**
#60	0.250	3.14	6.33	17.25	82.75	**78.51**
#140	0.106	7.62	15.36	32.60	67.40	**63.94**
#200	0.075	4.35	8.77	41.37	58.63	**55.63**
Pan	-	29.09	58.63	100.00	-	-

Notes :

Tested By DAW Date 11/25/09 Checked By MAS Date 12-3-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-04	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	26.0	26.0	23.6	4.92	21.1	42.1	0.01288	0.0316	**39.9**
5		23.0	23.6	4.92	18.1	36.1	0.01288	0.0204	**34.2**
15		17.0	23.6	4.92	12.1	24.1	0.01288	0.0122	**22.9**
30		15.0	23.6	4.92	10.1	20.1	0.01288	0.0087	**19.1**
60		13.0	23.6	4.92	8.1	16.1	0.01288	0.0063	**15.3**
250		8.0	24.2	4.52	3.5	6.9	0.01279	0.0031	**6.6**
1440		7.0	23.1	5.26	1.7	3.5	0.01296	0.0013	**3.3**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.62	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	94.88
Weight of Dry Material (gm)	49.62		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12/1/09 Checked By AHB Date 12-3-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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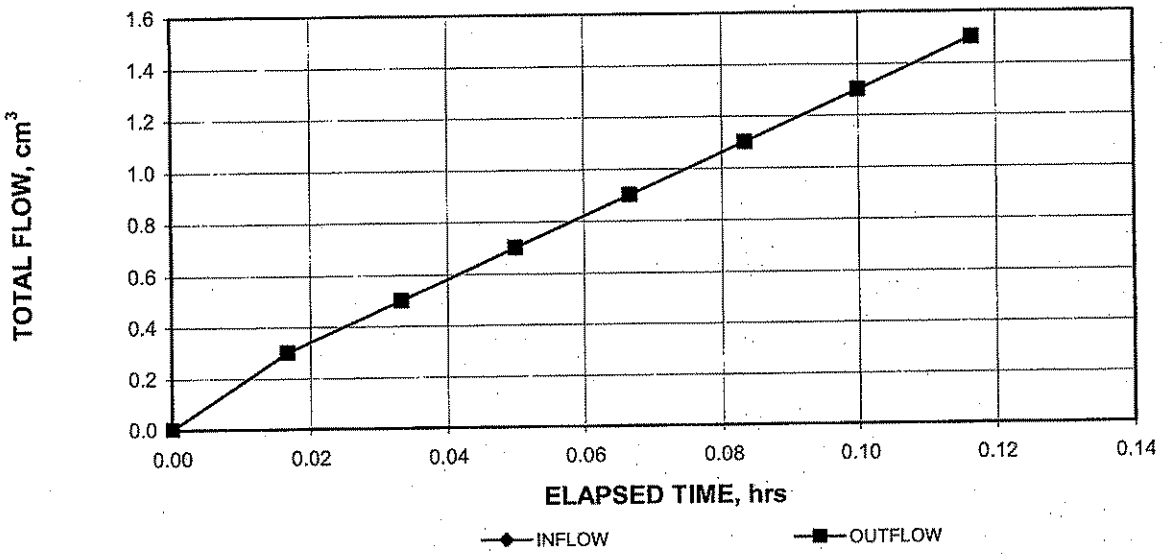
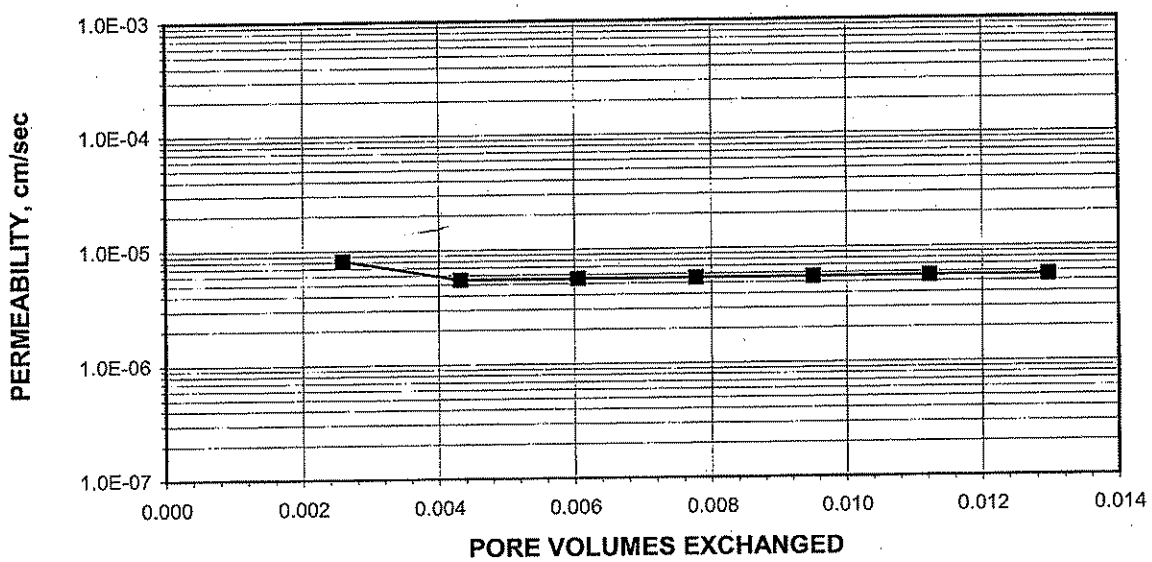
Client	JOYCE ENGINEERING, INC.	Boring No.	ST35A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-14	Sample No.	L3
Lab ID No.	2009-666-14-01		

AVERAGE PERMEABILITY = 5.6E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.6E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/1/2009 Checked By: GJM Date: 12-2-09

DCN: CT-22C DATE: 12/2/2009 FILE: \\Server\Data\GEOTECH\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-14-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-14	Sample No.	L3
Lab ID No.	2009-666-14-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	213	804
Wt. of Tare & WS (gm.)	498.92	245.28
Wt. of Tare & DS (gm.)	444.84	211.42
Wt. of Tare (gm.)	173.23	106.64
Wt. of Water (gm.)	54.08	33.86
Wt. of DS (gm.)	271.61	104.78
Moisture Content (%)	**19.9**	**32.3**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	432.20	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	432.20	476.91
Length 1 (in.)	2.432	2.469
Length 2 (in.)	2.408	2.425
Length 3 (in.)	2.449	2.442
Top Diameter (in.)	2.850	2.818
Middle Diameter (in.)	2.826	2.809
Bottom Diameter (in.)	2.828	2.814
Average Length (in.)	2.43	2.45
Average Area (in.^{2})	6.31	6.22
Sample Volume (cm^3)	251.27	249.16
Unit Wet Wt. (gm./ cm^3)	1.72	1.91
Unit Wet Wt. (pcf)	107.4	119.5
Unit Dry Wt. (pcf)	89.5	90.3
Unit Dry Wt. (gm./ cm^3)	1.43	1.45
Void Ratio, e	0.88	0.87
Porosity, n	0.47	0.46
Pore Volume (cm^3)	117.8	115.7
Total Wgt. Of Sample After Test		458.73

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-2-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A7
Project No.	2009-666-14	Sample No.	L3
Lab ID No.	2009-666-14-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.1	Sample Length (cm), L	6.21
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.15
Cell (psi)	75.0	Sample Area (cm^2), A	40.11
Total Pressure Head (cm)	63.3	Inflow Burette Area (cm^2), a-in	0.959
Hydraulic Gradient	10.19	Outflow Burette Area (cm^2), a-out	0.983
		B Parameter (%)	95

AVERAGE PERMEABILITY = 5.6E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.6E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/1/2009	9	46	0.00	0.0	0.0	88.1	0	23.2	NA
12/1/2009	9	47	0.02	0.3	0.3	87.4	0	23.2	8.2E-06
12/1/2009	9	48	0.03	0.5	0.5	87.0	0	23.2	5.5E-06
12/1/2009	9	49	0.05	0.7	0.7	86.6	0	23.2	5.5E-06
12/1/2009	9	50	0.07	0.9	0.9	86.2	0	23.2	5.5E-06
12/1/2009	9	51	0.08	1.1	1.1	85.8	0	23.2	5.6E-06
12/1/2009	9	52	0.10	1.3	1.3	85.4	0	23.2	5.6E-06
12/1/2009	9	53	0.12	1.5	1.5	85.0	1	23.2	5.6E-06

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-2-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7A
Project No.	2009-666-14	Sample No.	L3
Lab ID	2009-666-14-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

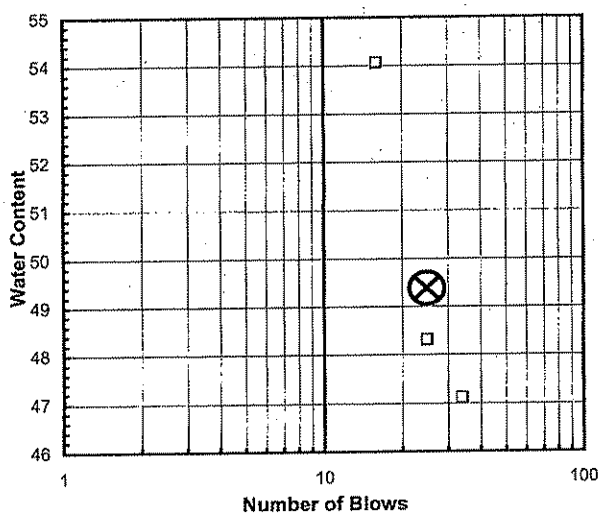
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	S	G	S-1	MULTIPOINT
Wt. of Tare & WS (gm)	28.88	29.08	29.28	
Wt. of Tare & DS (gm)	24.08	24.52	24.90	
Wt. of Tare (gm)	15.20	15.08	15.60	
Wt. of Water (gm)	4.8	4.6	4.4	
Wt. of DS (gm)	8.9	9.4	9.3	
Moisture Content (%)	**54.1**	**48.3**	**47.1**	
Number of Blows	**16**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	T	A-M	
Wt. of Tare & WS (gm)	21.59	21.72	
Wt. of Tare & DS (gm)	19.73	19.86	
Wt. of Tare (gm)	15.18	15.35	
Wt. of Water (gm)	1.9	1.9	
Wt. of DS (gm)	4.6	4.5	
Moisture Content (%)	**40.9**	**41.2**	**-0.4**

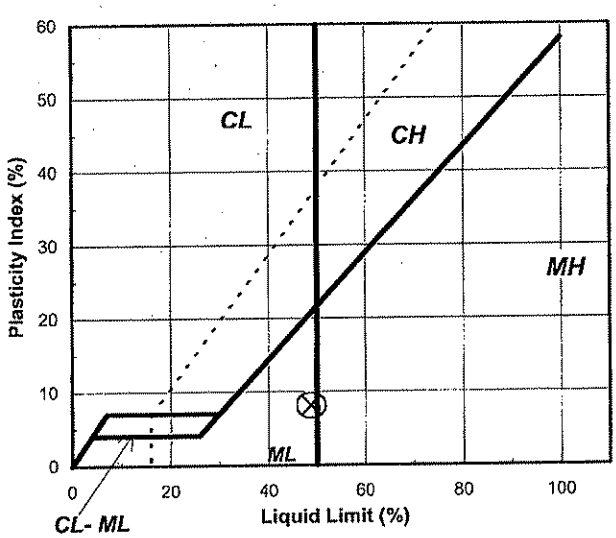
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**49**
Plastic Limit (%)	**41**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/2/2009 *Checked By* GEM *Date* 12-2-09

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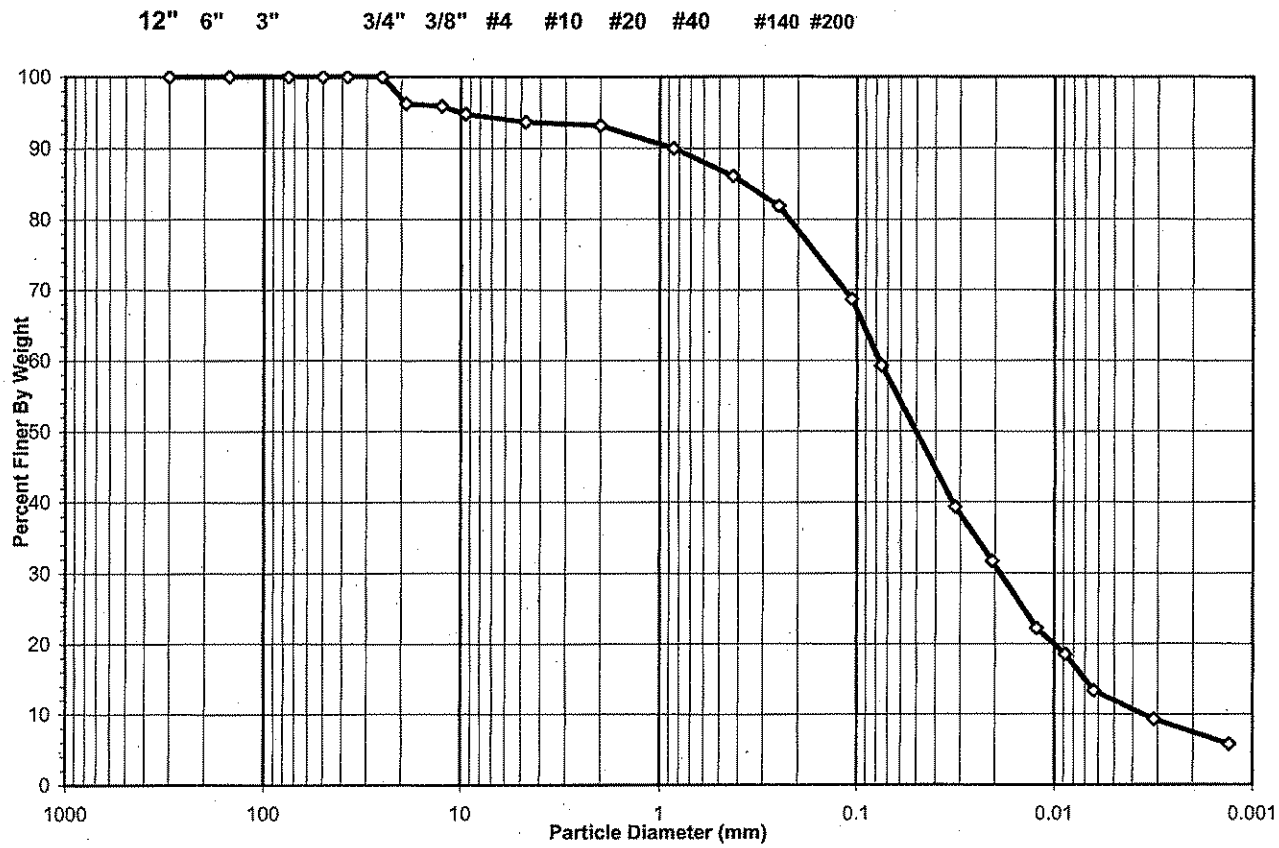
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7A
Project No.	2009-666-14	Sample No.	L3
Lab ID	2009-666-14-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS				HYDROMETER	
USCS	cobbles	gravel	sand		silt and clay fraction	
USDA	cobbles	gravel	sand		silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	6.30
#4 To #200	*Sand*	34.36
Finer Than #200	*Silt & Clay*	59.33

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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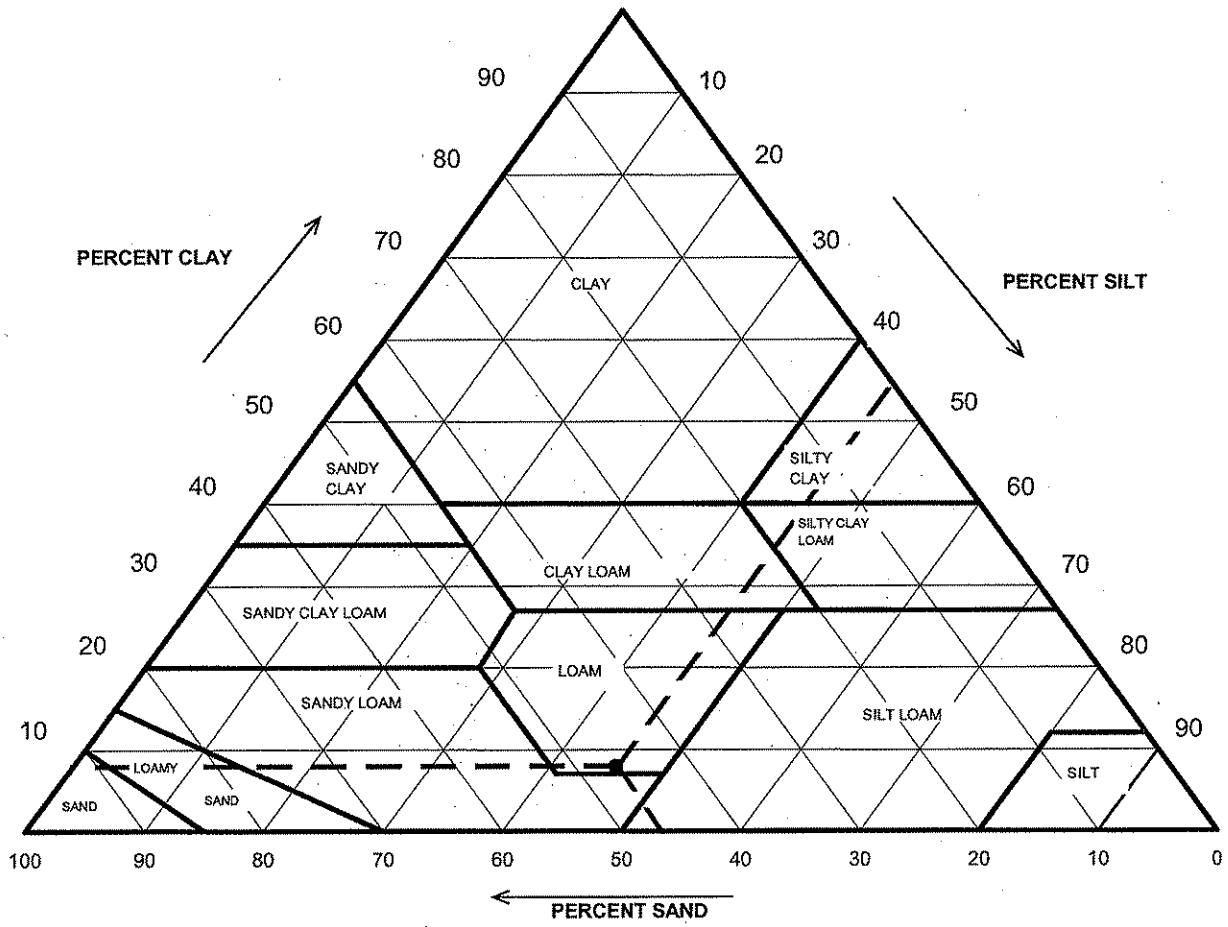
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7A
Project No.	2009-666-14	Sample No.	L3
Lab ID	2009-666-14-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	6.79	**0.00**
2	93.21	*Sand*	43.35	**46.51**
0.05	49.86	*Silt*	42.42	**45.51**
0.002	7.44	*Clay*	7.44	**7.98**

USDA Classification: ***LOAM***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7A
Project No.	2009-666-14	Sample No.	L3
Lab ID	2009-666-14-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	213	Tare No.	V-1
Wgt.Tare + Wet Soil (gm)	498.92	Wgt.Tare + Wet Soil (gm)	45.58
Wgt.Tare + Dry Soil (gm)	444.84	Wgt.Tare + Dry Soil (gm)	44.66
Weight of Tare (gm)	173.23	Weight of Tare (gm)	15.58
Weight of Water (gm)	54.08	Weight of Water (gm)	0.92
Weight of Dry Soil (gm)	271.61	Weight of Dry Soil (gm)	29.08
Moisture Content (%)	**19.9**	**Moisture Content (%)**	**3.2**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	325.69	Weight of the Dry Sample (gm)	320.14
Dry Weight +#10 Material(gm)	271.6	Weight of minus #200 material (gm)	30.89
Wet Weight Hydro. Material.(gm)	50.07	Weight of plus #200 material (gm)	289.25
Dry Weight Hydro. Material (gm)	48.53		
Total Dry Weight Sample (gm)	320.14	**J-FACTOR (%FINER THAN #10)**	**0.9321**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	11.91	3.72	3.72	96.28	**96.28**
1/2"	12.5	11.11	4.09	4.09	95.91	**95.91**
3/8"	9.50	2.93	1.08	5.17	94.83	**94.83**
#4	4.75	3.08	1.13	6.30	93.70	**93.70**
#10	2.00	1.32	0.49	6.79	93.21	**93.21**
#20	0.85	1.68	3.46	3.46	96.54	**89.98**
#40	0.425	2.03	4.18	7.64	92.36	**86.09**
#60	0.250	2.19	4.51	12.16	87.84	**81.88**
#140	0.106	6.86	14.13	26.29	73.71	**68.71**
#200	0.075	4.88	10.05	36.35	63.65	**59.33**
Pan	-	30.89	63.65	100.00	-	-

Notes :

Tested By JBD Date 12/3/2009 Checked By GEM Date 12-8-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST35
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A7A
Project No.	2009-666-14	Sample No.	L3
Lab ID	2009-666-14-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	26.0	26.0	23.0	5.33	20.7	42.2	0.01297	0.0318	**39.3**
5		22.0	23.0	5.33	16.7	34.0	0.01297	0.0207	**31.7**
15		17.0	23.0	5.33	11.7	23.8	0.01297	0.0123	**22.2**
30		15.0	23.1	5.26	9.7	19.9	0.01296	0.0088	**18.5**
60		12.0	23.5	4.99	7.0	14.3	0.01290	0.0063	**13.3**
250		10.0	23.3	5.12	4.9	9.9	0.01293	0.0031	**9.3**
1440		8.0	23.5	4.99	3.0	6.1	0.01290	0.0013	**5.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	48.53	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	93.21
Weight of Dry Material (gm)	48.53		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12/2/2009 Checked By GZM Date 12-8-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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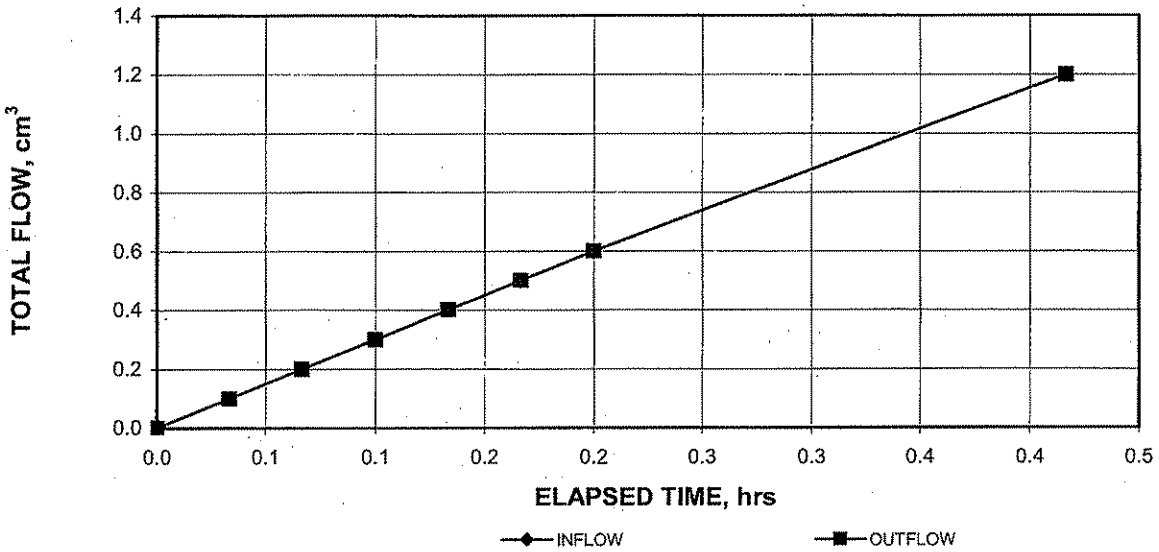
INTEGRITY IN TESTING

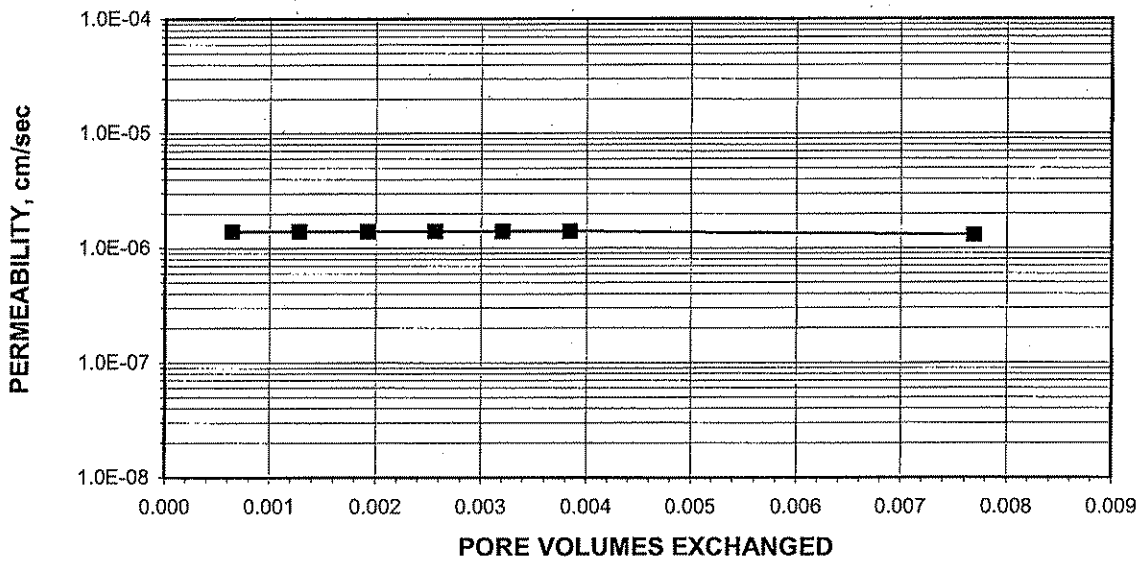
Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID No.	2009-666-09-07		

AVERAGE PERMEABILITY = 1.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID No.	2009-666-09-07		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	214	811
Wt. of Tare & WS (gm.)	535.34	216.32
Wt. of Tare & DS (gm.)	457.38	192.58
Wt. of Tare (gm.)	171.30	106.63
Wt. of Water (gm.)	77.96	23.74
Wt. of DS (gm.)	286.08	85.95
Moisture Content (%)	**27.3**	**27.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	675.40	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	675.40	677.36
Length 1 (in.)	3.498	3.373
Length 2 (in.)	3.462	3.397
Length 3 (in.)	3.495	3.461
Top Diameter (in.)	2.838	2.868
Middle Diameter (in.)	2.819	2.830
Bottom Diameter (in.)	2.821	2.805
Average Length (in.)	3.49	3.41
Average Area (in.^{2})	6.27	6.31
Sample Volume (cm^3)	358.21	352.61
Unit Wet Wt. (gm./ cm^3)	1.89	1.92
Unit Wet Wt. (pcf)	117.7	119.9
Unit Dry Wt. (pcf)	92.5	94.0
Unit Dry Wt. (gm./ cm^3)	1.48	1.51
Void Ratio, e	0.82	0.79
Porosity, n	0.45	0.44
Pore Volume (cm^3)	161.6	156.0
Total Wgt. Of Sample After Test		679.44

Tested By: TMS Date: 11/11/2009 Checked By: GZM Date: 11-13-09

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PERMEABILITY TEST

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID No.	2009-666-09-07		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.7	Sample Length (cm), L	8.66
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	75.0	Sample Area (cm^2), A	40.71
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	0.878
Hydraulic Gradient	10.55	Outflow Burette Area (cm^2), a-out	0.871
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.4E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.4E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	12	36	0.0	0.0	0.0	117.7	0	22.5	NA
11/11/2009	12	38	0.0	0.1	0.1	117.5	0	22.5	1.4E-06
11/11/2009	12	40	0.1	0.2	0.2	117.3	0	22.5	1.4E-06
11/11/2009	12	42	0.1	0.3	0.3	117.1	0	22.5	1.4E-06
11/11/2009	12	44	0.1	0.4	0.4	116.8	0	22.5	1.4E-06
11/11/2009	12	46	0.2	0.5	0.5	116.6	0	22.5	1.4E-06
11/11/2009	12	48	0.2	0.6	0.6	116.4	0	22.5	1.4E-06
11/11/2009	13	1	0.4	1.2	1.2	115.1	1	22.5	1.3E-06

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID	2009-666-09-07	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

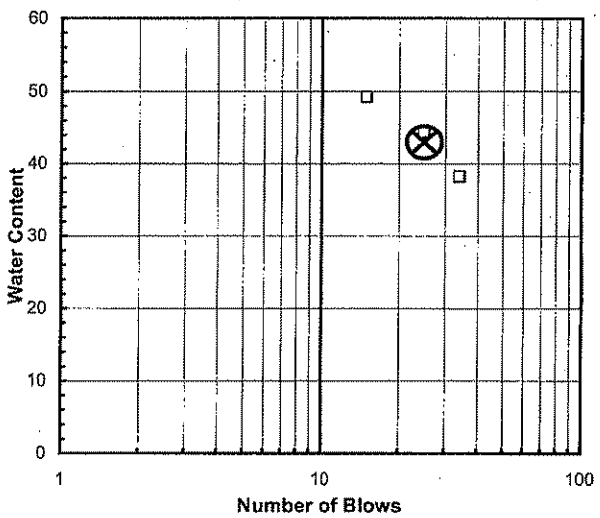
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-T	B-B	A-O	MULTIPOINT
Wt. of Tare & WS (gm)	28.64	30.06	27.39	
Wt. of Tare & DS (gm)	24.34	25.61	24.08	
Wt. of Tare (gm)	15.60	15.55	15.40	
Wt. of Water (gm)	4.3	4.5	3.3	
Wt. of DS (gm)	8.7	10.1	8.7	
Moisture Content (%)	**49.2**	**44.2**	**38.1**	
Number of Blows	**15**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-L	A-H	
Wt. of Tare & WS (gm)	23.67	22.38	
Wt. of Tare & DS (gm)	21.57	20.64	
Wt. of Tare (gm)	15.49	15.53	
Wt. of Water (gm)	2.1	1.7	
Wt. of DS (gm)	6.1	5.1	
Moisture Content (%)	**34.5**	**34.1**	**0.5**

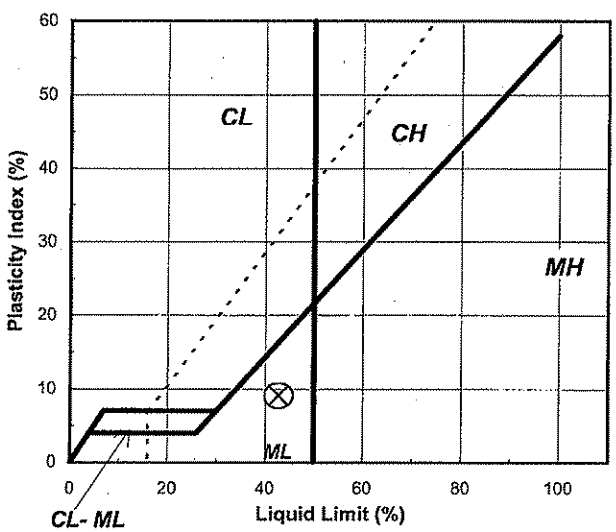
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**43**
Plastic Limit (%)	**34**
Plasticity Index (%)	**9**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/13/2009 *Checked By* GEM *Date* 11-16-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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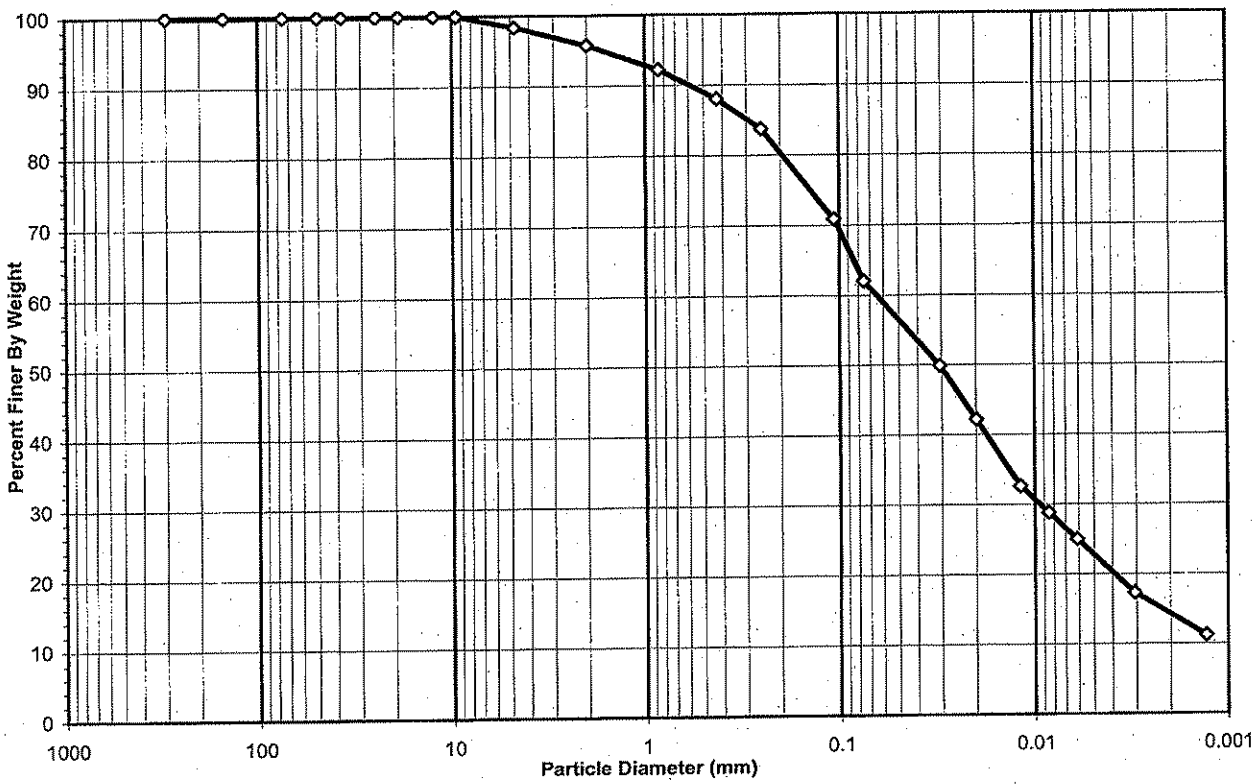
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID	2009-666-09-07	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	1.65
#4 To #200	*Sand*	36.33
Finer Than #200	*Silt & Clay*	62.02

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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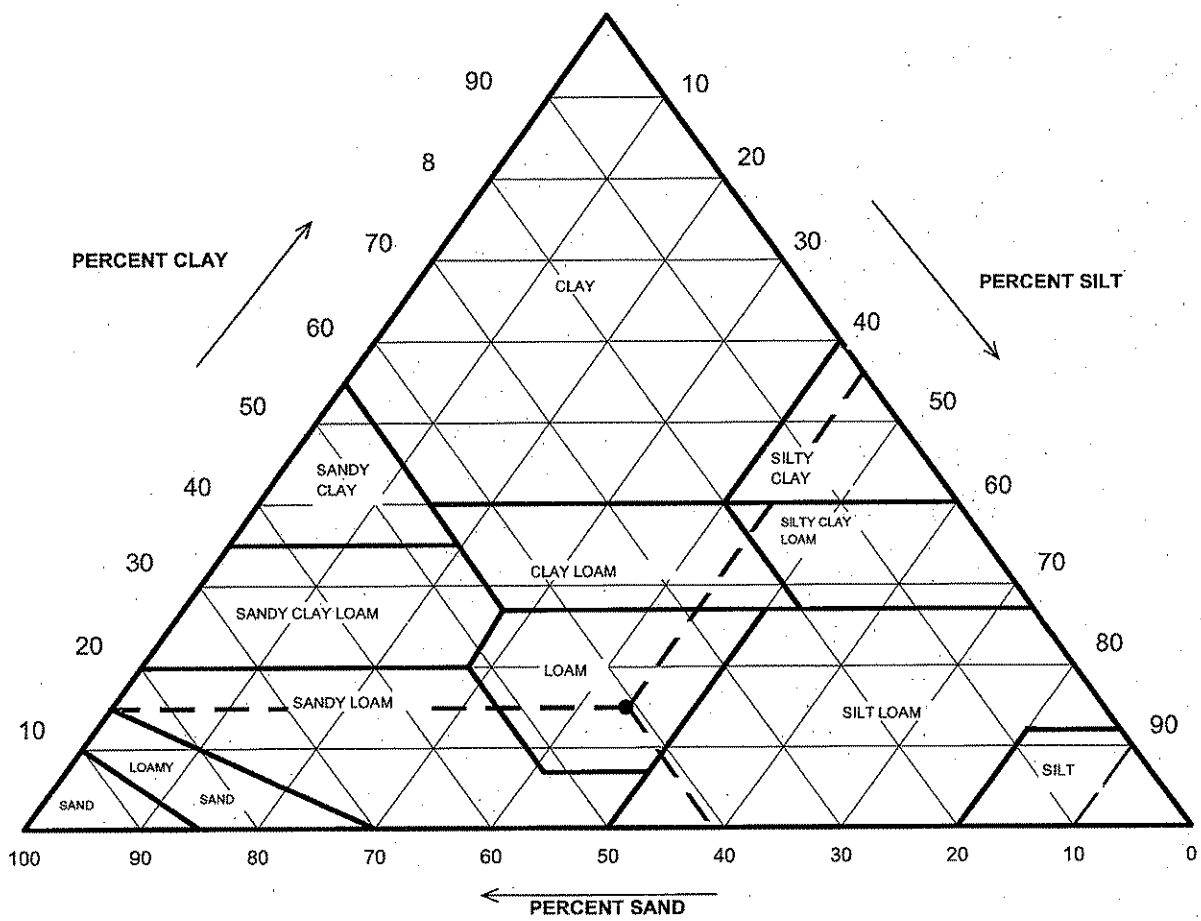
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID	2009-666-09-07	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	4.25	**0.00**
2	95.75	*Sand*	39.23	**40.97**
0.05	56.52	*Silt*	42.22	**44.10**
0.002	14.30	*Clay*	14.30	**14.93**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-07 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID	2009-666-09-07	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	214	Tare No.	B-1
Wgt.Tare + Wet Soil (gm)	535.34	Wgt.Tare + Wet Soil (gm)	53.97
Wgt.Tare + Dry Soil (gm)	457.38	Wgt.Tare + Dry Soil (gm)	53.53
Weight of Tare (gm)	171.30	Weight of Tare (gm)	15.86
Weight of Water (gm)	77.96	Weight of Water (gm)	0.44
Weight of Dry Soil (gm)	286.08	Weight of Dry Soil (gm)	37.67
Moisture Content (%)	**27.3**	**Moisture Content (%)**	**1.2**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	364.04	Weight of the Dry Sample (gm)	335.56
Dry Weight +#10 Material(gm)	286.1	Weight of minus #200 material (gm)	32.05
Wet Weight Hydro. Material.(gm)	50.06	Weight of plus #200 material (gm)	303.51
Dry Weight Hydro. Material (gm)	49.48		
Total Dry Weight Sample (gm)	335.56	**J-FACTOR (%FINER THAN #10)**	**0.9575**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	4.71	1.65	1.65	98.35	**98.35**
#10	2.00	7.46	2.61	4.25	95.75	**95.75**
#20	0.85	1.83	3.70	3.70	96.30	**92.20**
#40	0.425	2.17	4.39	8.08	91.92	**88.01**
#60	0.250	2.22	4.49	12.57	87.43	**83.71**
#140	0.106	6.64	13.42	25.99	74.01	**70.86**
#200	0.075	4.57	9.24	35.22	64.78	**62.02**
Pan	-	32.05	64.78	100.00	-	-

Notes :

Tested By SD Date 11/19/2009 Checked By GEM Date 11-18-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L1
Project No.	2009-666-09	Sample No.	ST-26
Lab ID	2009-666-09-07	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	31.0	31.0	23.5	4.99	26.0	52.0	0.01290	0.0305	**49.8**
5		27.0	23.5	4.99	22.0	44.0	0.01290	0.0199	**42.2**
15		22.0	23.5	4.99	17.0	34.0	0.01290	0.0119	**32.6**
30		20.0	23.5	4.99	15.0	30.0	0.01290	0.0085	**28.8**
60		18.0	23.5	4.99	13.0	26.0	0.01290	0.0061	**24.9**
250		14.0	23.5	4.99	9.0	18.0	0.01290	0.0031	**17.3**
1440		11.0	23.3	5.12	5.9	11.8	0.01293	0.0013	**11.3**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.48	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	95.75
Weight of Dry Material (gm)	49.48		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/17/2009 Checked By GZM Date 11-18-09

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PERMEABILITY TEST

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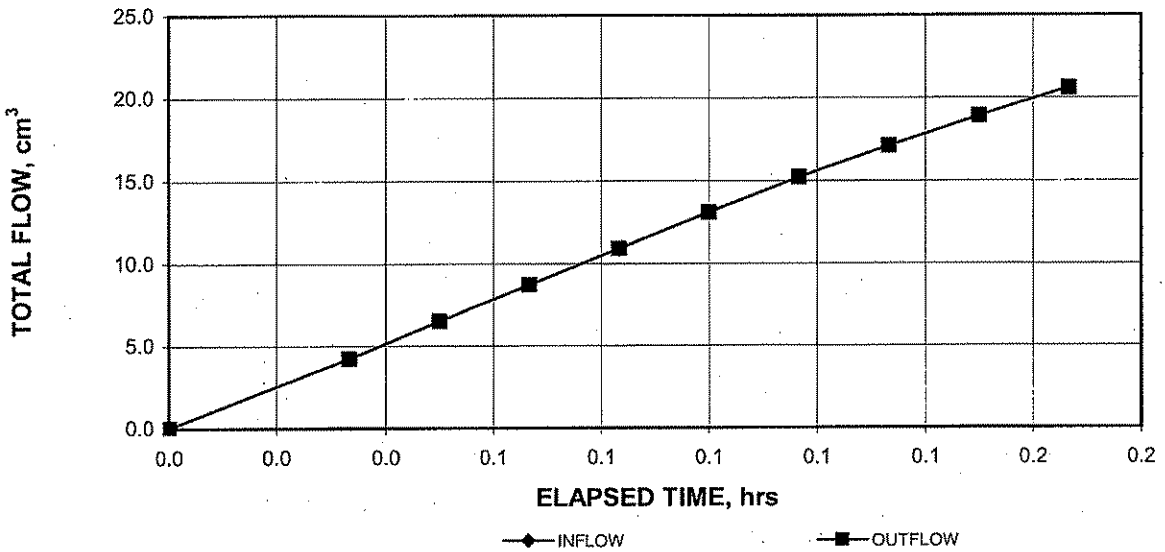
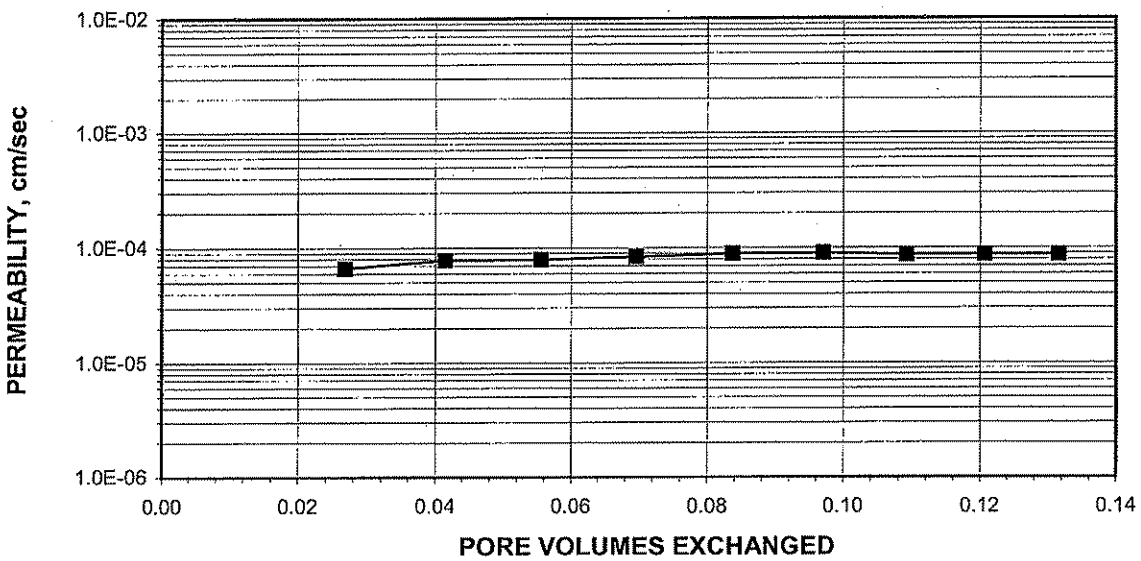
Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID No.	2009-666-09-09		

AVERAGE PERMEABILITY = 8.8E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 8.8E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

DCN: CT-22 DATE: 01/03/06 REVISION: 2 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-09 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID No.	2009-666-09-09		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	208	812
Wt. of Tare & WS (gm.)	433.53	351.25
Wt. of Tare & DS (gm.)	387.38	291.01
Wt. of Tare (gm.)	169.72	107.29
Wt. of Water (gm.)	46.15	60.24
Wt. of DS (gm.)	217.66	183.72
Moisture Content (%)	**21.2**	**32.8**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	558.50	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	558.50	611.89
Length 1 (in.)	3.317	3.226
Length 2 (in.)	3.280	3.262
Length 3 (in.)	3.241	3.258
Top Diameter (in.)	2.837	2.822
Middle Diameter (in.)	2.817	2.800
Bottom Diameter (in.)	2.828	2.770
Average Length (in.)	3.28	3.25
Average Area (in.^{2})	6.28	6.15
Sample Volume (cm^3)	337.39	327.18
Unit Wet Wt. (gm./ cm^3)	1.66	1.87
Unit Wet Wt. (pcf)	103.3	116.7
Unit Dry Wt. (pcf)	85.3	87.9
Unit Dry Wt. (gm./ cm^3)	1.37	1.41
Void Ratio, e	0.98	0.92
Porosity, n	0.49	0.48
Pore Volume (cm^3)	166.7	156.5
Total Wgt. Of Sample After Test		611.74

Tested By: TMS Date: 11/11/2009 Checked By: GEM Date: 11-13-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID No.	2009-666-09-09		

Pressure Heads (Constant)	
Top Cap (psi)	48.8
Bottom Cap (psi)	50.0
Cell (psi)	75.0
Total Pressure Head (cm)	84.4
Hydraulic Gradient	10.22

Final Sample Dimensions	
Sample Length (cm), L	8.25
Sample Diameter (cm)	7.11
Sample Area (cm^2), A	39.65
Inflow Burette Area (cm^2), a-in	0.897
Outflow Burette Area (cm^2), a-out	0.878
B Parameter (%)	95

AVERAGE PERMEABILITY = 8.8E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 8.8E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/11/2009	11	19.5	0.0	0.0	0.0	107.2	0	22.5	NA
11/11/2009	11	21.5	0.0	4.2	4.2	97.8	0	22.5	6.7E-05
11/11/2009	11	22.5	0.1	6.5	6.5	92.7	0	22.5	7.8E-05
11/11/2009	11	23.5	0.1	8.7	8.7	87.8	0	22.5	7.9E-05
11/11/2009	11	24.5	0.1	10.9	10.9	82.8	0	22.5	8.4E-05
11/11/2009	11	25.5	0.1	13.1	13.1	77.9	0	22.5	8.9E-05
11/11/2009	11	26.5	0.1	15.2	15.2	73.2	0	22.5	9.0E-05
11/11/2009	11	27.5	0.1	17.1	17.1	69.0	0	22.5	8.7E-05
11/11/2009	11	28.5	0.2	18.9	18.9	64.9	0	22.5	8.7E-05
11/11/2009	11	29.5	0.2	20.6	20.6	61.1	1	22.5	8.8E-05

Tested By: TMS Date: 11/11/2009 Checked By: GZM Date: 11-13-09

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	D8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID	2009-666-09-09	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

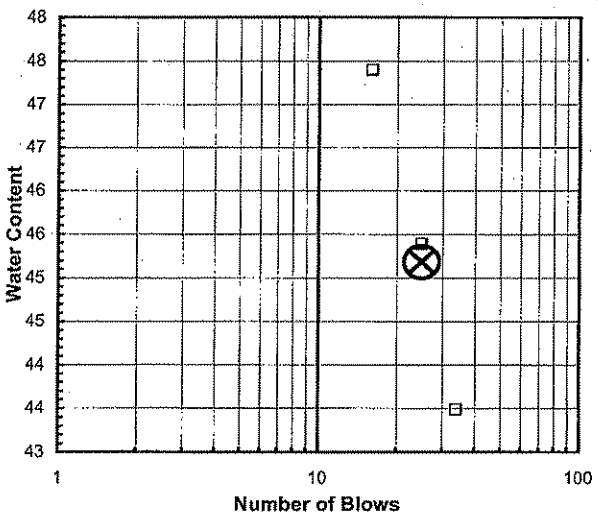
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	Q	M	K	MULTIPOINT
Wt. of Tare & WS (gm)	27.88	26.80	27.99	
Wt. of Tare & DS (gm)	23.79	23.16	24.12	
Wt. of Tare (gm)	15.16	15.14	15.22	
Wt. of Water (gm)	4.1	3.6	3.9	
Wt. of DS (gm)	8.6	8.0	8.9	
Moisture Content (%)	**47.4**	**45.4**	**43.5**	
Number of Blows	**16**	**25**	**34**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	P	F	
Wt. of Tare & WS (gm)	21.96	21.82	
Wt. of Tare & DS (gm)	20.02	19.88	
Wt. of Tare (gm)	15.17	15.09	
Wt. of Water (gm)	1.9	1.9	
Wt. of DS (gm)	4.9	4.8	
Moisture Content (%)	**40.0**	**40.5**	**-0.5**

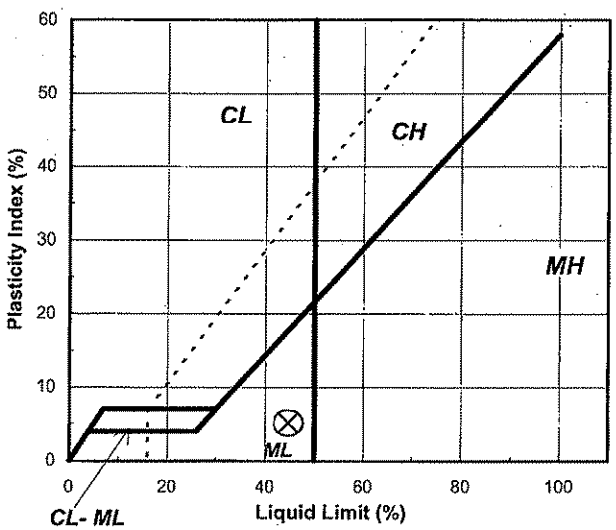
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**40**
Plasticity Index (%)	**5**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 11/13/2009 *Checked By* GEM *Date* 11-16-09

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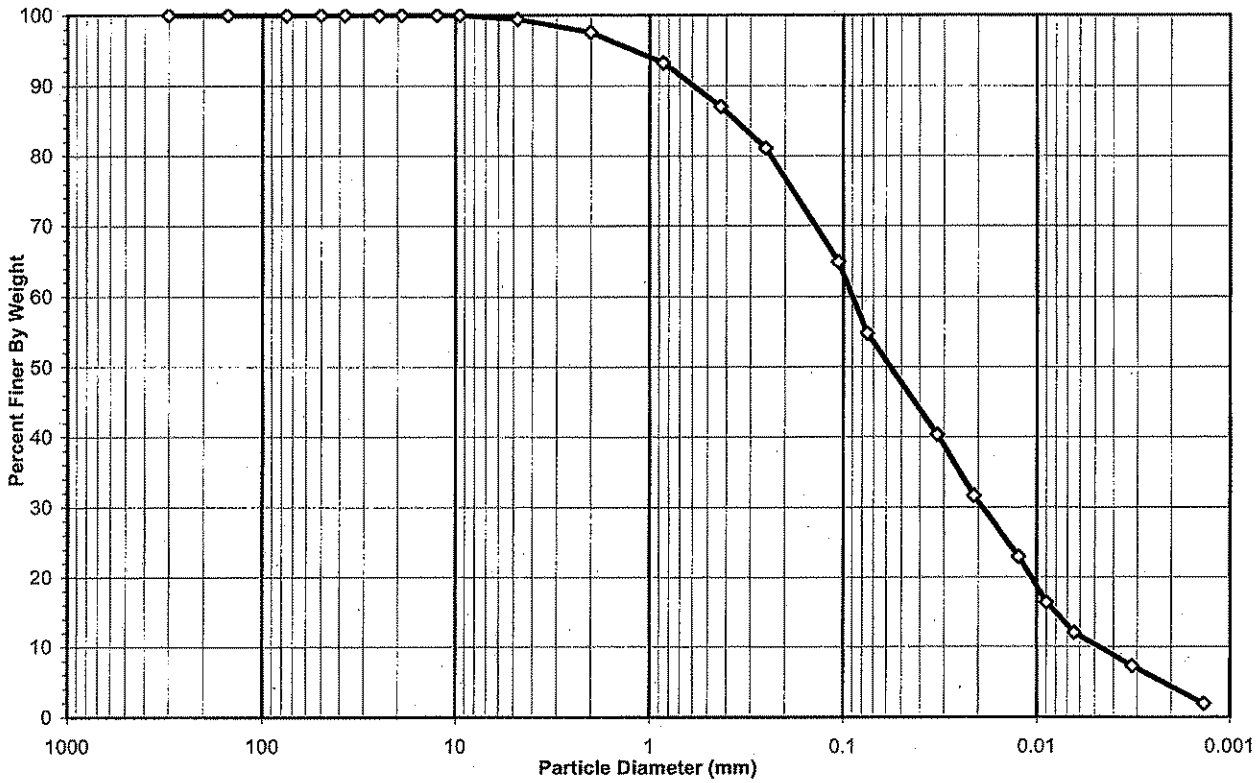
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID	2009-666-09-09	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.56
#4 To #200	*Sand*	44.67
Finer Than #200	*Silt & Clay*	54.77

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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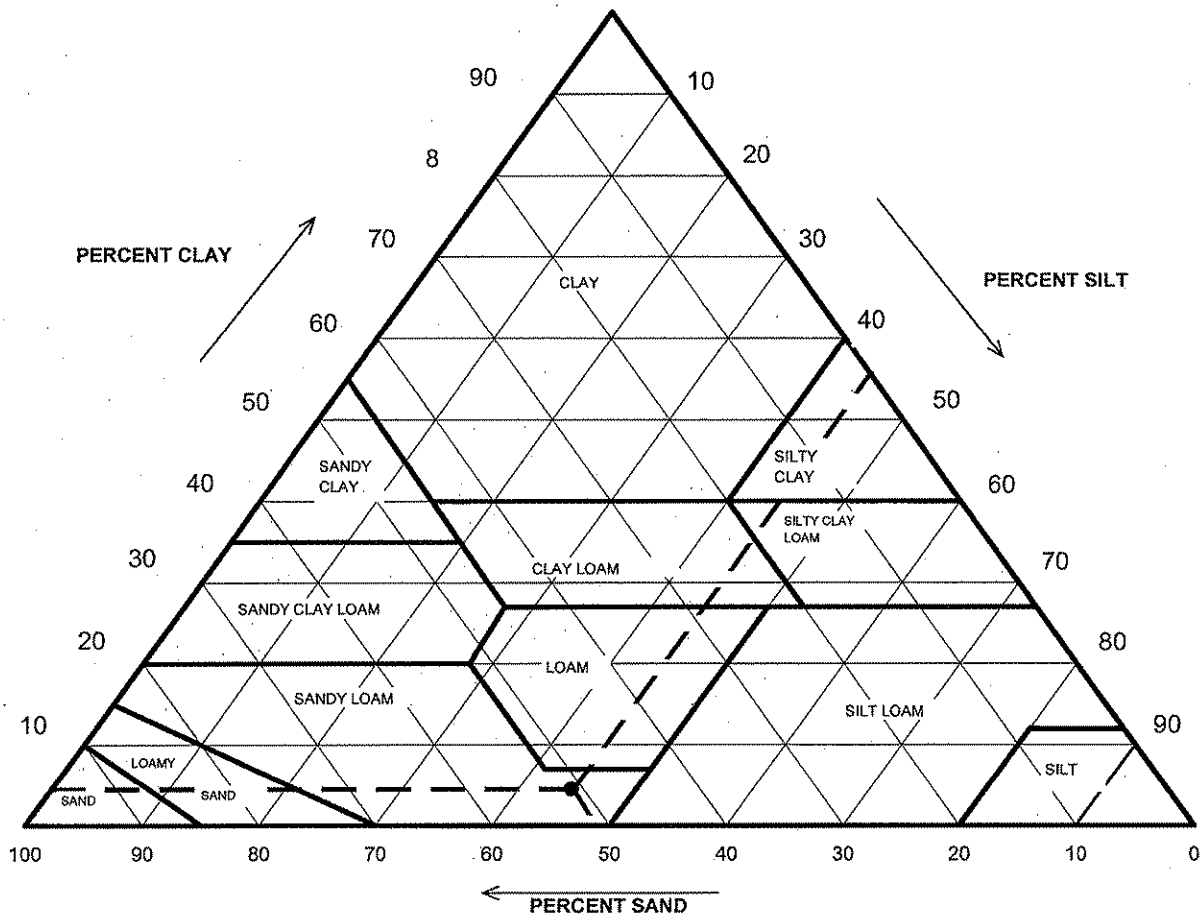
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID	2009-666-09-09	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	2.40	**0.00**
2	97.60	*Sand*	49.79	**51.01**
0.05	47.82	*Silt*	43.46	**44.53**
0.002	4.35	*Clay*	4.35	**4.46**

USDA Classification: ***SANDY LOAM***

 DCN: CT-53P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-09-09 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID	2009-666-09-09	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	208	Tare No.	C-2
Wgt.Tare + Wet Soil (gm)	433.53	Wgt.Tare + Wet Soil (gm)	46.01
Wgt.Tare + Dry Soil (gm)	383.38	Wgt.Tare + Dry Soil (gm)	42.61
Weight of Tare (gm)	169.72	Weight of Tare (gm)	15.68
Weight of Water (gm)	50.15	Weight of Water (gm)	3.40
Weight of Dry Soil (gm)	213.66	Weight of Dry Soil (gm)	26.93
Moisture Content (%)	**23.5**	**Moisture Content (%)**	**12.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	263.81	Weight of the Dry Sample (gm)	258.07
Dry Weight +#10 Material(gm)	213.7	Weight of minus #200 material (gm)	24.92
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	233.15
Dry Weight Hydro. Material (gm)	44.41		
Total Dry Weight Sample (gm)	258.07	**J-FACTOR (%FINER THAN #10)**	**0.9760**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.20	0.56	0.56	99.44	**99.44**
#10	2.00	3.92	1.83	2.40	97.60	**97.60**
#20	0.85	1.99	4.48	4.48	95.52	**93.23**
#40	0.425	2.81	6.33	10.81	89.19	**87.05**
#60	0.250	2.71	6.10	16.91	83.09	**81.10**
#140	0.106	7.37	16.59	33.50	66.50	**64.90**
#200	0.075	4.61	10.38	43.88	56.12	**54.77**
Pan	-	24.92	56.12	100.00	-	-

Notes :

Tested By DAW Date 11/16/2009 Checked By Gam Date 11-17-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	A8
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	L2
Project No.	2009-666-09	Sample No.	ST-28
Lab ID	2009-666-09-09	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	22.8	5.46	18.5	41.3	0.01300	0.0323	**40.3**
5		20.0	22.8	5.46	14.5	32.4	0.01300	0.0210	**31.6**
15		16.0	22.8	5.46	10.5	23.5	0.01300	0.0124	**22.9**
30		13.0	22.8	5.46	7.5	16.8	0.01300	0.0089	**16.4**
60		11.0	22.8	5.46	5.5	12.3	0.01300	0.0064	**12.1**
250		9.0	22.5	5.66	3.3	7.4	0.01305	0.0032	**7.3**
1440		7.0	21.8	6.13	0.9	1.9	0.01316	0.0013	**1.9**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	44.41	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	97.60
Weight of Dry Material (gm)	44.41		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11/12/2009 Checked By GEM Date 11-17-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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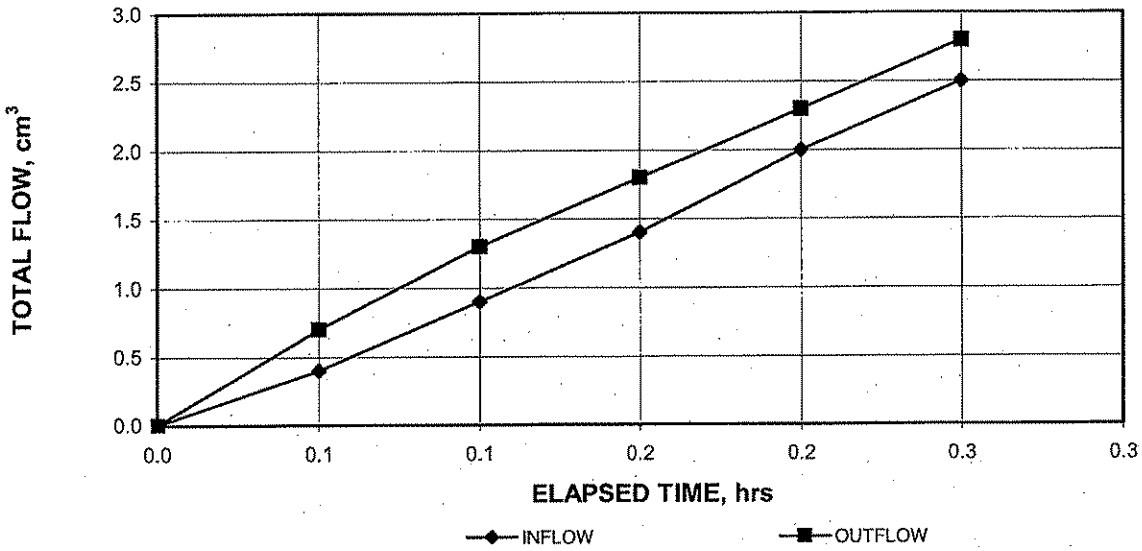
INTEGRITY IN TESTING

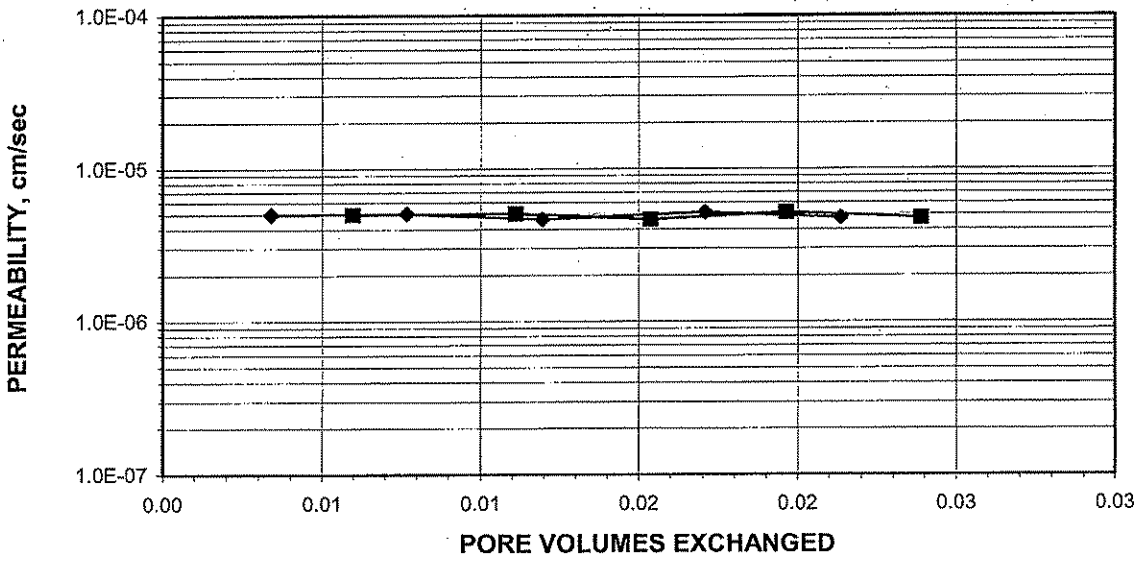
Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID No.	2009-666-12-02		

AVERAGE PERMEABILITY = 4.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.9E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MPS Date: 11/25/2009 Checked By: GJM Date: 11-30-09

DCN: CT-22C DATE: 11/30/2009 FILE: [2009-666 JOYCE WHITE OAK\[2009-666-12-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID No.	2009-666-12-02		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	208	813
Wt. of Tare & WS (gm.)	531.68	243.56
Wt. of Tare & DS (gm.)	457.34	207.68
Wt. of Tare (gm.)	169.73	113.06
Wt. of Water (gm.)	74.34	35.88
Wt. of DS (gm.)	287.61	94.62
Moisture Content (%)	**25.8**	**37.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	663.71	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	663.71	727.38
Length 1 (in.)	3.381	3.060
Length 2 (in.)	3.425	3.108
Length 3 (in.)	3.400	3.040
Top Diameter (in.)	2.836	2.830
Middle Diameter (in.)	2.855	2.832
Bottom Diameter (in.)	2.841	2.775
Average Length (in.)	3.40	3.07
Average Area (in.^{2})	6.35	6.21
Sample Volume (cm^3)	354.15	312.44
Unit Wet Wt. (gm./ cm^3)	1.87	2.33
Unit Wet Wt. (pcf)	117.0	145.3
Unit Dry Wt. (pcf)	93.0	105.4
Unit Dry Wt. (gm./ cm^3)	1.49	1.69
Void Ratio, e	0.81	0.60
Porosity, n	0.45	0.37
Pore Volume (cm^3)	158.8	117.1
Total Wgt. Of Sample After Test		575.3

Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID No.	2009-666-12-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.6	Sample Length (cm), L	7.80
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.14
Cell (psi)	75.0	Sample Area (cm^2), A	40.08
Total Pressure Head (cm)	98.4	Inflow Burette Area (cm^2), a-in	0.877
Hydraulic Gradient	12.62	Outflow Burette Area (cm^2), a-out	0.886
		B Parameter (%)	97

AVERAGE PERMEABILITY = 4.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.9E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	(min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/25/2009	11	30	0.0	0.0	0.0	109.2	0	23.4	NA
11/25/2009	11	33	0.1	0.4	0.7	108.0	0	23.4	5.0E-06
11/25/2009	11	36	0.1	0.9	1.3	106.7	0	23.4	5.0E-06
11/25/2009	11	39	0.2	1.4	1.8	105.6	0	23.4	4.6E-06
11/25/2009	11	42	0.2	2.0	2.3	104.4	0	23.4	5.2E-06
11/25/2009	11	45	0.3	2.5	2.8	103.2	1	23.4	4.7E-06

Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID	2009-666-12-02	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

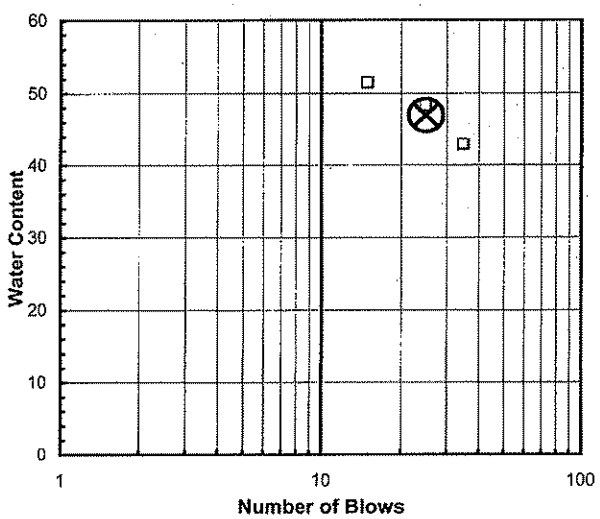
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-P	A-N	A-Q	MULTIPOINT
Wt. of Tare & WS (gm)	30.38	29.28	28.72	
Wt. of Tare & DS (gm)	25.49	24.78	24.78	
Wt. of Tare (gm)	15.98	15.46	15.58	
Wt. of Water (gm)	4.9	4.5	3.9	
Wt. of DS (gm)	9.5	9.3	9.2	
Moisture Content (%)	**51.4**	**48.3**	**42.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-U	A-D	
Wt. of Tare & WS (gm)	21.36	21.91	
Wt. of Tare & DS (gm)	19.73	20.18	
Wt. of Tare (gm)	15.31	15.42	
Wt. of Water (gm)	1.6	1.7	
Wt. of DS (gm)	4.4	4.8	
Moisture Content (%)	**36.9**	**36.3**	**0.5**

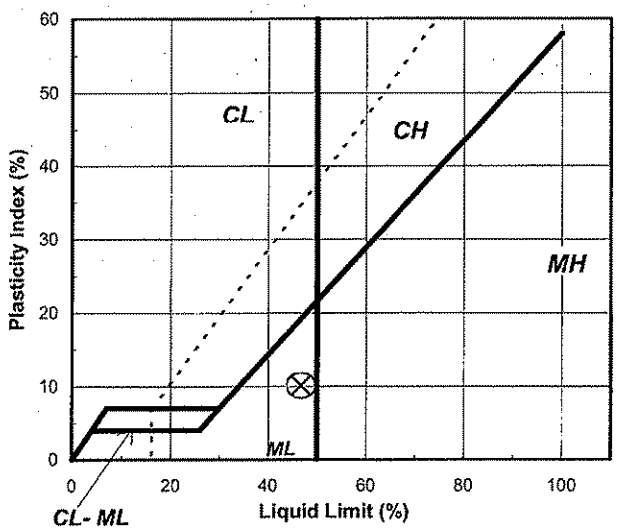
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**37**
Plasticity Index (%)	**10**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/30/2009 *Checked By* GEM *Date* 12-1-09

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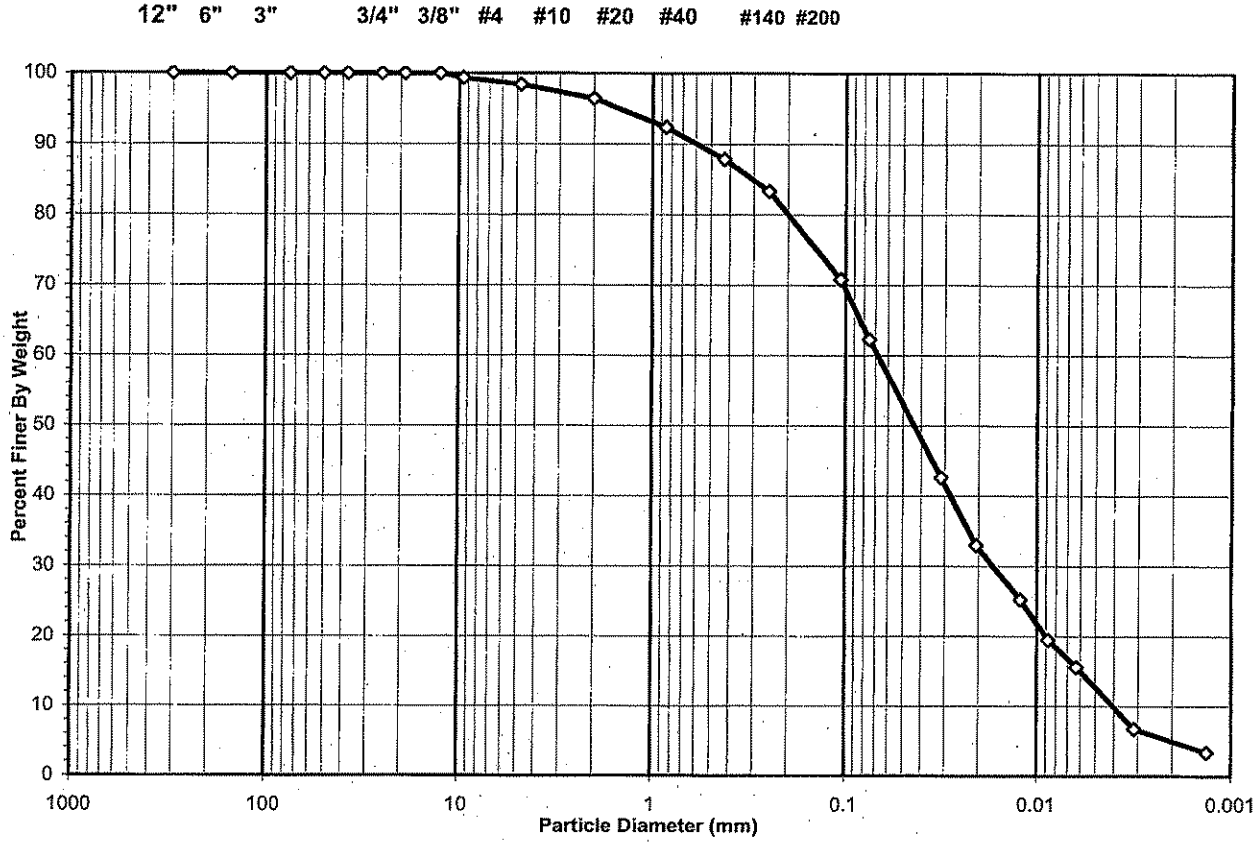
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID	2009-666-12-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel		sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	1.58
#4 To #200	*Sand*	36.19
Finer Than #200	*Silt & Clay*	62.23

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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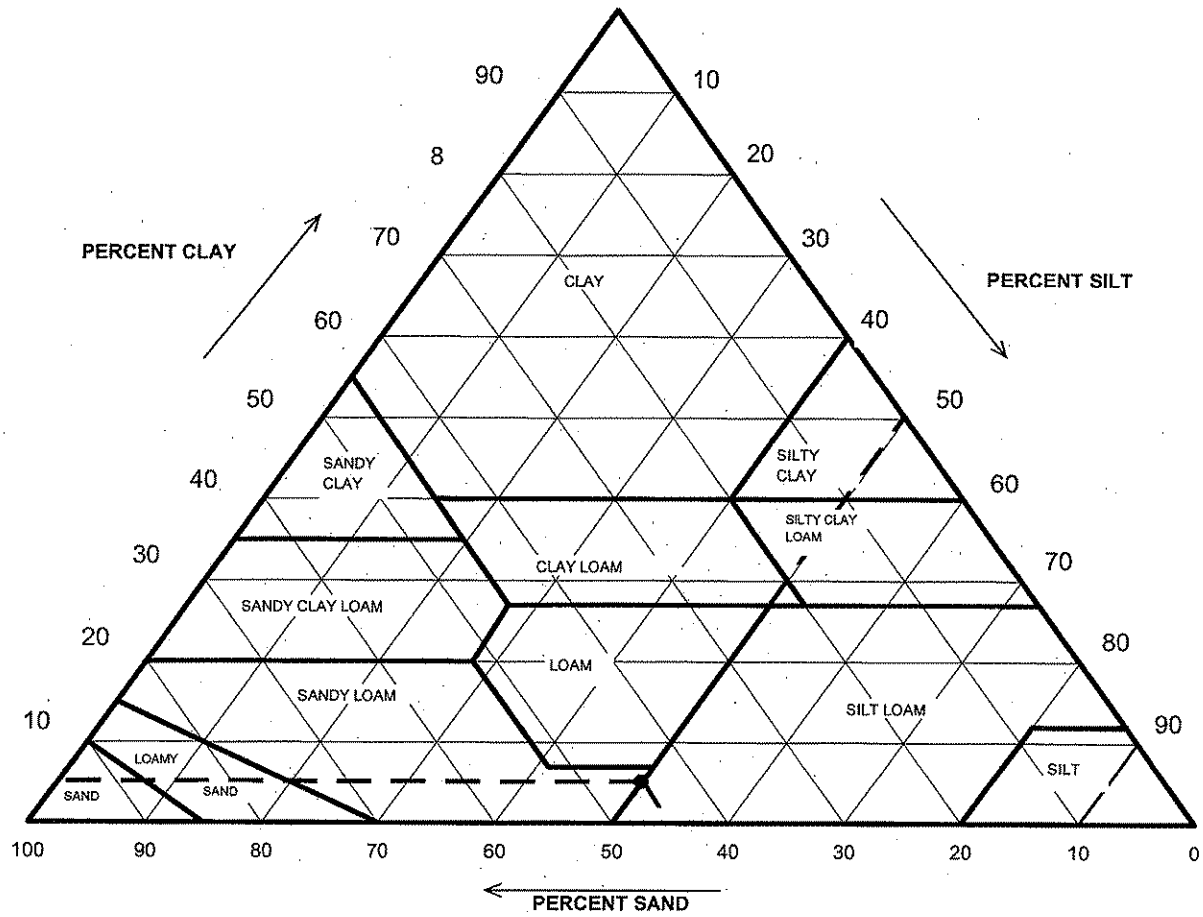
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID	2009-666-12-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.56	**0.00**
2	96.44	*Sand*	43.35	**44.95**
0.05	53.09	*Silt*	48.13	**49.90**
0.002	4.96	*Clay*	4.96	**5.14**

USDA Classification: ***SANDY LOAM***

 DCN: CT-SSP DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID	2009-666-12-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	208	Tare No.	A-H
Wgt.Tare + Wet Soil (gm)	531.68	Wgt.Tare + Wet Soil (gm)	31.59
Wgt.Tare + Dry Soil (gm)	457.34	Wgt.Tare + Dry Soil (gm)	31.43
Weight of Tare (gm)	169.73	Weight of Tare (gm)	15.57
Weight of Water (gm)	74.34	Weight of Water (gm)	0.16
Weight of Dry Soil (gm)	287.61	Weight of Dry Soil (gm)	15.86
Moisture Content (%)	**25.8**	**Moisture Content (%)**	**1.0**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	361.95	Weight of the Dry Sample (gm)	337.11
Dry Weight +#10 Material(gm)	287.6	Weight of minus #200 material (gm)	31.94
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	305.17
Dry Weight Hydro. Material (gm)	49.50		
Total Dry Weight Sample (gm)	337.11	**J-FACTOR (%FINER THAN #10)**	**0.9644**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.84	0.64	0.64	99.36	**99.36**
#4	4.75	2.70	0.94	1.58	98.42	**98.42**
#10	2.00	5.70	1.98	3.56	96.44	**96.44**
#20	0.85	2.10	4.24	4.24	95.76	**92.35**
#40	0.425	2.31	4.67	8.91	91.09	**87.85**
#60	0.250	2.33	4.71	13.62	86.38	**83.31**
#140	0.106	6.42	12.97	26.59	73.41	**70.80**
#200	0.075	4.40	8.89	35.47	64.53	**62.23**
Pan	-	31.94	64.53	100.00	-	-

Notes :

Tested By DAW Date 11/25/2009 Checked By GZM Date 12-3-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST28A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L2
Lab ID	2009-666-12-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	23.6	4.92	22.1	44.2	0.01288	0.0314	**42.6**
5		22.0	23.6	4.92	17.1	34.2	0.01288	0.0205	**32.9**
15		18.0	23.6	4.92	13.1	26.2	0.01288	0.0122	**25.2**
30		15.0	23.6	4.92	10.1	20.2	0.01288	0.0087	**19.4**
60		13.0	23.6	4.92	8.1	16.2	0.01288	0.0063	**15.6**
250		8.0	24.2	4.52	3.5	7.0	0.01279	0.0031	**6.7**
1440		7.0	23.1	5.26	1.7	3.5	0.01296	0.0013	**3.4**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.50	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	96.44
Weight of Dry Material (gm)	49.50		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12/1/2009 Checked By GEM Date 12-3-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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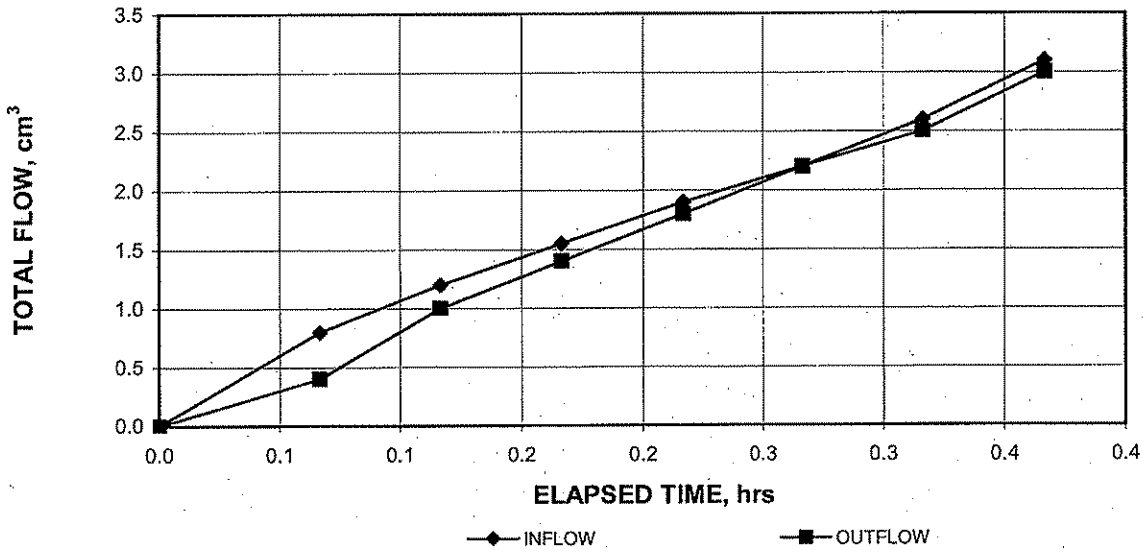
INTEGRITY IN TESTING

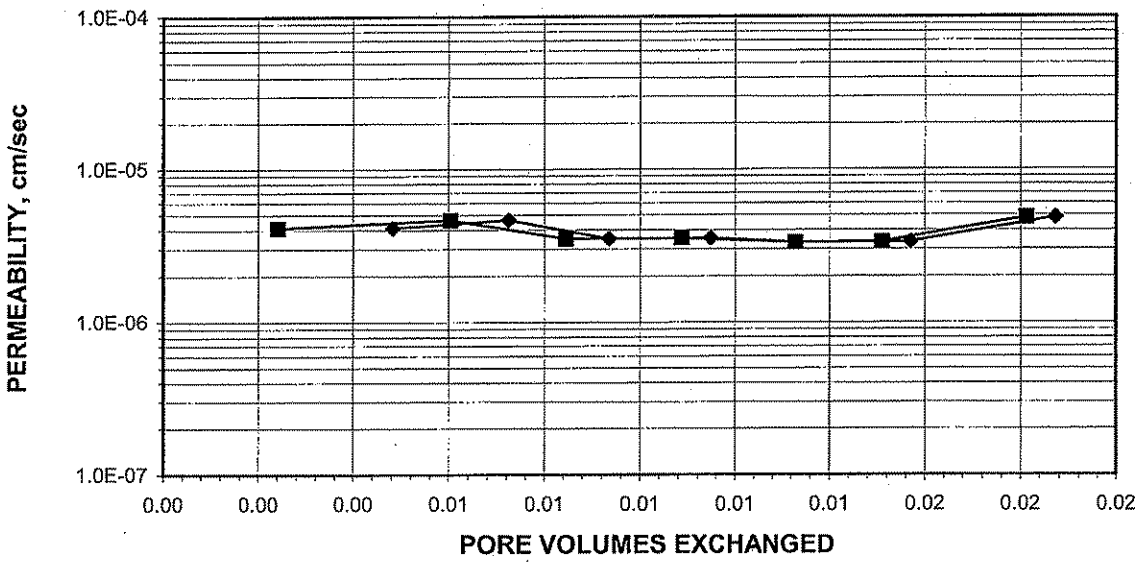
Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-01		

AVERAGE PERMEABILITY = 3.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.7E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MPS Date: 11/25/2009 Checked By: GAM Date: 11-30-09

DCN: CT-22C DATE: 12/09/2009 FILE: [2009-666-12-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-01		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	215	803
Wt. of Tare & WS (gm.)	514.55	243.50
Wt. of Tare & DS (gm.)	443.56	207.70
Wt. of Tare (gm.)	172.25	104.17
Wt. of Water (gm.)	70.99	35.80
Wt. of DS (gm.)	271.31	103.53
Moisture Content (%)	**26.2**	**34.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	590.68	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	590.68	630.07
Length 1 (in.)	3.346	3.330
Length 2 (in.)	3.347	3.350
Length 3 (in.)	3.356	3.323
Top Diameter (in.)	2.859	2.826
Middle Diameter (in.)	2.830	2.805
Bottom Diameter (in.)	2.832	2.800
Average Length (in.)	3.35	3.33
Average Area (in.^{2})	6.34	6.20
Sample Volume (cm^3)	347.80	338.93
Unit Wet Wt. (gm./ cm^3)	1.70	1.86
Unit Wet Wt. (pcf)	106.0	116.0
Unit Dry Wt. (pcf)	84.0	86.2
Unit Dry Wt. (gm./ cm^3)	1.35	1.38
Void Ratio, e	1.01	0.95
Porosity, n	0.50	0.49
Pore Volume (cm^3)	174.4	165.5
Total Wgt. Of Sample After Test		632.1

Tested By: MPS Date: 11/25/2009 Checked By: Gen Date: 11-30-09

DCN: CT-22C DATE: 11-11-09 [redacted] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID No.	2009-666-12-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.6	Sample Length (cm), L	8.47
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.14
Cell (psi)	75.0	Sample Area (cm^2), A	40.02
Total Pressure Head (cm)	98.4	Inflow Burette Area (cm^2), a-in	0.897
Hydraulic Gradient	11.62	Outflow Burette Area (cm^2), a-out	0.878
		B Parameter (%)	97

AVERAGE PERMEABILITY = 3.7E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.7E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW ($cm^{3)}$)	TOTAL OUTFLOW ($cm^{3)}$)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/25/2009	11	25	0.0	0.0	0.0	118.4	0	23.4	NA
11/25/2009	11	29	0.1	0.8	0.4	117.1	0	23.4	4.1E-06
11/25/2009	11	32	0.1	1.2	1.0	115.9	0	23.4	4.6E-06
11/25/2009	11	35	0.2	1.6	1.4	115.1	0	23.4	3.5E-06
11/25/2009	11	38	0.2	1.9	1.8	114.3	0	23.4	3.5E-06
11/25/2009	11	41	0.3	2.2	2.2	113.5	0	23.4	3.3E-06
11/25/2009	11	44	0.3	2.6	2.5	112.7	0	23.4	3.3E-06
11/25/2009	11	47	0.4	3.1	3.0	111.6	1	23.4	4.8E-06

Tested By: MPS Date: 11/25/2009 Checked By: GAM Date: 11-30-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

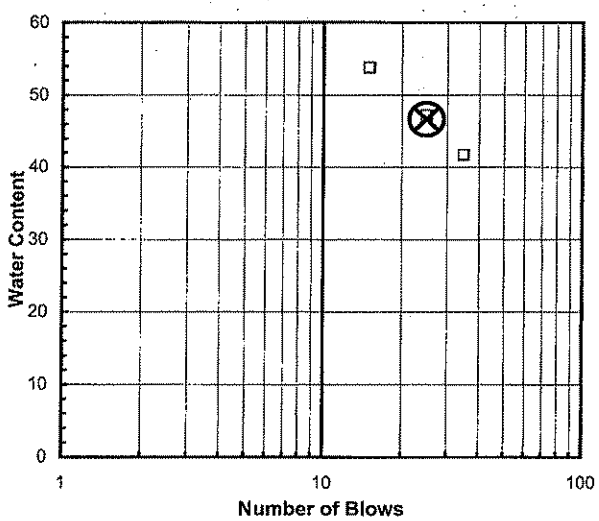
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-I	A-B	A-F	MULTI POINT
Wt. of Tare & WS (gm)	29.62	28.02	27.95	
Wt. of Tare & DS (gm)	24.67	24.03	24.29	
Wt. of Tare (gm)	15.46	15.56	15.49	
Wt. of Water (gm)	5.0	4.0	3.7	
Wt. of DS (gm)	9.2	8.5	8.8	
Moisture Content (%)	**53.7**	**47.1**	**41.6**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	O	B	
Wt. of Tare & WS (gm)	22.01	22.00	
Wt. of Tare & DS (gm)	20.12	20.10	
Wt. of Tare (gm)	15.25	15.21	
Wt. of Water (gm)	1.9	1.9	
Wt. of DS (gm)	4.9	4.9	
Moisture Content (%)	**38.8**	**38.9**	**0.0**

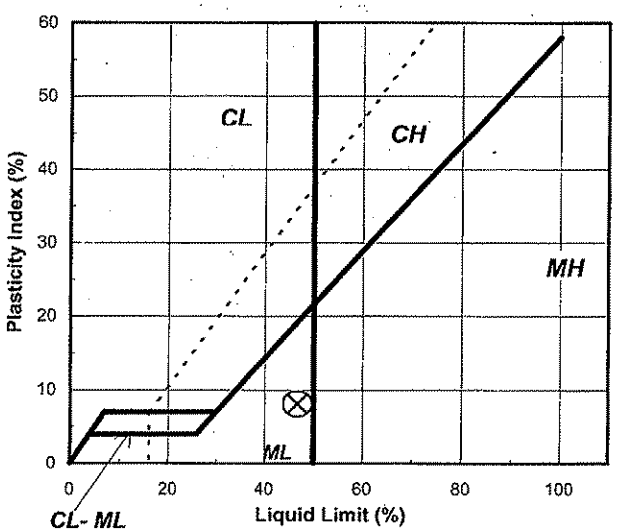
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**39**
Plasticity Index (%)	**8**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/30/2009 *Checked By* GEM *Date* 12-1-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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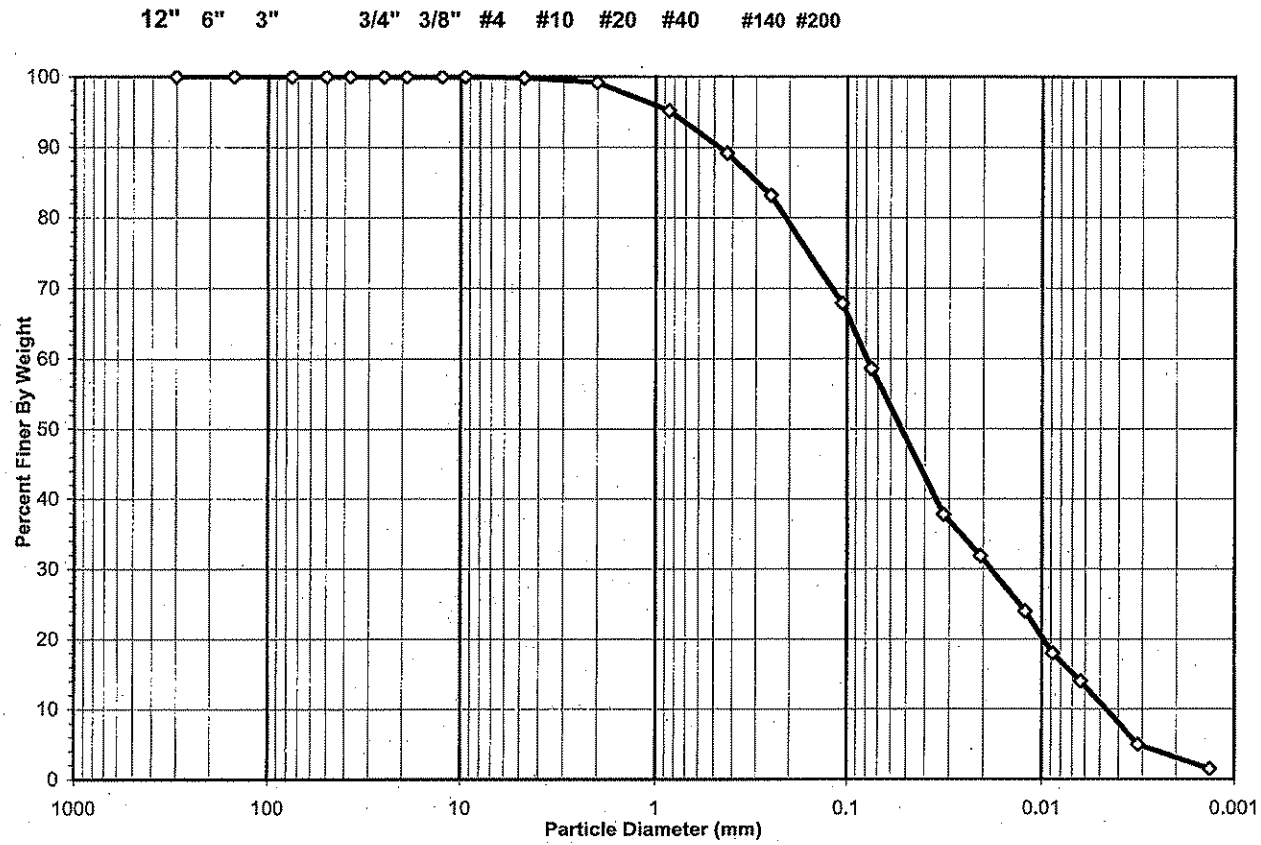
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS				HYDROMETER	
USCS	cobbles	gravel	sand		silt and clay fraction	
USDA	cobbles	gravel	sand		silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.13
#4 To #200	*Sand*	41.27
Finer Than #200	*Silt & Clay*	58.61

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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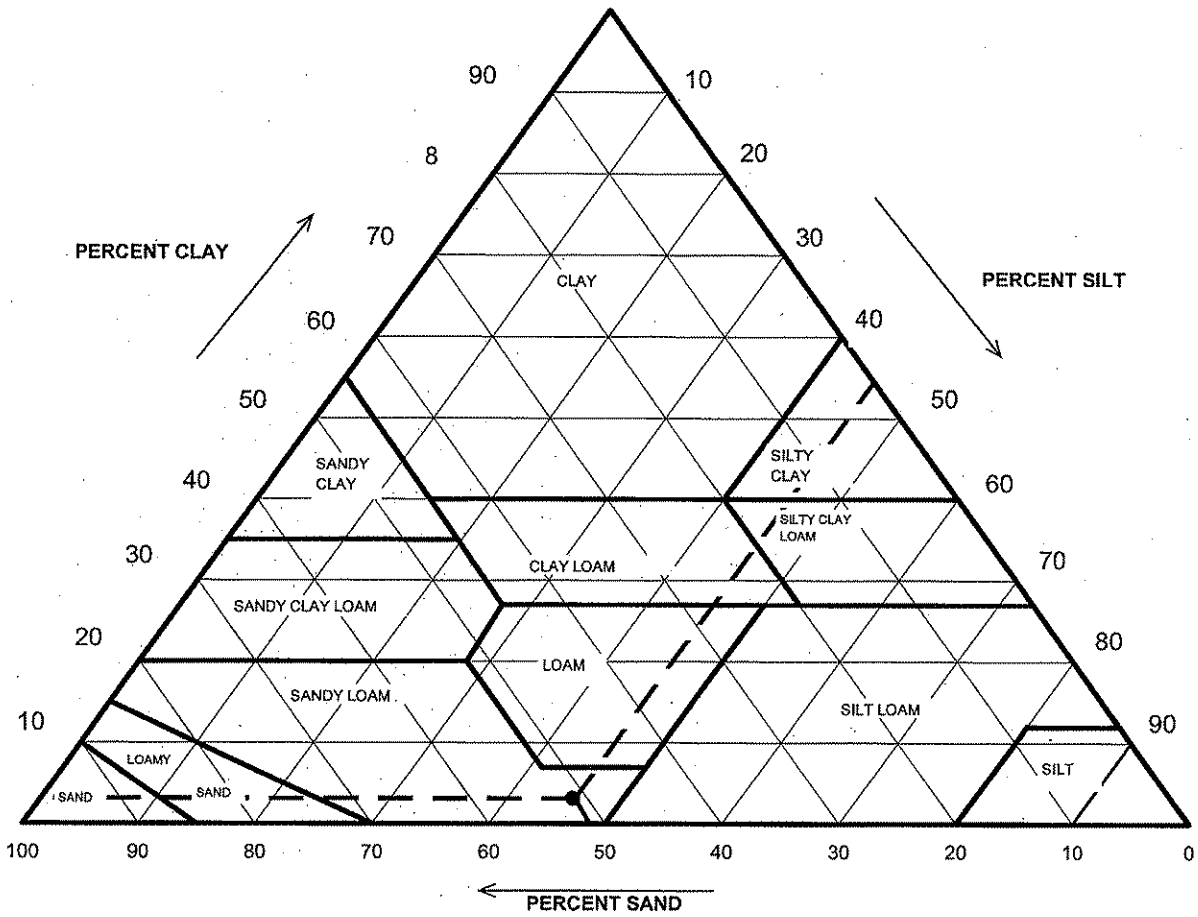
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.81	**0.00**
2	99.19	*Sand*	50.79	**51.21**
0.05	48.40	*Silt*	45.31	**45.68**
0.002	3.09	*Clay*	3.09	**3.12**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-12-01 GM #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	215	Tare No.	B-B
Wgt.Tare + Wet Soil (gm)	514.55	Wgt.Tare + Wet Soil (gm)	38.83
Wgt.Tare + Dry Soil (gm)	443.56	Wgt.Tare + Dry Soil (gm)	38.64
Weight of Tare (gm)	172.25	Weight of Tare (gm)	15.53
Weight of Water (gm)	70.99	Weight of Water (gm)	0.19
Weight of Dry Soil (gm)	271.31	Weight of Dry Soil (gm)	23.11
Moisture Content (%)	**26.2**	**Moisture Content (%)**	**0.8**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	342.30	Weight of the Dry Sample (gm)	320.90
Dry Weight +#10 Material(gm)	271.3	Weight of minus #200 material (gm)	29.30
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	291.60
Dry Weight Hydro. Material (gm)	49.59		
Total Dry Weight Sample (gm)	320.90	**J-FACTOR (%FINER THAN #10)**	**0.9919**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.34	0.13	0.13	99.87	**99.87**
#10	2.00	1.86	0.69	0.81	99.19	**99.19**
#20	0.85	1.99	4.01	4.01	95.99	**95.21**
#40	0.425	3.03	6.11	10.12	89.88	**89.15**
#60	0.250	2.99	6.03	16.15	83.85	**83.17**
#140	0.106	7.65	15.43	31.58	68.42	**67.87**
#200	0.075	4.63	9.34	40.91	59.09	**58.61**
Pan	-	29.30	59.09	100.00	-	**-**

Notes :

Tested By DAW Date 11/25/2009 Checked By GEM Date 12-3-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST31
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A8
Project No.	2009-666-12	Sample No.	L3
Lab ID	2009-666-12-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	23.6	4.92	19.1	38.1	0.01288	0.0320	**37.8**
5		21.0	23.6	4.92	16.1	32.1	0.01288	0.0207	**31.8**
15		17.0	23.6	4.92	12.1	24.1	0.01288	0.0122	**23.9**
30		14.0	23.6	4.92	9.1	18.1	0.01288	0.0088	**18.0**
60		12.0	23.6	4.92	7.1	14.1	0.01288	0.0063	**14.0**
250		7.0	24.2	4.52	2.5	5.0	0.01279	0.0031	**4.9**
1440		6.0	23.1	5.26	0.7	1.5	0.01296	0.0013	**1.5**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	49.59	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.19
Weight of Dry Material (gm)	49.59		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12/1/2009 Checked By GM Date 12-3-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

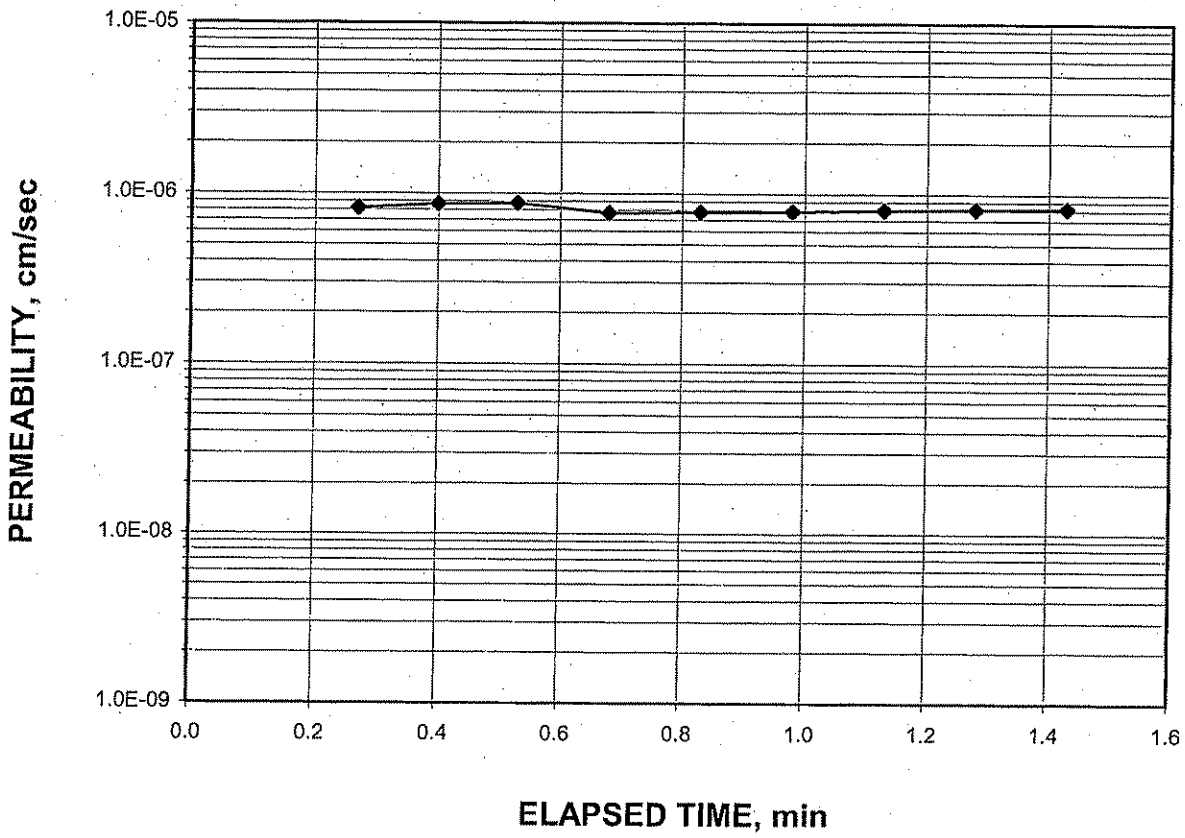
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L1
Lab ID No.	2009-666-07-02		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 8.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 8.0E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L1
Lab ID No.	2009-666-07-02		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	837	811
Wt. of Tare & WS (gm.)	576.07	525.44
Wt. of Tare & DS (gm.)	511.46	434.72
Wt. of Tare (gm.)	260.86	106.45
Wt. of Water (gm.)	64.61	90.72
Wt. of DS (gm.)	250.60	328.27
Moisture Content (%)	**25.8**	**27.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	722.36	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	722.36	733.01
Length 1 (in.)	3.642	3.640
Length 2 (in.)	3.684	3.649
Length 3 (in.)	3.702	3.665
Top Diameter (in.)	2.834	2.835
Middle Diameter (in.)	2.820	2.788
Bottom Diameter (in.)	2.814	2.811
Average Length (in.)	3.68	3.65
Average Area (in.^{2})	6.26	6.21
Sample Volume (cm^3)	376.95	371.42
Unit Wet Wt. (gm./ cm^3)	1.916	1.974
Unit Wet Wt. (pcf)	119.6	123.2
Unit Dry Wt. (pcf)	95.1	96.5
Unit Dry Wt. (gm./ cm^3)	1.524	1.546
Void Ratio, e	0.772	0.746
Porosity, n	0.436	0.427
Pore Volume (cm^3)	164.2	158.7
Total Wt. Of Sample After Test		730.05

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

DCN: CT-22C DATE:12-21-09 REVISION: 0 \\Server\Data\Active\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-02 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L1
Lab ID No.	2009-666-07-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	9.27
Back Pressure(psi)	60.0	Sample Area (cm^2), A	40.05
Eff. Cons. Pressure(psi)	15.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 8.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 8.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	ELAPSED TIME (min)	t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	11	7.70	0.0	9.5	11.0	0	24.0	NA
10/6/2009	11	7.97	0.3	9.3	10.7	0	24.0	8.1E-07
10/6/2009	11	8.10	0.4	9.2	10.6	0	24.0	8.6E-07
10/6/2009	11	8.23	0.5	9.1	10.4	0	24.0	8.7E-07
10/6/2009	11	8.38	0.7	9.0	10.3	0	24.0	7.7E-07
10/6/2009	11	8.53	0.8	8.9	10.1	0	24.0	7.8E-07
10/6/2009	11	8.68	1.0	8.8	10.0	0	24.0	7.9E-07
10/6/2009	11	8.83	1.1	8.7	9.9	0	24.0	8.0E-07
10/6/2009	11	8.98	1.3	8.6	9.7	0	24.0	8.1E-07
10/6/2009	11	9.13	1.4	8.5	9.6	1	24.0	8.2E-07

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-02	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

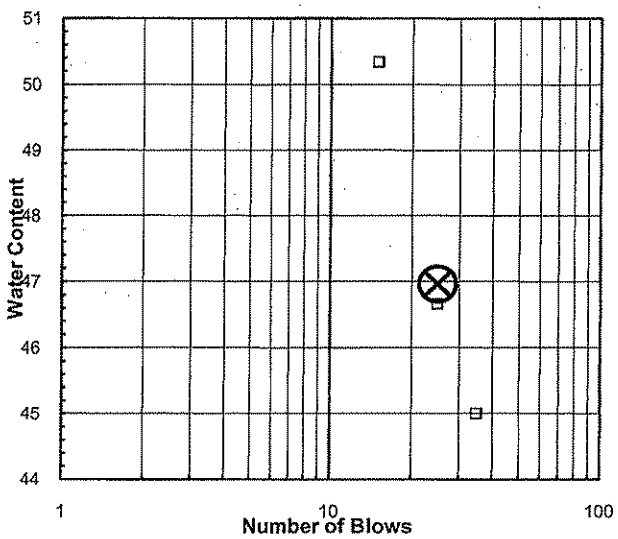
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	P	B	F	**MULTIPOINT**
Wt. of Tare & WS (gm)	28.76	27.99	30.31	
Wt. of Tare & DS (gm)	24.22	23.94	25.59	
Wt. of Tare (gm)	15.20	15.26	15.10	
Wt. of Water (gm)	4.5	4.1	4.7	
Wt. of DS (gm)	9.0	8.7	10.5	
Moisture Content (%)	**50.3**	**46.7**	**45.0**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	K	M	
Wt. of Tare & WS (gm)	22.06	22.07	
Wt. of Tare & DS (gm)	20.22	20.28	
Wt. of Tare (gm)	15.23	15.14	
Wt. of Water (gm)	1.8	1.8	
Wt. of DS (gm)	5.0	5.1	
Moisture Content (%)	**36.9**	**34.8**	**2.0**

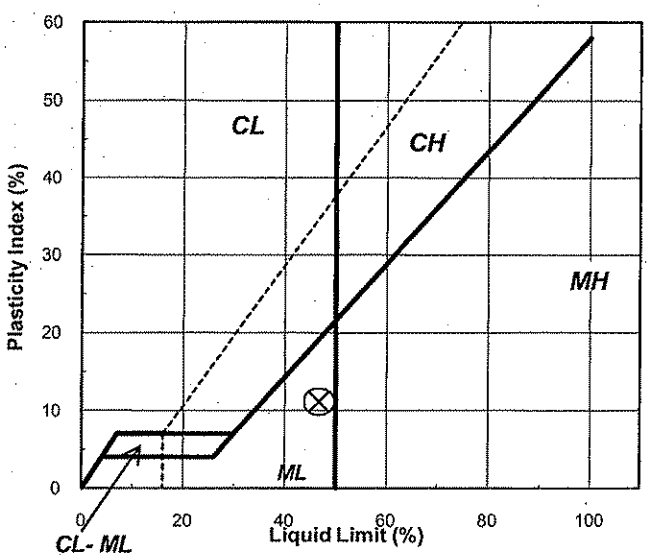
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**47**
Plastic Limit (%)	**36**
Plasticity Index (%)	**11**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 10/9/2009 *Checked By* GBM *Date* 10-12-09

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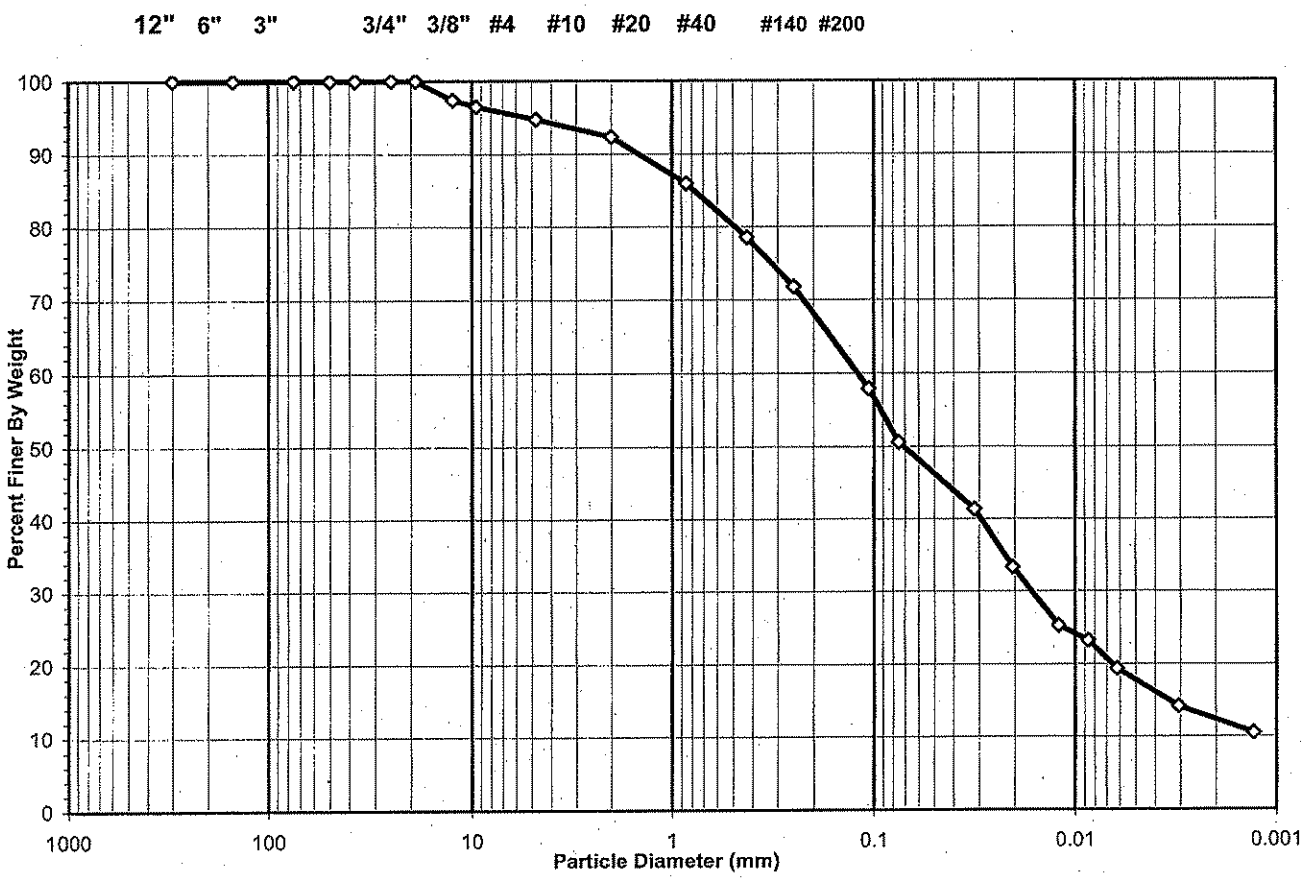
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	5.26
#4 To #200	*Sand*	44.17
Finer Than #200	*Silt & Clay*	50.56

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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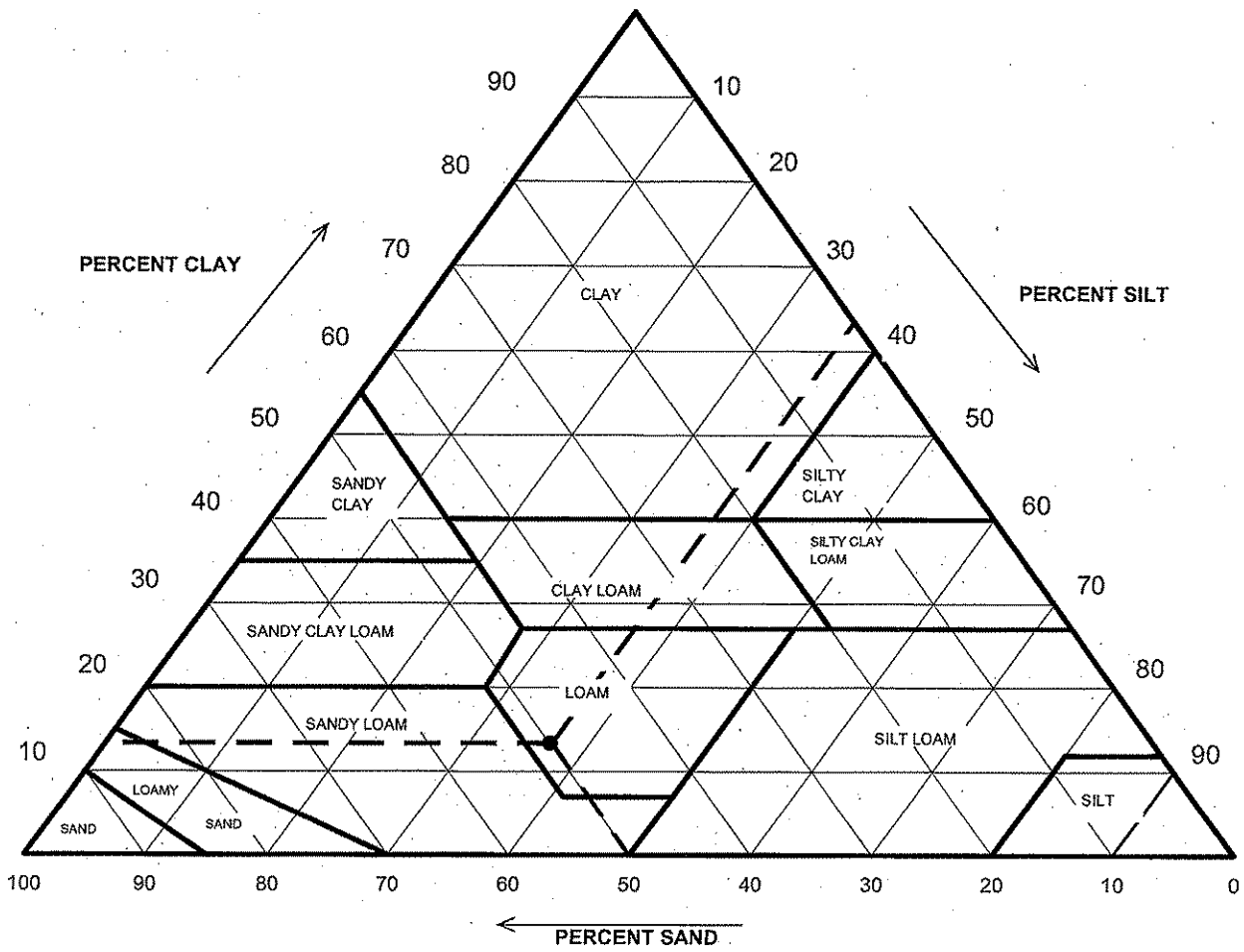
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	7.69	**0.00**
2	92.31	*Sand*	46.07	**49.91**
0.05	46.24	*Silt*	33.91	**36.74**
0.002	12.33	*Clay*	12.33	**13.35**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	837	Tare No.	S
Wgt.Tare + Wet Soil (gm)	576.07	Wgt.Tare + Wet Soil (gm)	38.53
Wgt.Tare + Dry Soil (gm)	511.46	Wgt.Tare + Dry Soil (gm)	36.40
Weight of Tare (gm)	260.86	Weight of Tare (gm)	15.18
Weight of Water (gm)	64.61	Weight of Water (gm)	2.13
Weight of Dry Soil (gm)	250.60	Weight of Dry Soil (gm)	21.22
Moisture Content (%)	**25.8**	**Moisture Content (%)**	**10.0**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	315.21	Weight of the Dry Sample (gm)	296.04
Dry Weight +#10 Material(gm)	250.6	Weight of minus #200 material (gm)	24.89
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	271.15
Dry Weight Hydro. Material (gm)	45.44		
Total Dry Weight Sample (gm)	296.04	**J-FACTOR (%FINER THAN #10)**	**0.9231**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	6.57	2.62	2.62	97.38	**97.38**
3/8"	9.50	2.28	0.91	3.53	96.47	**96.47**
#4	4.75	4.34	1.73	5.26	94.74	**94.74**
#10	2.00	6.08	2.43	7.69	92.31	**92.31**
#20	0.85	3.13	6.89	6.89	93.11	**85.95**
#40	0.425	3.66	8.05	14.94	85.06	**78.52**
#60	0.250	3.32	7.31	22.25	77.75	**71.77**
#140	0.106	6.81	14.99	37.24	62.76	**57.94**
#200	0.075	3.63	7.99	45.23	54.77	**50.56**
Pan	-	24.89	54.77	100.00	-	-

Notes :

Tested By SD Date 10/9/2009 Checked By GDM Date 10-12-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-12
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L1
Lab ID	2009-666-07-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	25.0	25.0	24.3	4.45	20.6	44.8	0.01278	0.0316	**41.3**
5		21.0	24.3	4.45	16.6	36.1	0.01278	0.0205	**33.3**
15		17.0	24.3	4.45	12.6	27.3	0.01278	0.0121	**25.2**
30		16.0	24.3	4.45	11.6	25.2	0.01278	0.0086	**23.2**
60		14.0	24.4	4.38	9.6	21.0	0.01276	0.0062	**19.3**
250		11.0	25.0	3.98	7.0	15.3	0.01268	0.0031	**14.1**
1440		10.0	23.8	4.79	5.2	11.4	0.01285	0.0013	**10.5**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	45.44	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	92.31
Weight of Dry Material (gm)	45.44		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GZM Date 10-12-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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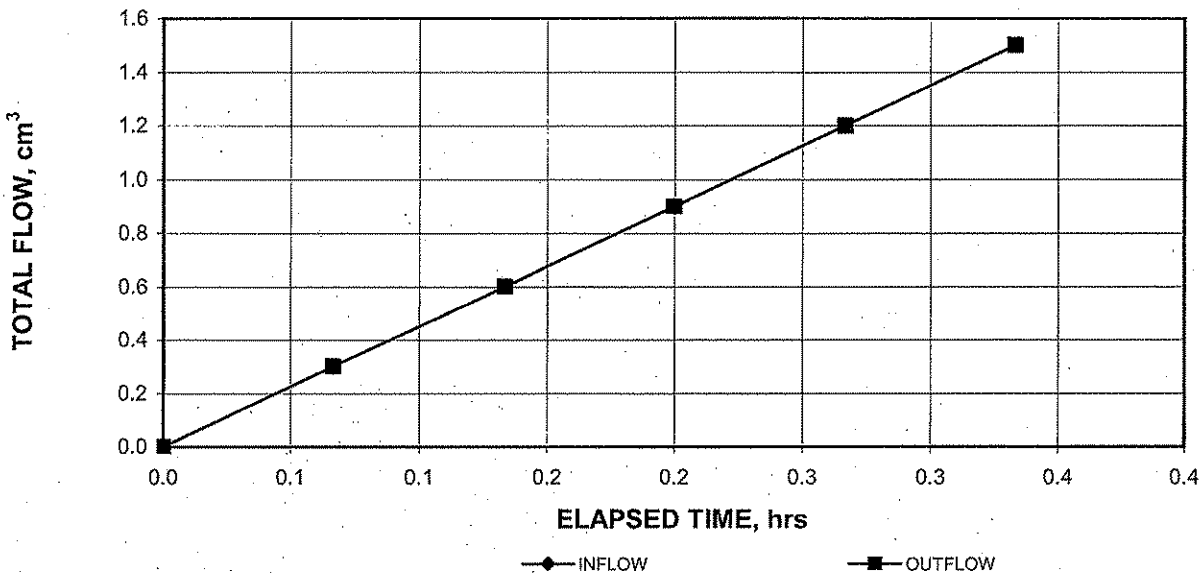
INTEGRITY IN TESTING

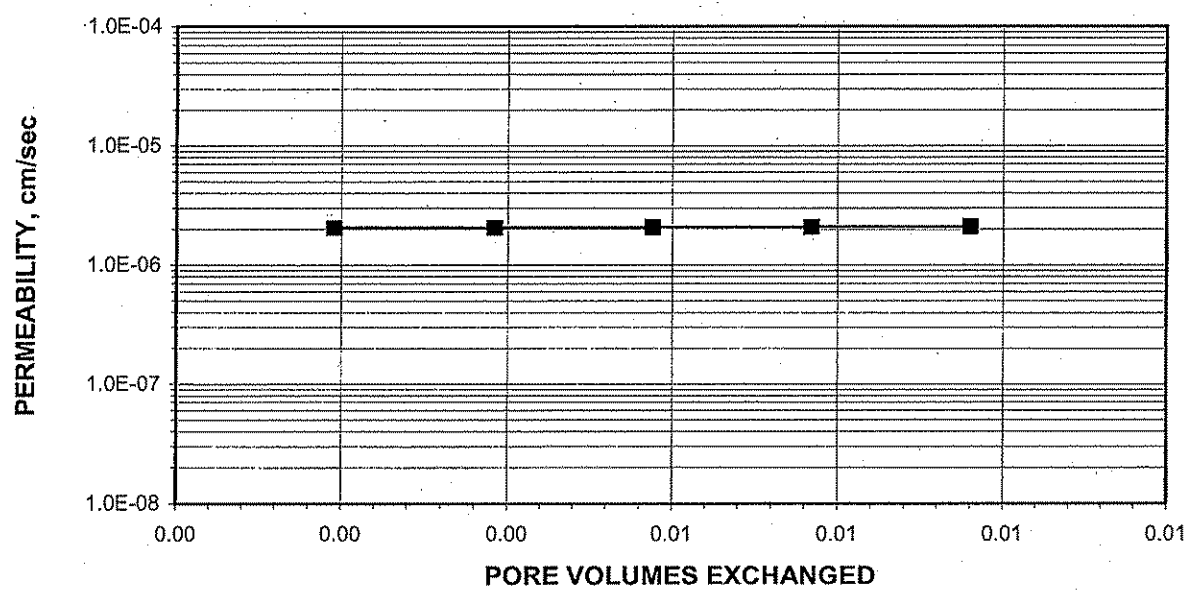
Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L2
Lab ID No.	2009-666-07-04		

AVERAGE PERMEABILITY = 2.1E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.1E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 10/6/2009 Checked By: GBM Date: 10-9-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L2
Lab ID No.	2009-666-07-04		
		Specific Gravity	2.70 Assumed
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	214	801
Wt. of Tare & WS (gm.)	751.43	527.03
Wt. of Tare & DS (gm.)	633.60	433.91
Wt. of Tare (gm.)	171.27	106.82
Wt. of Water (gm.)	117.83	93.12
Wt. of DS (gm.)	462.33	327.09
Moisture Content (%)	**25.5**	**28.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	626.05	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (gm.)	626.05	640.93
Length 1 (in.)	3.335	3.288
Length 2 (in.)	3.313	3.264
Length 3 (in.)	3.313	3.256
Top Diameter (in.)	2.843	2.837
Middle Diameter (in.)	2.851	2.848
Bottom Diameter (in.)	2.815	2.854
Average Length (in.)	3.32	3.27
Average Area (in.^{2})	6.32	6.36
Sample Volume (cm^3)	343.79	340.90
Unit Wet Wt. (gm./ cm^3)	1.82	1.88
Unit Wet Wt. (pcf)	113.7	117.4
Unit Dry Wt. (pcf)	90.6	91.4
Unit Dry Wt. (gm./ cm^3)	1.45	1.46
Void Ratio, e	0.86	0.84
Porosity, n	0.46	0.46
Pore Volume (cm^3)	159.0	156.1
Total Wgt. Of Sample After Test		637.02

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-09-09

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PERMEABILITY TEST

ASTM D 5084-90(Reapproved 2003)
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L2
Lab ID No.	2009-666-07-04		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.30
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.23
Cell (psi)	75.0	Sample Area (cm^2), A	41.05
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.878
Hydraulic Gradient	10.16	Outflow Burette Area (cm^2), a-out	0.871
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.1E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.1E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	10	0	0.0	0.0	0.0	110.7	0	24.0	NA
10/6/2009	10	4	0.1	0.3	0.3	110.0	0	24.0	2.0E-06
10/6/2009	10	8	0.1	0.6	0.6	109.4	0	24.0	2.1E-06
10/6/2009	10	12	0.2	0.9	0.9	108.7	0	24.0	2.1E-06
10/6/2009	10	16	0.3	1.2	1.2	108.0	0	24.0	2.1E-06
10/6/2009	10	20	0.3	1.5	1.5	107.4	1	24.0	2.1E-06

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-04	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

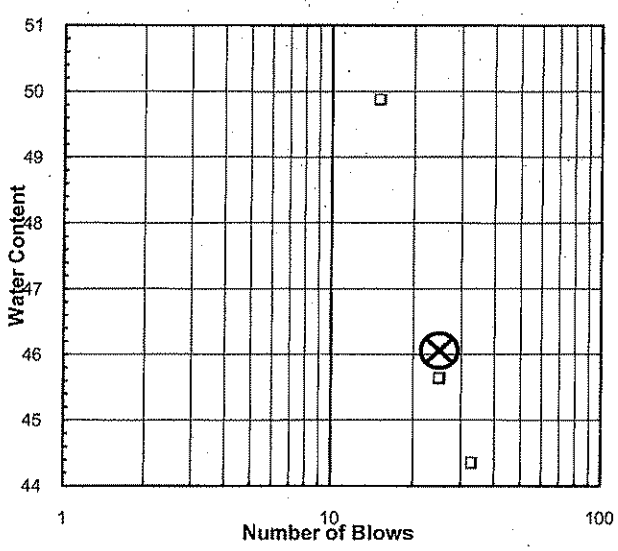
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-Q	J	C	M U L T I P O I N T
Wt. of Tare & WS (gm)	26.90	27.28	28.11	
Wt. of Tare & DS (gm)	23.11	23.47	24.15	
Wt. of Tare (gm)	15.51	15.12	15.22	
Wt. of Water (gm)	3.8	3.8	4.0	
Wt. of DS (gm)	7.6	8.4	8.9	
Moisture Content (%)	**49.9**	**45.6**	**44.3**	
Number of Blows	**15**	**25**	**33**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-F	A-P	
Wt. of Tare & WS (gm)	21.59	21.64	
Wt. of Tare & DS (gm)	19.97	20.04	
Wt. of Tare (gm)	15.43	15.57	
Wt. of Water (gm)	1.6	1.6	
Wt. of DS (gm)	4.5	4.5	
Moisture Content (%)	**35.7**	**35.8**	**-0.1**

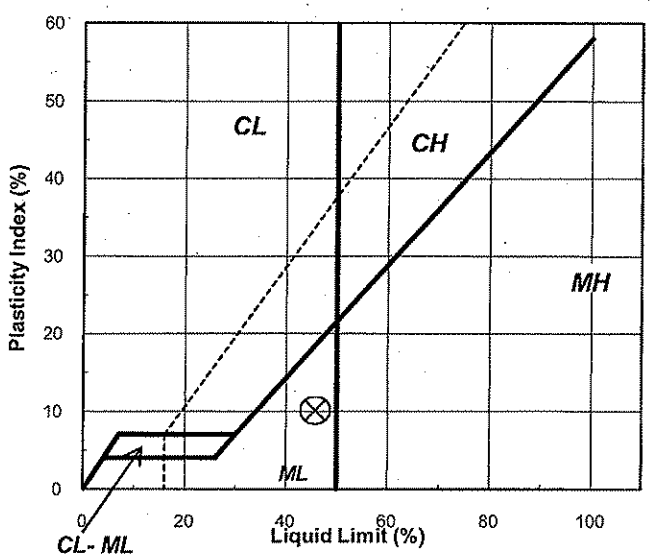
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**46**
Plastic Limit (%)	**36**
Plasticity Index (%)	**10**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 10/9/2009 *Checked By* GEM *Date* 10-12-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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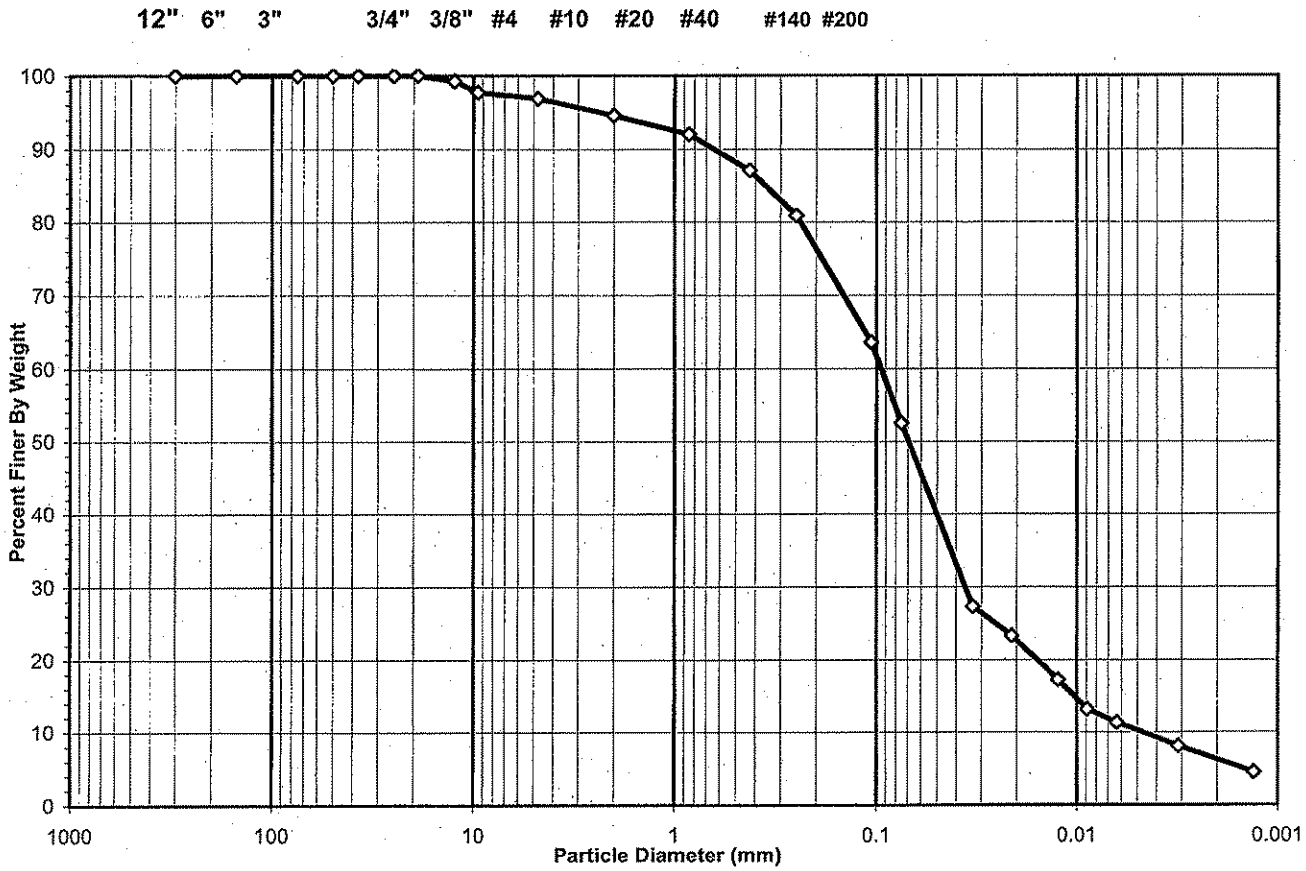
INTEGRITY IN TESTING

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-04	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	3.12
#4 To #200	*Sand*	44.41
Finer Than #200	*Silt & Clay*	52.47

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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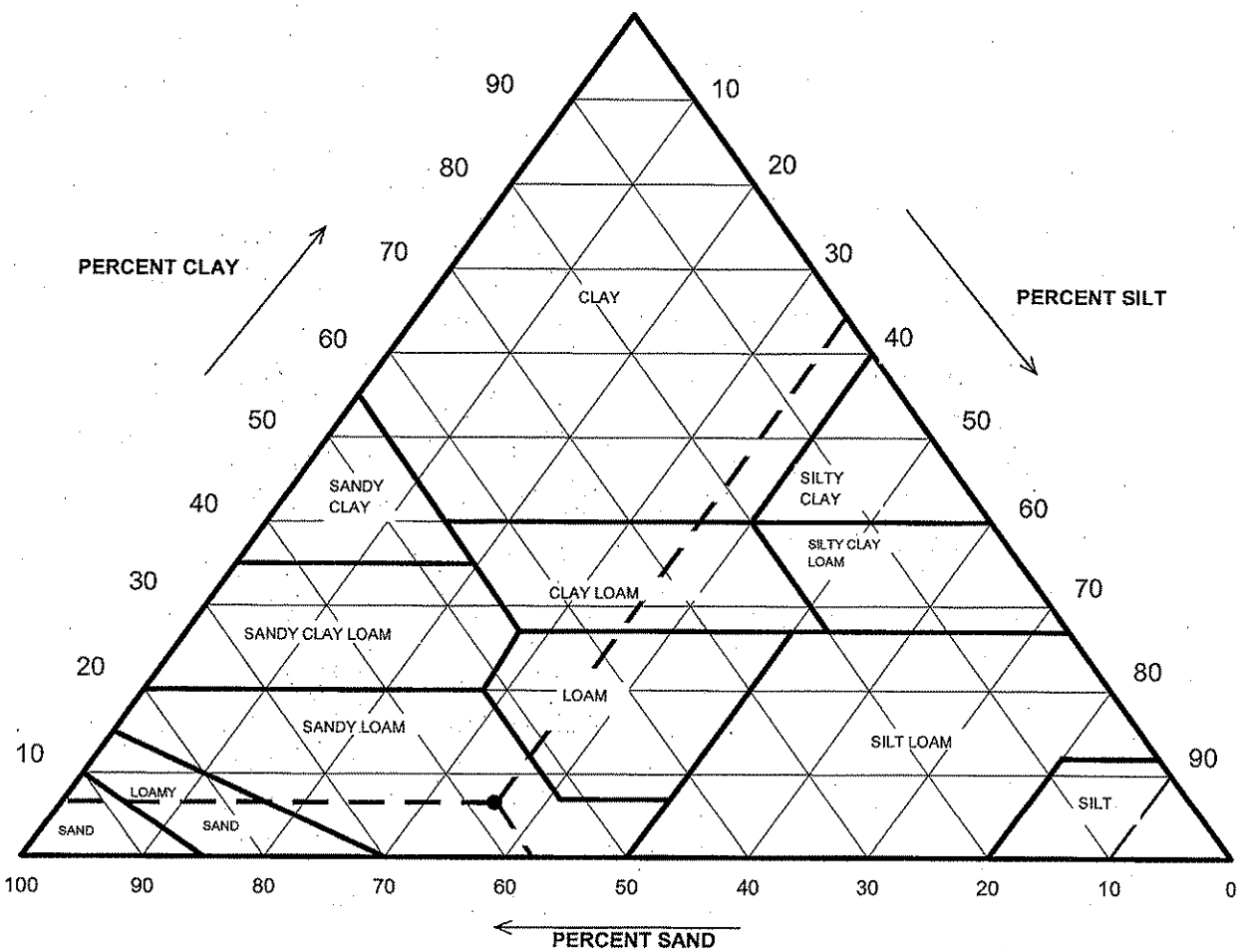
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-04	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	5.46	**0.00**
2	94.54	*Sand*	54.51	**57.66**
0.05	40.03	*Silt*	33.80	**35.75**
0.002	6.23	*Clay*	6.23	**6.59**

USDA Classification: ***SANDY LOAM***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-04	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	214	Tare No.	A-Q
Wgt.Tare + Wet Soil (gm)	751.43	Wgt.Tare + Wet Soil (gm)	34.61
Wgt.Tare + Dry Soil (gm)	633.68	Wgt.Tare + Dry Soil (gm)	33.26
Weight of Tare (gm)	171.24	Weight of Tare (gm)	15.51
Weight of Water (gm)	117.75	Weight of Water (gm)	1.35
Weight of Dry Soil (gm)	462.44	Weight of Dry Soil (gm)	17.75
Moisture Content (%)	**25.5**	**Moisture Content (%)**	**7.6**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	580.19	Weight of the Dry Sample (gm)	508.91
Dry Weight +#10 Material(gm)	462.4	Weight of minus #200 material (gm)	25.79
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	483.12
Dry Weight Hydro. Material (gm)	46.47		
Total Dry Weight Sample (gm)	508.91	**J-FACTOR (%FINER THAN #10)**	**0.9454**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	3.39	0.73	0.73	99.27	**99.27**
3/8"	9.50	7.14	1.54	2.28	97.72	**97.72**
#4	4.75	3.91	0.85	3.12	96.88	**96.88**
#10	2.00	10.79	2.33	5.46	94.54	**94.54**
#20	0.85	1.24	2.67	2.67	97.33	**92.02**
#40	0.425	2.42	5.21	7.88	92.12	**87.10**
#60	0.250	3.05	6.56	14.44	85.56	**80.89**
#140	0.106	8.50	18.29	32.73	67.27	**63.60**
#200	0.075	5.47	11.77	44.51	55.49	**52.47**
Pan	-	25.79	55.49	100.00	-	**-**

Notes :

Tested By SD Date 10/9/2009 Checked By GAM Date 10-12-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-14
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L2
Lab ID	2009-666-07-04	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	18.0	18.0	24.3	4.45	13.6	28.9	0.01278	0.0330	**27.3**
5		16.0	24.3	4.45	11.6	24.6	0.01278	0.0211	**23.3**
15		13.0	24.3	4.45	8.6	18.2	0.01278	0.0124	**17.2**
30		11.0	24.3	4.45	6.6	14.0	0.01278	0.0089	**13.2**
60		10.0	24.4	4.38	5.6	12.0	0.01276	0.0063	**11.3**
250		8.0	25.0	3.98	4.0	8.6	0.01268	0.0031	**8.1**
1440		7.0	23.8	4.79	2.2	4.7	0.01285	0.0013	**4.5**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	46.47	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	94.54
Weight of Dry Material (gm)	46.47		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GEM Date 10-12-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

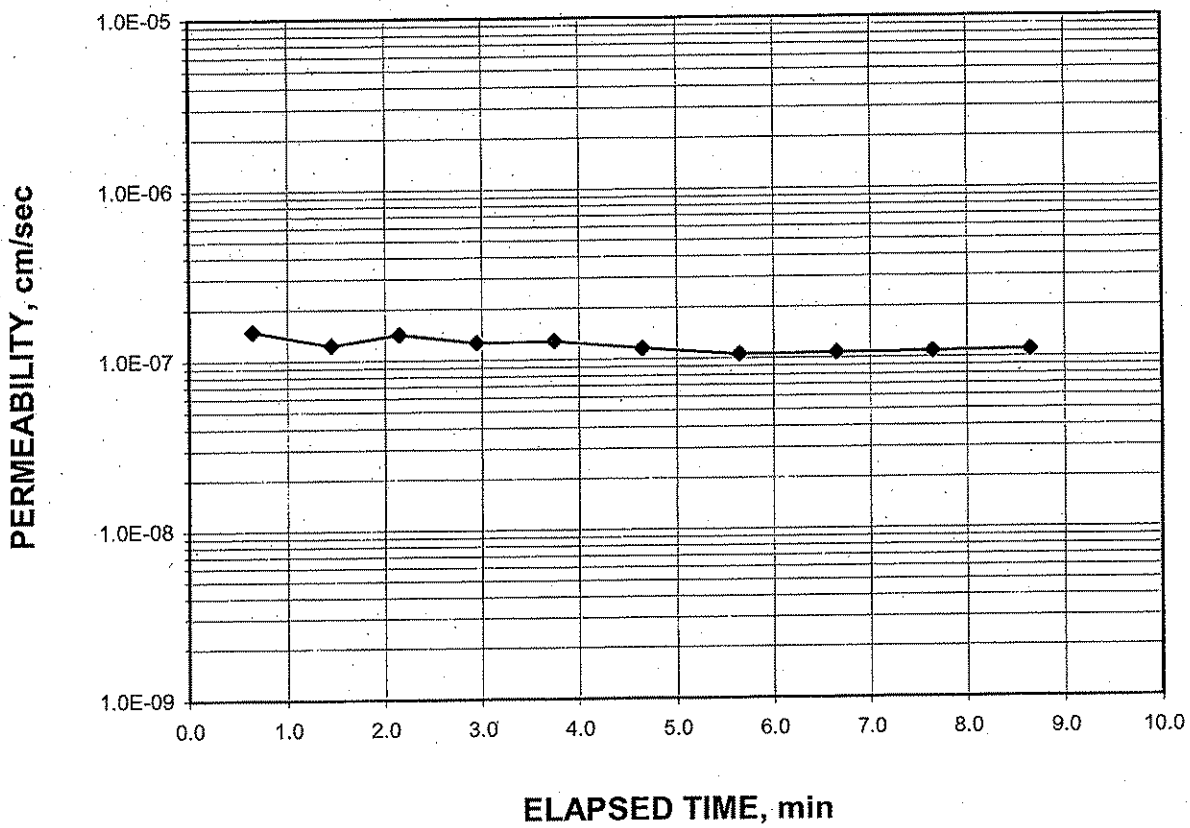
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-07		

Visual Description: REDDISH BROWN SILT

AVERAGE PERMEABILITY = 1.1E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.1E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 10/6/2009 Checked By: Gam Date: 10-9-09

DCN: CT-22C DATE:12-21-08 REVISION: 0 \\Server\Share\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-07		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	208	814
Wt. of Tare & WS (gm.)	558.72	416.53
Wt. of Tare & DS (gm.)	481.12	354.7
Wt. of Tare (gm.)	169.78	111.87
Wt. of Water (gm.)	77.60	61.83
Wt. of DS (gm.)	311.34	242.83
Moisture Content (%)	**24.9**	**25.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	691.90	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	691.90	694.88
Length 1 (in.)	3.361	3.322
Length 2 (in.)	3.357	3.326
Length 3 (in.)	3.336	3.325
Top Diameter (in.)	2.874	2.850
Middle Diameter (in.)	2.845	2.843
Bottom Diameter (in.)	2.856	2.836
Average Length (in.)	3.35	3.32
Average Area (in.^{2})	6.42	6.35
Sample Volume (cm^3)	352.40	345.82
Unit Wet Wt. (gm./ cm^3)	1.963	2.009
Unit Wet Wt. (pcf)	122.6	125.4
Unit Dry Wt. (pcf)	98.1	100.0
Unit Dry Wt. (gm./ cm^3)	1.572	1.602
Void Ratio, e	0.718	0.686
Porosity, n	0.418	0.407
Pore Volume (cm^3)	147.3	140.7
Total Wt. Of Sample After Test		695.36

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9A
Project No.	2009-666-07	Sample No.	L3
Lab ID No.	2009-666-07-07		

Test Pressures

Cell Pressure(psi)	75.0
Back Pressure(psi)	50.0
Eff. Cons. Pressure(psi)	25.0
Response (%)	95

Final Sample Dimensions

Sample Length (cm), L	8.44
Sample Area (cm^2), A	40.96
Pipette Area (cm^2), a_p	0.03142
Annulus Area (cm^2), a_a	0.76712
Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 1.1E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.1E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	ELAPSED TIME (min)	t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
10/6/2009	8	59.25	0.0	9.5	12.1	0	24.0	NA
10/6/2009	8	59.90	0.6	9.4	11.9	0	24.0	1.5E-07
10/6/2009	9	0.70	1.5	9.3	11.8	0	24.0	1.2E-07
10/6/2009	9	1.40	2.1	9.2	11.6	0	24.0	1.4E-07
10/6/2009	9	2.20	3.0	9.1	11.4	0	24.0	1.3E-07
10/6/2009	9	3.00	3.8	9.0	11.3	0	24.0	1.3E-07
10/6/2009	9	3.90	4.6	8.9	11.1	0	24.0	1.2E-07
10/6/2009	9	4.90	5.6	8.8	11.0	0	24.0	1.1E-07
10/6/2009	9	5.90	6.6	8.7	10.8	0	24.0	1.1E-07
10/6/2009	9	6.90	7.6	8.6	10.7	0	24.0	1.1E-07
10/6/2009	9	7.90	8.6	8.5	10.5	1	24.0	1.1E-07

Tested By: TMS Date: 10/6/2009 Checked By: GEM Date: 10-9-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-07	Soil Description	**REDDISH BROWN SILT**

Note: The* USCS *symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

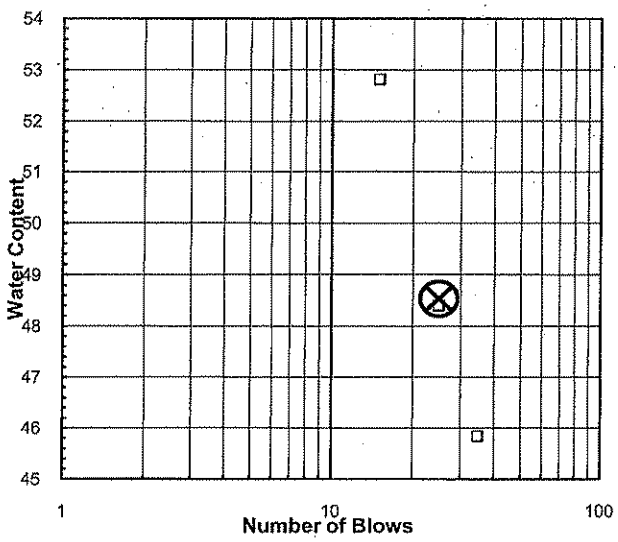
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	Y	A-D	E	MULTIPOINT
Wt. of Tare & WS (gm)	27.31	27.84	28.96	
Wt. of Tare & DS (gm)	23.26	23.78	24.67	
Wt. of Tare (gm)	15.59	15.39	15.31	
Wt. of Water (gm)	4.1	4.1	4.3	
Wt. of DS (gm)	7.7	8.4	9.4	
Moisture Content (%)	**52.8**	**48.4**	**45.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	N	A	
Wt. of Tare & WS (gm)	21.49	21.56	
Wt. of Tare & DS (gm)	19.91	20.05	
Wt. of Tare (gm)	15.31	15.21	
Wt. of Water (gm)	1.6	1.5	
Wt. of DS (gm)	4.6	4.8	
Moisture Content (%)	**34.3**	**31.2**	**3.1**

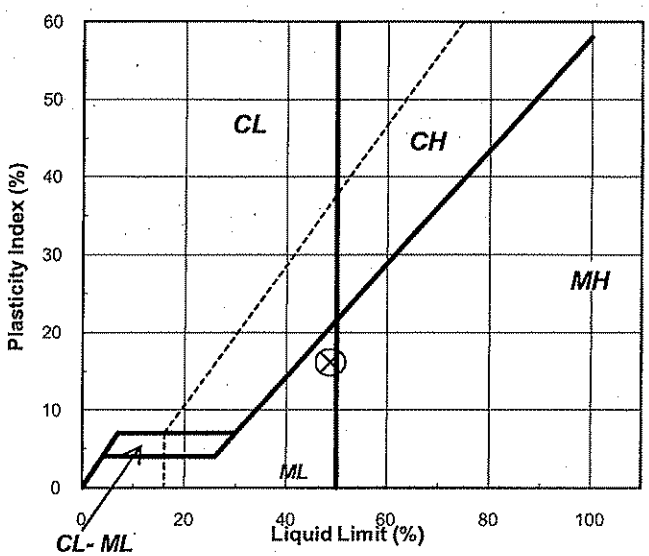
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**49**
Plastic Limit (%)	**33**
Plasticity Index (%)	**16**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 10/9/2009 *Checked By* GEM *Date* 10-12-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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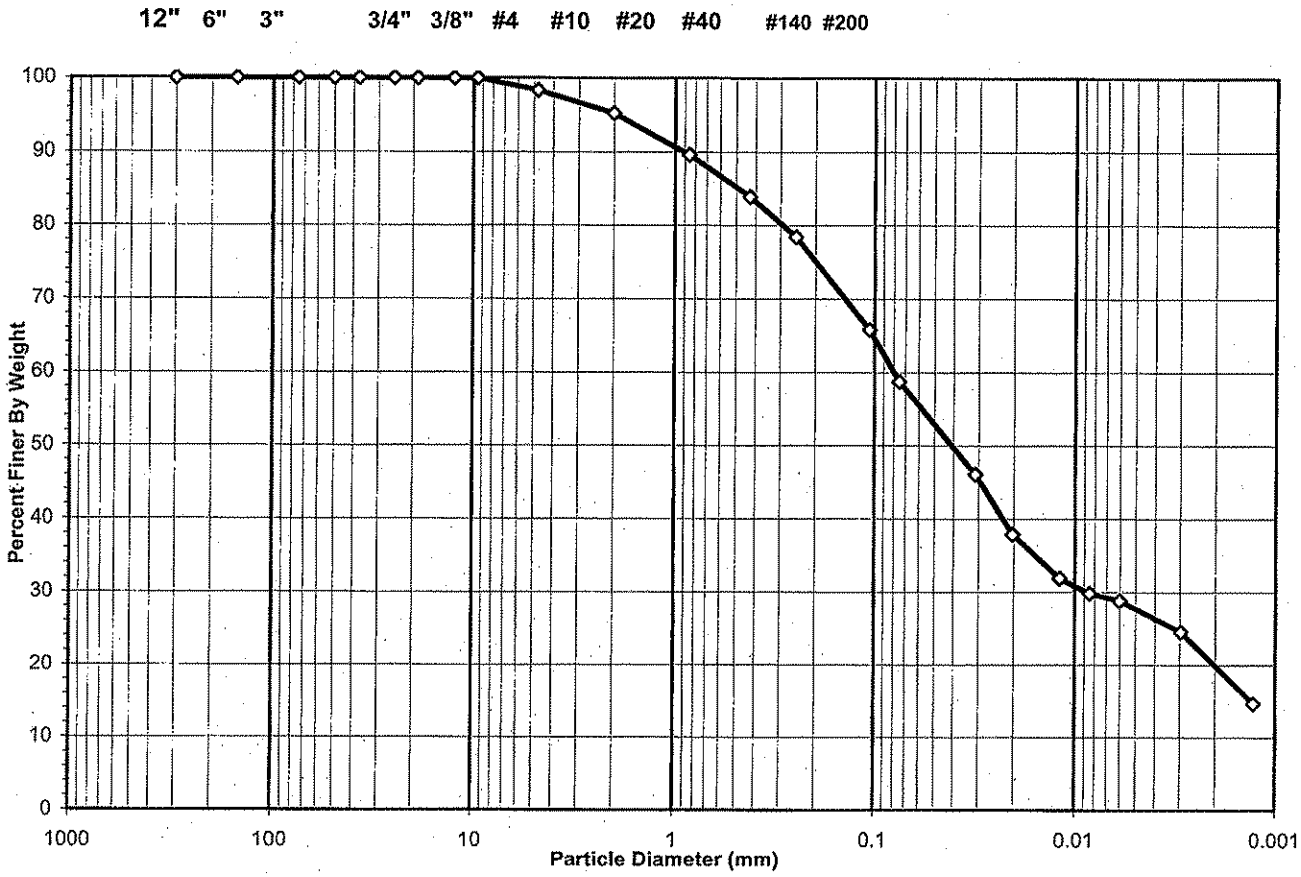
SIEVE AND HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-07	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	1.67
#4 To #200	*Sand*	39.61
Finer Than #200	*Silt & Clay*	58.72

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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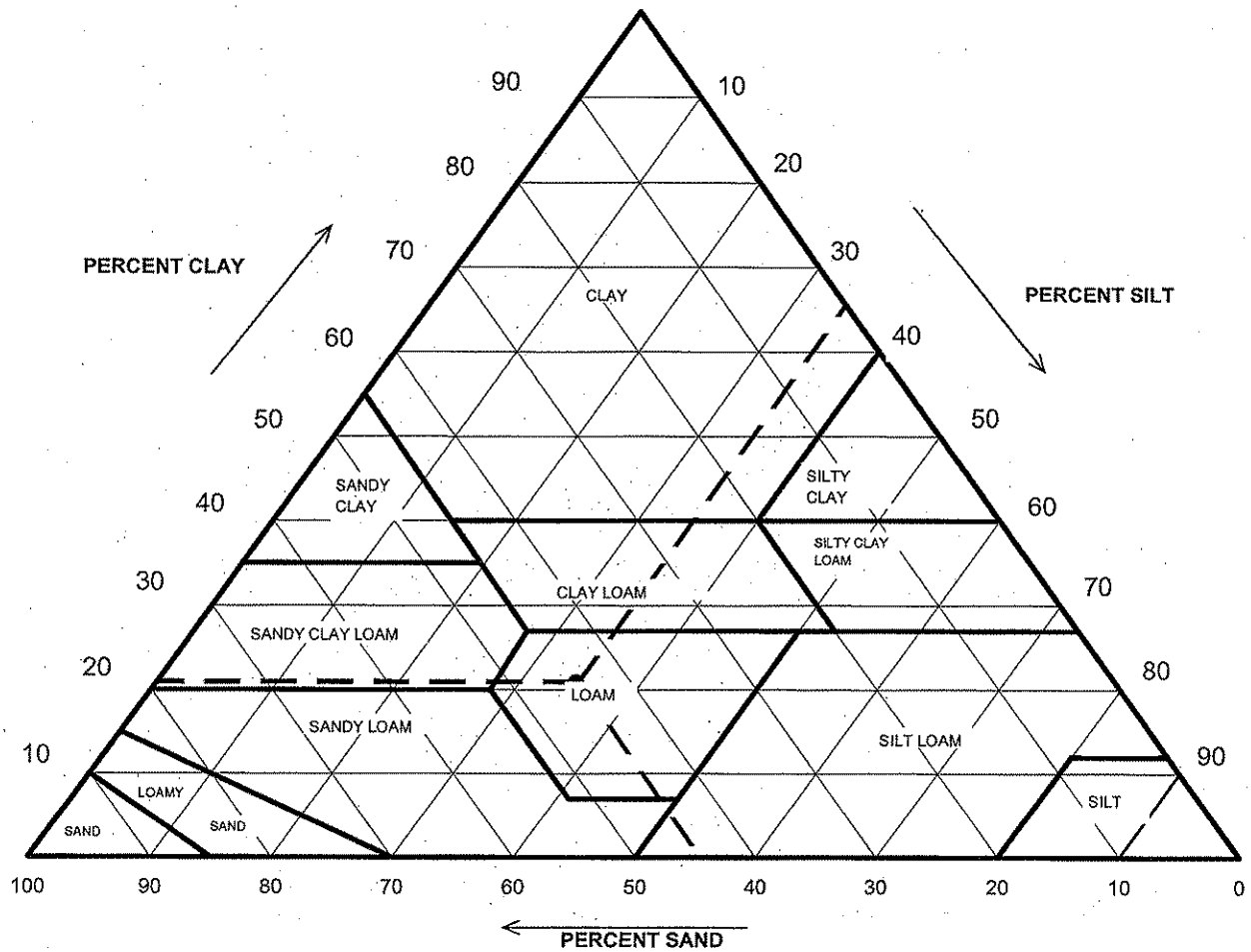
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-07	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	4.79	**0.00**
2	95.21	*Sand*	42.34	**44.47**
0.05	52.87	*Silt*	32.94	**34.59**
0.002	19.93	*Clay*	19.93	**20.93**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:05/12/09 REVISION:0 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-07-07 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-07	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	208	Tare No.	AB
Wgt.Tare + Wet Soil (gm)	558.72	Wgt.Tare + Wet Soil (gm)	40.32
Wgt.Tare + Dry Soil (gm)	481.12	Wgt.Tare + Dry Soil (gm)	38.43
Weight of Tare (gm)	169.78	Weight of Tare (gm)	15.56
Weight of Water (gm)	77.60	Weight of Water (gm)	1.89
Weight of Dry Soil (gm)	311.34	Weight of Dry Soil (gm)	22.87
Moisture Content (%)	**24.9**	**Moisture Content (%)**	**8.3**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	388.94	Weight of the Dry Sample (gm)	357.52
Dry Weight +#10 Material(gm)	311.3	Weight of minus #200 material (gm)	28.48
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	329.04
Dry Weight Hydro. Material (gm)	46.18		
Total Dry Weight Sample (gm)	357.52	**J-FACTOR (%FINER THAN #10)**	**0.9521**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	5.19	1.67	1.67	98.33	**98.33**
#10	2.00	9.72	3.12	4.79	95.21	**95.21**
#20	0.85	2.72	5.89	5.89	94.11	**89.60**
#40	0.425	2.78	6.02	11.91	88.09	**83.87**
#60	0.250	2.64	5.72	17.63	82.37	**78.43**
#140	0.106	6.13	13.27	30.90	69.10	**65.79**
#200	0.075	3.43	7.43	38.33	61.67	**58.72**
Pan	-	28.48	61.67	100.00	-	-

Notes :

Tested By SD Date 10/9/2009 Checked By GBM Date 10-12-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-17
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9
Project No.	2009-666-07	Sample No.	L3
Lab ID	2009-666-07-07	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	24.3	4.45	22.6	48.3	0.01278	0.0311	**46.0**
5		23.0	24.3	4.45	18.6	39.8	0.01278	0.0202	**37.9**
15		20.0	24.4	4.38	15.6	33.5	0.01276	0.0119	**31.9**
30		19.0	24.4	4.38	14.6	31.3	0.01276	0.0085	**29.8**
60		18.5	24.4	4.38	14.1	30.3	0.01276	0.0060	**28.8**
250		16.0	25.0	3.98	12.0	25.8	0.01268	0.0030	**24.5**
1440		12.0	23.8	4.79	7.2	15.5	0.01285	0.0013	**14.7**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	46.18	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	95.21
Weight of Dry Material (gm)	46.18		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 10/8/2009 Checked By GEM Date 10-12-09

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PERMEABILITY TEST

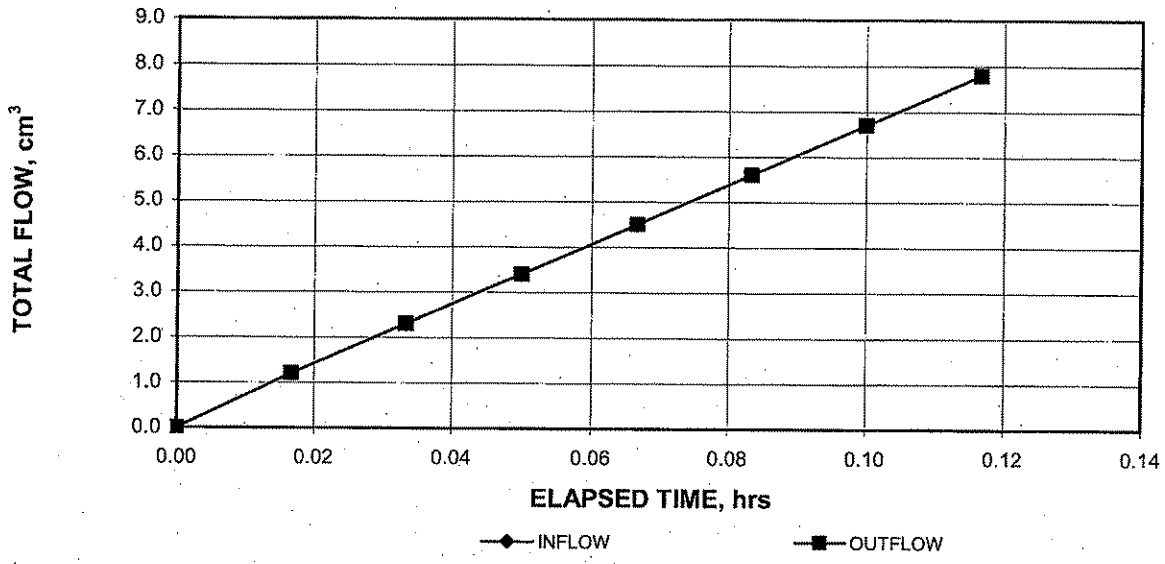
ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

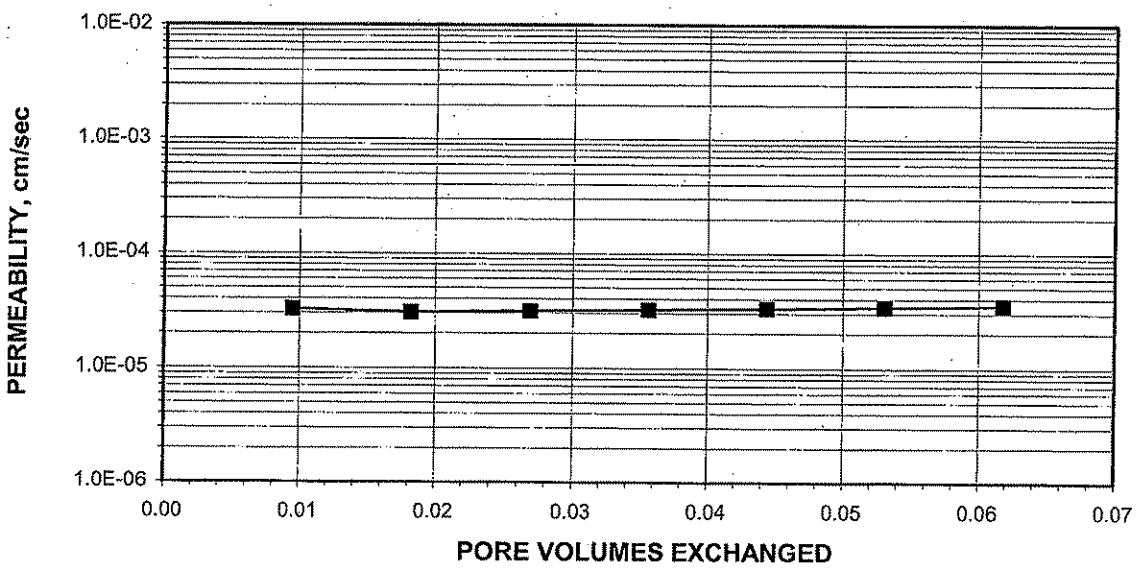
Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID No.	2009-666-13-01		

AVERAGE PERMEABILITY = 3.3E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.3E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/1/2009 Checked By: GDM Date: 12-3-09

DCN: CT-22C DATE: 12/1/2009 FILE: [2009-666-13-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID No.	2009-666-13-01		

Specific Gravity 2.75 Measured
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	203	813
Wt. of Tare & WS (gm.)	391.01	277.16
Wt. of Tare & DS (gm.)	346.79	238.95
Wt. of Tare (gm.)	171.11	113.08
Wt. of Water (gm.)	44.22	38.21
Wt. of DS (gm.)	175.68	125.87
Moisture Content (%)	**25.2**	**30.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	512.61	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	512.61	533.85
Length 1 (in.)	2.663	2.653
Length 2 (in.)	2.688	2.685
Length 3 (in.)	2.665	2.645
Top Diameter (in.)	2.858	2.855
Middle Diameter (in.)	2.846	2.834
Bottom Diameter (in.)	2.832	2.814
Average Length (in.)	2.67	2.66
Average Area (in.^{2})	6.36	6.31
Sample Volume (cm^3)	278.42	275.13
Unit Wet Wt. (gm./ cm^3)	1.84	1.94
Unit Wet Wt. (pcf)	114.9	121.1
Unit Dry Wt. (pcf)	91.8	92.9
Unit Dry Wt. (gm./ cm^3)	1.47	1.49
Void Ratio, e	0.87	0.85
Porosity, n	0.47	0.46
Pore Volume (cm^3)	129.5	126.2
Total Wgt. Of Sample After Test		533.36

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-3-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID No.	2009-666-13-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.0	Sample Length (cm), L	6.76
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	75.0	Sample Area (cm^2), A	40.71
Total Pressure Head (cm)	70.3	Inflow Burette Area (cm^2), a-in	0.897
Hydraulic Gradient	10.40	Outflow Burette Area (cm^2), a-out	0.878
		B Parameter (%)	95

AVERAGE PERMEABILITY = 3.3E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.3E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/1/2009	9	46.5	0.00	0.0	0.0	96.3	0	23.2	NA
12/1/2009	9	47.5	0.02	1.2	1.2	93.6	0	23.2	3.2E-05
12/1/2009	9	48.5	0.03	2.3	2.3	91.2	0	23.2	3.0E-05
12/1/2009	9	49.5	0.05	3.4	3.4	88.7	0	23.2	3.1E-05
12/1/2009	9	50.5	0.07	4.5	4.5	86.2	0	23.2	3.2E-05
12/1/2009	9	51.5	0.08	5.6	5.6	83.8	0	23.2	3.3E-05
12/1/2009	9	52.5	0.10	6.7	6.7	81.3	0	23.2	3.4E-05
12/1/2009	9	53.5	0.12	7.8	7.8	78.9	1	23.2	3.5E-05

Tested By: TMS Date: 12/1/2009 Checked By: GBM Date: 12-3-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Description	**REDDISH BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

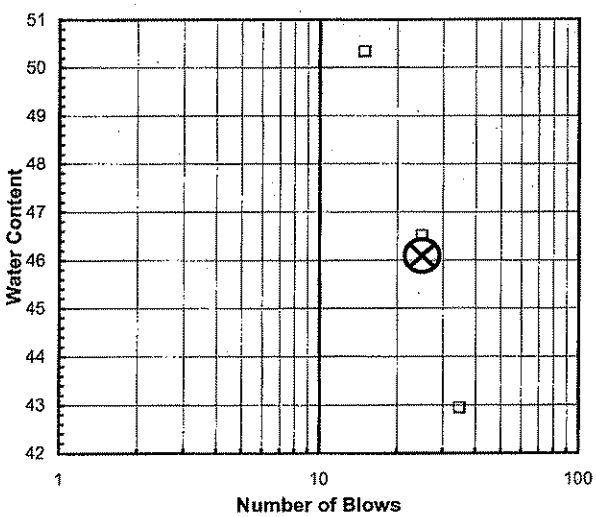
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-T	A-L	A-O	M U L T I P O I N T
Wt. of Tare & WS (gm)	27.12	28.51	26.16	
Wt. of Tare & DS (gm)	23.26	24.39	22.94	
Wt. of Tare (gm)	15.59	15.53	15.44	
Wt. of Water (gm)	3.9	4.1	3.2	
Wt. of DS (gm)	7.7	8.9	7.5	
Moisture Content (%)	**50.3**	**46.5**	**42.9**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	B-B	A-H	
Wt. of Tare & WS (gm)	22.81	22.28	
Wt. of Tare & DS (gm)	20.88	20.48	
Wt. of Tare (gm)	15.53	15.55	
Wt. of Water (gm)	1.9	1.8	
Wt. of DS (gm)	5.4	4.9	
Moisture Content (%)	**36.1**	**36.5**	**-0.4**

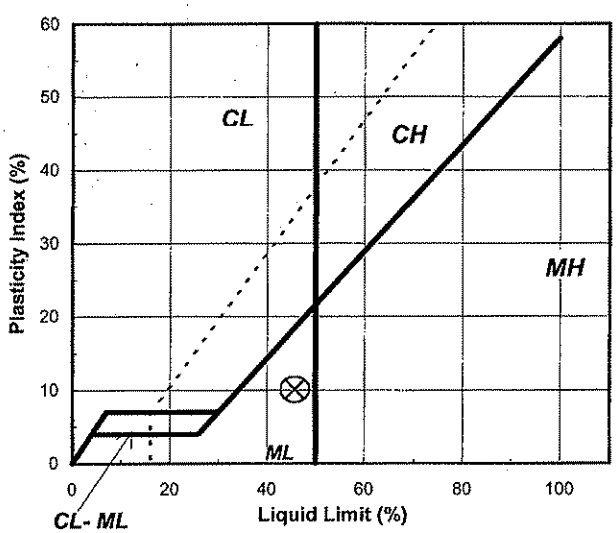
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**46**
Plastic Limit (%)	**36**
Plasticity Index (%)	**10**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 12/2/2009 *Checked By* GJM *Date* 12-3-09

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Visual Description	**REDDISH BROWN**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 27	R 280
Weight of Pycnometer + Soil + Water (gm)	718.67	715.75
Temperature, T (°Celsius)	26.4	25.7
Weight of Pycnometer + Water (gm)	687.70	685.06
Tare Number	P-12	211
Weight of Tare + Dry Soil (gm)	244.94	219.42
Weight of Tare (gm)	196.38	171.08
Weight of Dry Soil (gm)	48.56	48.34
Specific Gravity of Soil @ T	2.761	2.739
Specific Gravity of Water @ T	0.9967	0.9969
Conversion Factor for Temperature T	0.9985	0.9987
Specific Gravity @ 20° Celsius	2.765	2.743

Average Specific Gravity @ 20° Celsius	2.75

Tested By TMS *Date* 12/2/2009 *Checked By* GZM *Date* 12-3-09

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-01 PERM BACKUP.xls]Sheet1*

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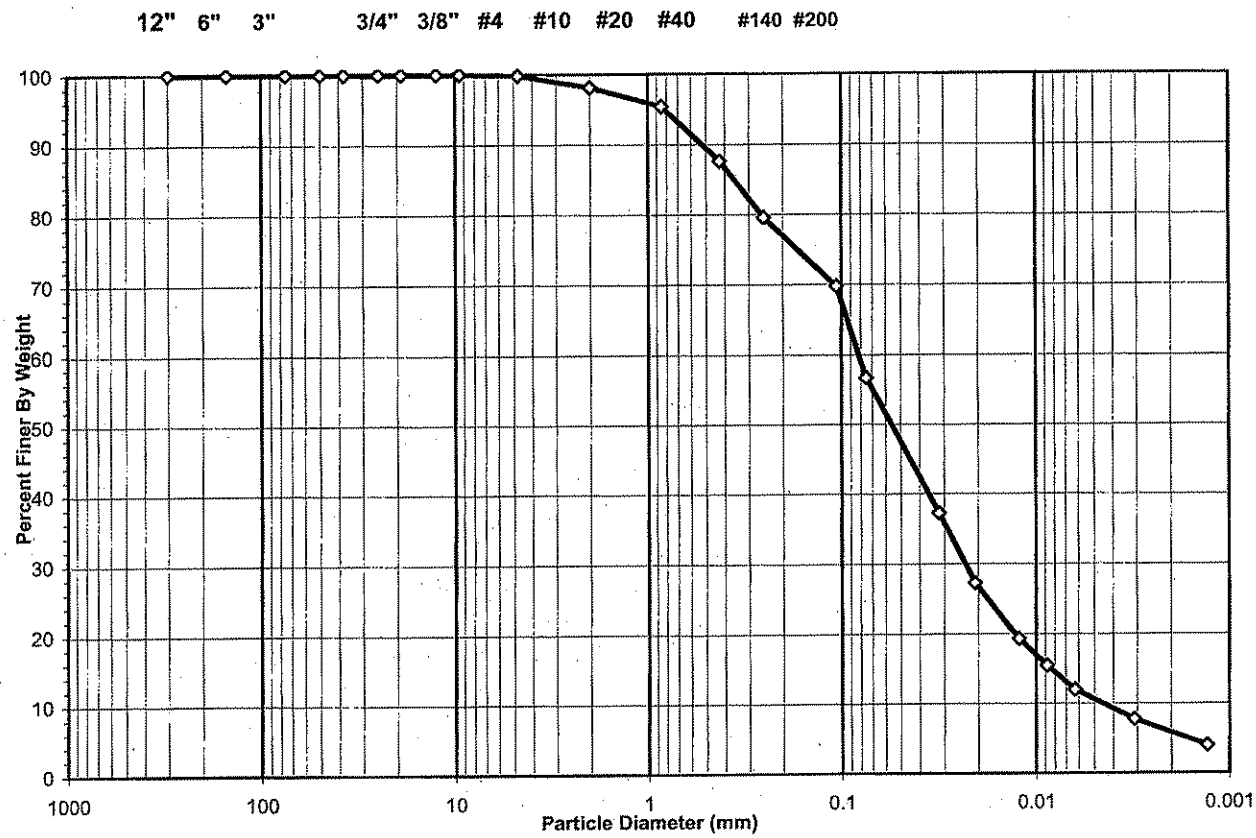
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.17
#4 To #200	*Sand*	43.19
Finer Than #200	*Silt & Clay*	56.64

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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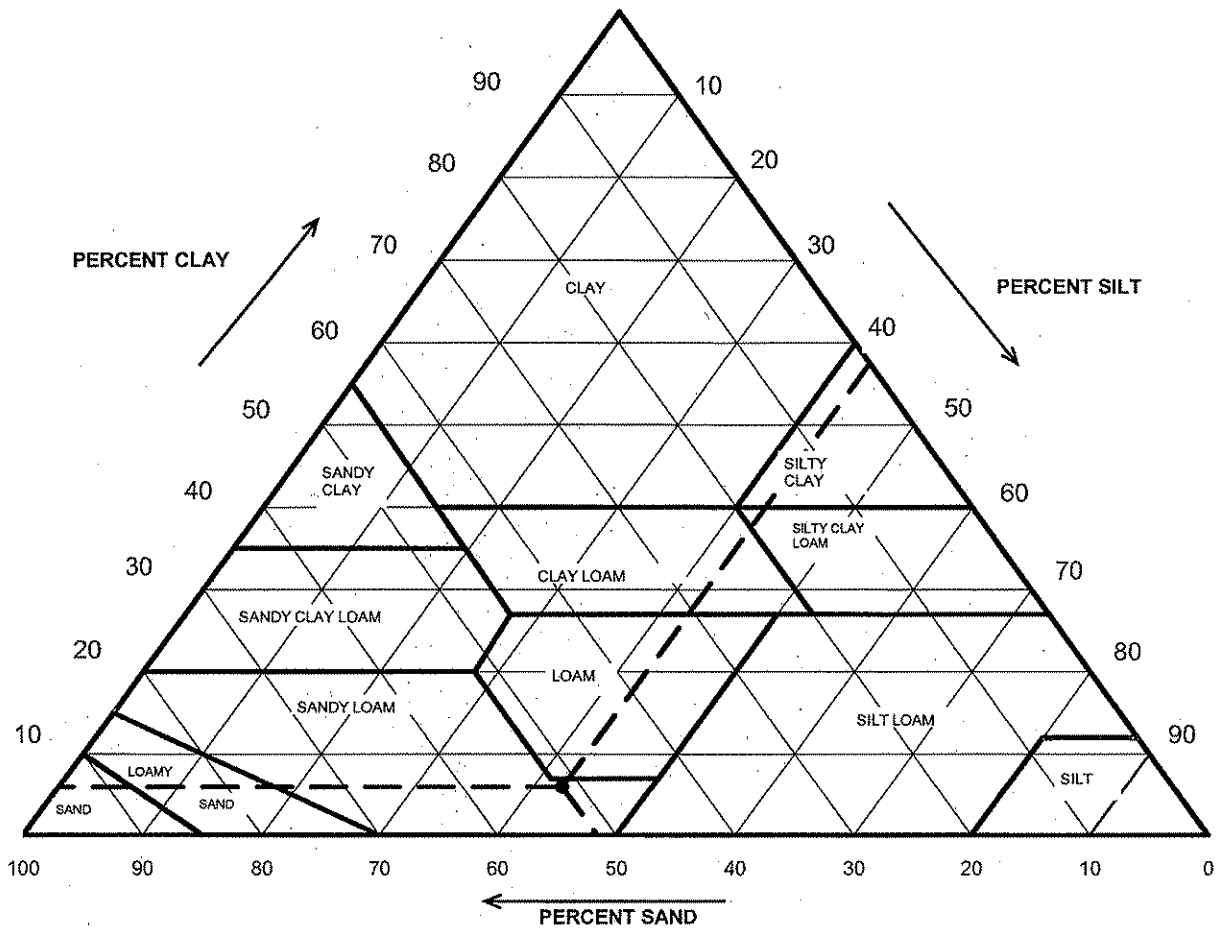
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.88	**0.00**
2	98.12	*Sand*	50.62	**51.58**
0.05	47.51	*Silt*	41.66	**42.46**
0.002	5.85	*Clay*	5.85	**5.96**

USDA Classification: ***SANDY LOAM***

 DCN: CT-53P DATE:05/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-735 ARCADIS\[2009-735-01-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	203	Tare No.	M-1
Wgt.Tare + Wet Soil (gm)	391.01	Wgt.Tare + Wet Soil (gm)	45.70
Wgt.Tare + Dry Soil (gm)	346.79	Wgt.Tare + Dry Soil (gm)	44.63
Weight of Tare (gm)	171.11	Weight of Tare (gm)	15.88
Weight of Water (gm)	44.22	Weight of Water (gm)	1.07
Weight of Dry Soil (gm)	175.68	Weight of Dry Soil (gm)	28.75
Moisture Content (%)	**25.2**	**Moisture Content (%)**	**3.7**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	219.90	Weight of the Dry Sample (gm)	223.89
Dry Weight +#10 Material(gm)	175.7	Weight of minus #200 material (gm)	27.83
Wet Weight Hydro. Material.(gm)	50.00	Weight of plus #200 material (gm)	196.06
Dry Weight Hydro. Material (gm)	48.21		
Total Dry Weight Sample (gm)	223.89	**J-FACTOR (%FINER THAN #10)**	**0.9812**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.30	0.17	0.17	99.83	**99.83**
#10	2.00	3.00	1.71	1.88	98.12	**98.12**
#20	0.85	1.34	2.78	2.78	97.22	**95.39**
#40	0.425	3.82	7.92	10.70	89.30	**87.62**
#60	0.250	3.94	8.17	18.88	81.12	**79.60**
#140	0.106	4.84	10.04	28.92	71.08	**69.75**
#200	0.075	6.44	13.36	42.28	57.72	**56.64**
Pan	-	27.83	57.72	100.00	-	-

Notes :

Tested By JBD Date 12/3/2009 Checked By GEM Date 12-8-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	23.0	5.33	18.7	38.0	0.01279	0.0318	**37.3**
5		19.0	23.0	5.33	13.7	27.8	0.01279	0.0208	**27.3**
15		15.0	23.0	5.33	9.7	19.7	0.01279	0.0123	**19.3**
30		13.0	23.1	5.26	7.7	15.7	0.01277	0.0088	**15.4**
60		11.0	23.5	4.99	6.0	12.2	0.01271	0.0062	**12.0**
250		9.0	23.3	5.12	3.9	7.9	0.01274	0.0031	**7.7**
1440		7.0	23.5	4.99	2.0	4.1	0.01271	0.0013	**4.0**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	48.21	a - Factor	0.98
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.12
Weight of Dry Material (gm)	48.21		
		Specific Gravity	2.75 Measured

Note:

Tested By JBD Date 12/2/2009 Checked By GEM Date 12-8-09

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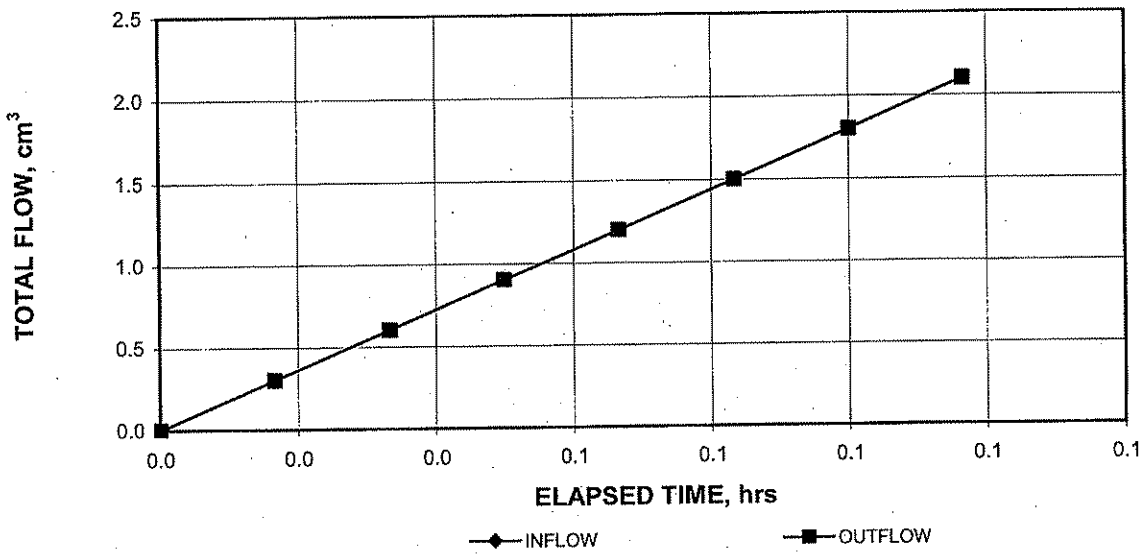
PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

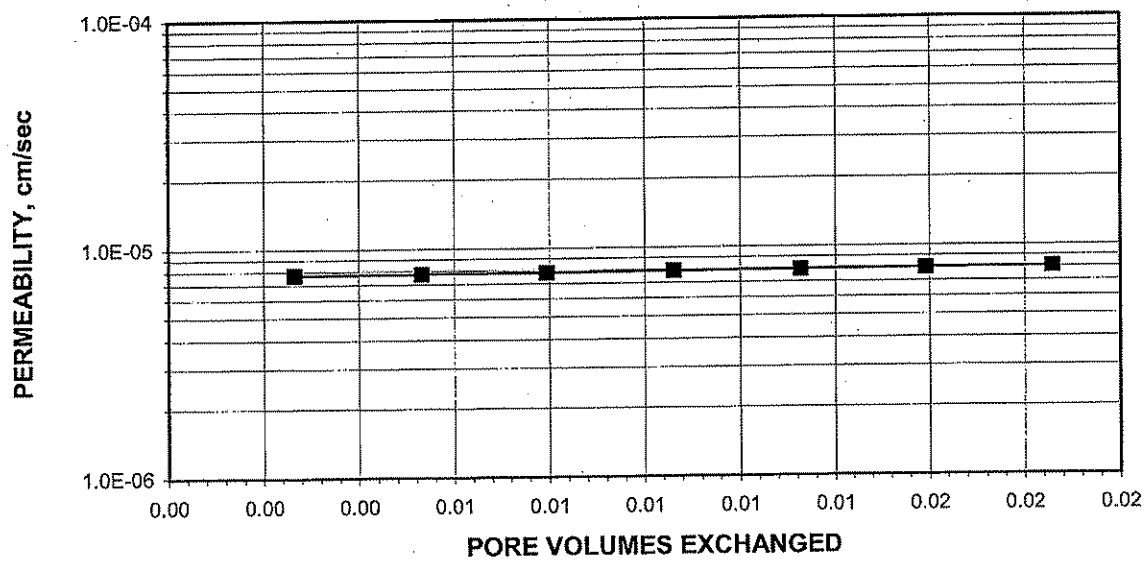
Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID No.	2009-666-13-01		

AVERAGE PERMEABILITY = 8.0E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 8.0E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/2/2009 Checked By: GEM Date: 12-8-09

DCN: CT-22C DATE: [illegible] FILE: [illegible]\2009-666 JOYCE WHITE OAK\[2009-666-13-01 PERM BACKUP.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID No.	2009-666-13-01		

Specific Gravity 2.77 Measured
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	833	807
Wt. of Tare & WS (gm.)	489.73	304.11
Wt. of Tare & DS (gm.)	446.82	259.32
Wt. of Tare (gm.)	259.39	104.97
Wt. of Water (gm.)	42.91	44.79
Wt. of DS (gm.)	187.43	154.35
Moisture Content (%)	**22.9**	**29.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	450.58	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	450.58	473.04
Length 1 (in.)	2.407	2.367
Length 2 (in.)	2.400	2.357
Length 3 (in.)	2.372	2.335
Top Diameter (in.)	2.853	2.853
Middle Diameter (in.)	2.853	2.851
Bottom Diameter (in.)	2.838	2.835
Average Length (in.)	2.39	2.35
Average Area (in.^{2})	6.37	6.36
Sample Volume (cm^3)	249.81	245.35
Unit Wet Wt. (gm./ cm^3)	1.80	1.93
Unit Wet Wt. (pcf)	112.6	120.4
Unit Dry Wt. (pcf)	91.6	93.3
Unit Dry Wt. (gm./ cm^3)	1.47	1.49
Void Ratio, e	0.89	0.85
Porosity, n	0.47	0.46
Pore Volume (cm^3)	117.5	113.0
Total Wgt. Of Sample After Test		469.4

Tested By: TMS Date: 12/2/2009 Checked By: GEM Date: 12-8-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID No.	2009-666-13-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	49.1	Sample Length (cm), L	5.98
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.23
Cell (psi)	75.0	Sample Area (cm^2), A	41.05
Total Pressure Head (cm)	63.3	Inflow Burette Area (cm^2), a-in	0.959
Hydraulic Gradient	10.59	Outflow Burette Area (cm^2), a-out	0.983
		B Parameter (%)	95

AVERAGE PERMEABILITY = 8.0E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 8.0E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/2/2009	11	30	0.0	0.0	0.0	88.1	0	23.1	NA
12/2/2009	11	31	0.0	0.3	0.3	87.4	0	23.1	7.7E-06
12/2/2009	11	32	0.0	0.6	0.6	86.8	0	23.1	7.8E-06
12/2/2009	11	33	0.1	0.9	0.9	86.2	0	23.1	7.8E-06
12/2/2009	11	34	0.1	1.2	1.2	85.6	0	23.1	7.9E-06
12/2/2009	11	35	0.1	1.5	1.5	85.0	0	23.1	7.9E-06
12/2/2009	11	36	0.1	1.8	1.8	84.4	0	23.1	8.0E-06
12/2/2009	11	37	0.1	2.1	2.1	83.7	1	23.1	8.0E-06

Tested By: TMS Date: 12/2/2009 Checked By: GEM Date: 12-8-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

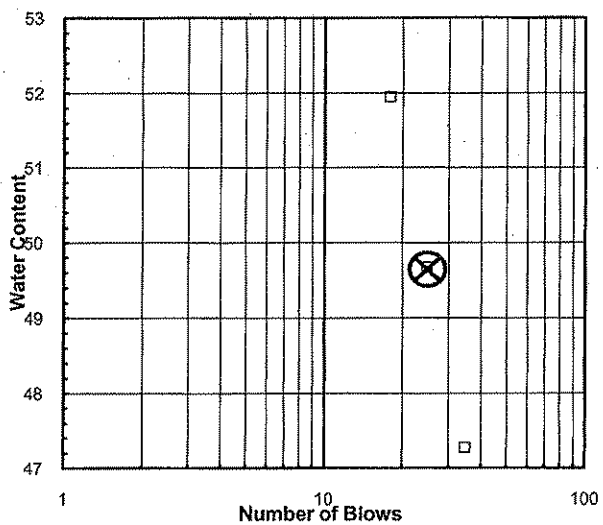
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	L	V	K-A	MULTIPOINT
Wt. of Tare & WS (gm)	27.33	28.65	28.95	
Wt. of Tare & DS (gm)	23.19	24.20	24.63	
Wt. of Tare (gm)	15.22	15.24	15.49	
Wt. of Water (gm)	4.1	4.5	4.3	
Wt. of DS (gm)	8.0	9.0	9.1	
Moisture Content (%)	**51.9**	**49.7**	**47.3**	
Number of Blows	**18**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	A-M	A-C	
Wt. of Tare & WS (gm)	21.59	21.71	
Wt. of Tare & DS (gm)	19.94	20.05	
Wt. of Tare (gm)	15.36	15.56	
Wt. of Water (gm)	1.7	1.7	
Wt. of DS (gm)	4.6	4.5	
Moisture Content (%)	**36.0**	**37.0**	**-0.9**

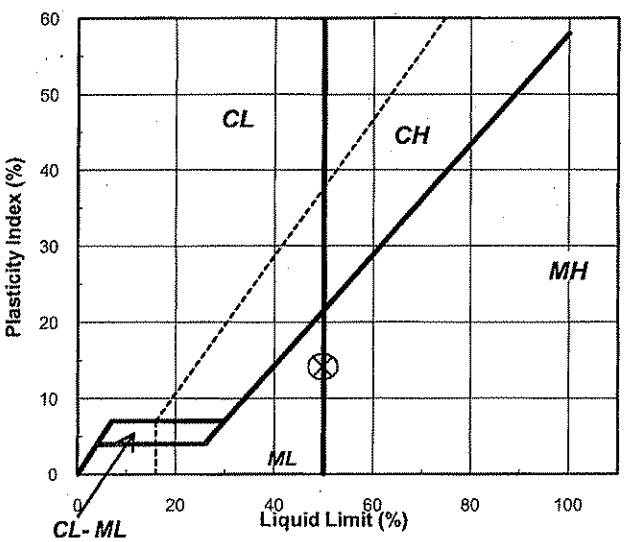
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**50**
Plastic Limit (%)	**36**
Plasticity Index (%)	**14**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/3/2009 *Checked By* GEM *Date* 12-8-09

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Visual Description	**REDDISH BROWN ELASTIC SILT** (Minus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 27	R 280
Weight of Pycnometer + Soil + Water (gm)	717.03	714.31
Temperature, T (°Celsius)	23.3	23.5
Weight of Pycnometer + Water (gm)	688.09	685.45
Tare Number	838	840
Weight of Tare + Dry Soil (gm)	307.05	307.85
Weight of Tare (gm)	261.68	262.71
Weight of Dry Soil (gm)	45.37	45.14
Specific Gravity of Soil @ T	2.761	2.772
Specific Gravity of Water @ T	0.9975	0.9974
Conversion Factor for Temperature T	0.9993	0.9992
Specific Gravity @ 20° Celsius	2.763	2.774

Average Specific Gravity @ 20° Celsius	2.77

Tested By TMS *Date* 12/3/2009 *Checked By* GZM *Date* 12-8-09

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-01 Sp. Gravity Backup.xls]Sheet1*

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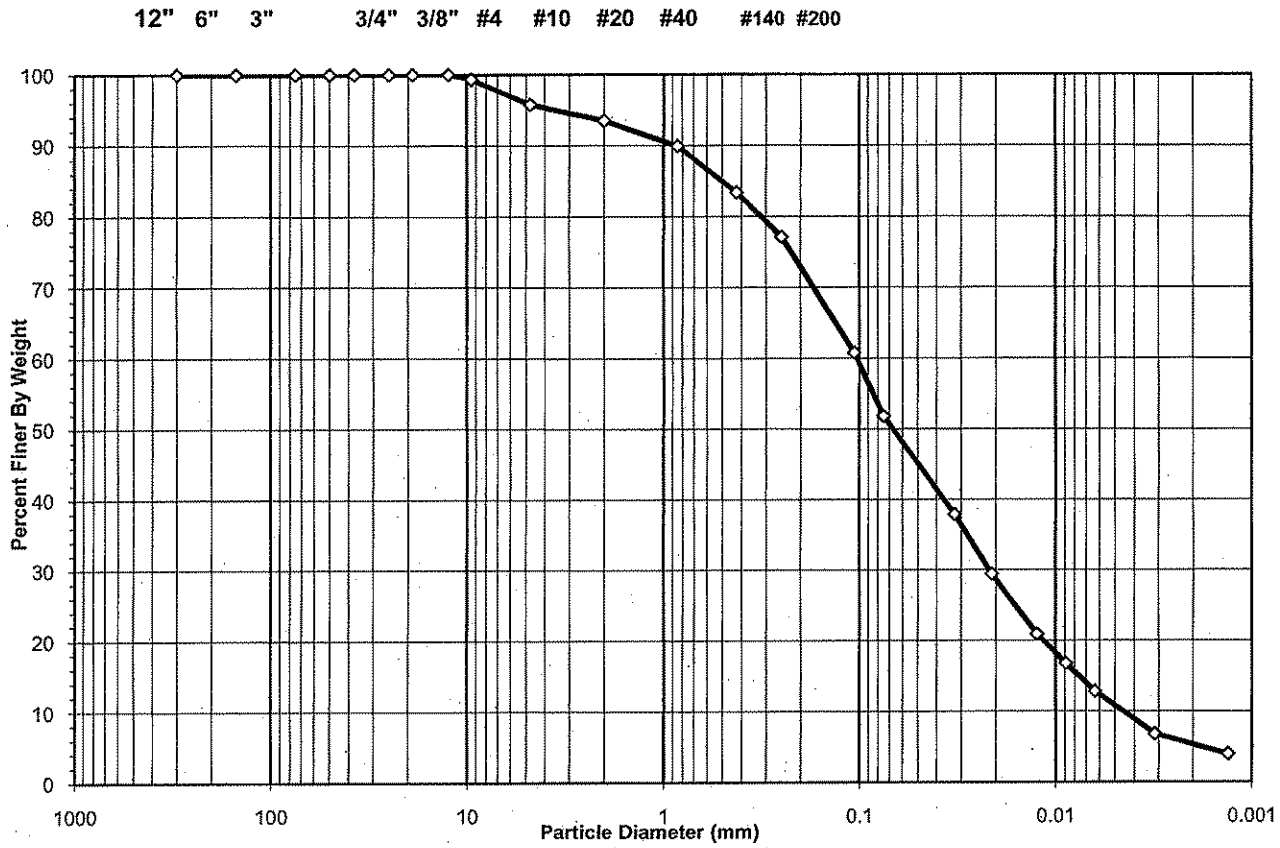
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	20097-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel		sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	4.21
#4 To #200	*Sand*	43.96
Finer Than #200	*Silt & Clay*	51.83

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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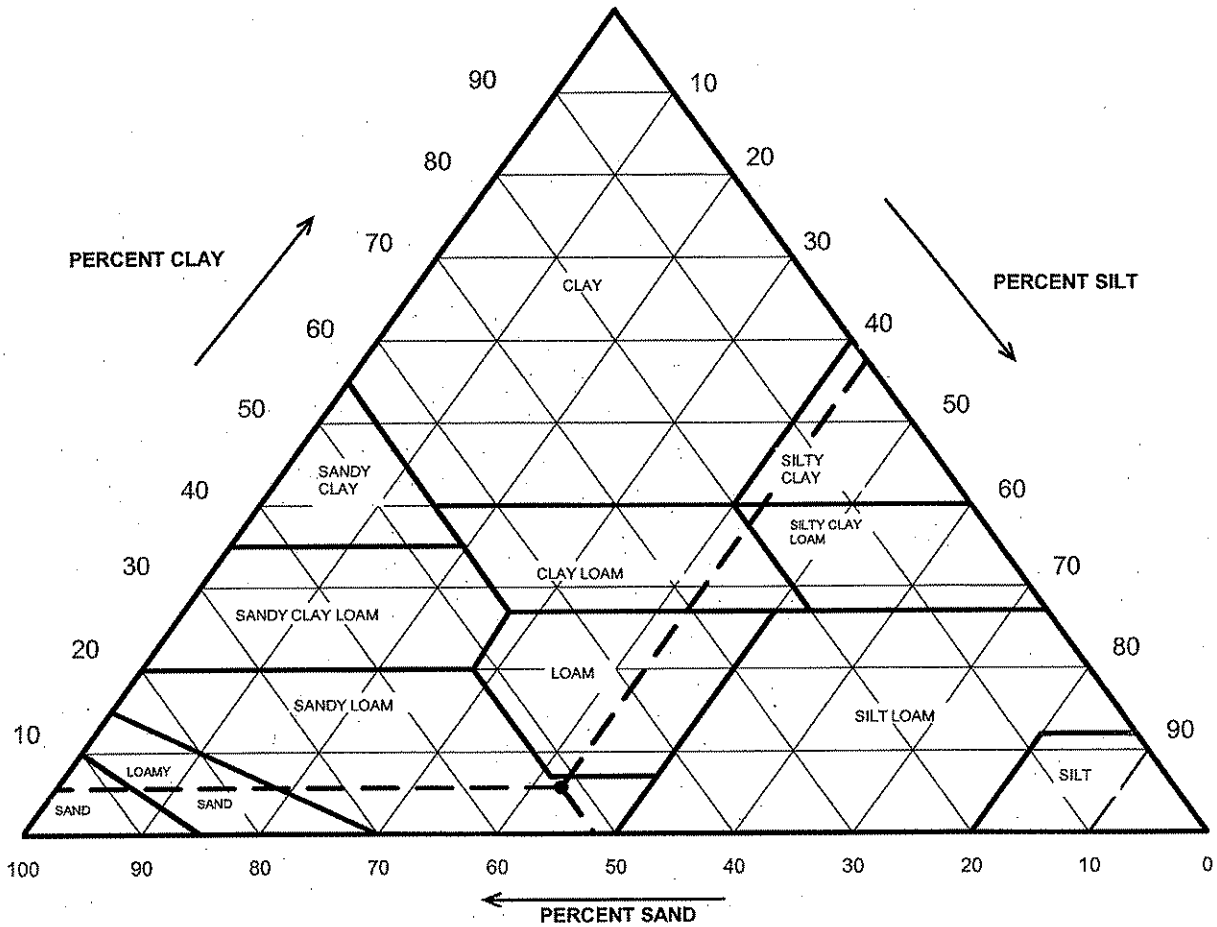
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	20097-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	6.42	**0.00**
2	93.58	*Sand*	48.47	**51.80**
0.05	45.11	*Silt*	39.78	**42.51**
0.002	5.32	*Clay*	5.32	**5.69**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-01 #10 Split Hydro rev 9 BACKUP.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	20097-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	833	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	489.73	Wgt.Tare + Wet Soil (gm)	37.22
Wgt.Tare + Dry Soil (gm)	446.82	Wgt.Tare + Dry Soil (gm)	34.50
Weight of Tare (gm)	259.39	Weight of Tare (gm)	15.72
Weight of Water (gm)	42.91	Weight of Water (gm)	2.72
Weight of Dry Soil (gm)	187.43	Weight of Dry Soil (gm)	18.78
Moisture Content (%)	**22.9**	**Moisture Content (%)**	**14.5**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	230.34	Weight of the Dry Sample (gm)	231.14
Dry Weight +#10 Material(gm)	187.4	Weight of minus #200 material (gm)	24.21
Wet Weight Hydro. Material.(gm)	50.04	Weight of plus #200 material (gm)	206.93
Dry Weight Hydro. Material (gm)	43.71		
Total Dry Weight Sample (gm)	231.14	**J-FACTOR (%FINER THAN #10)**	**0.9358**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	1.20	0.64	0.64	99.36	**99.36**
#4	4.75	6.69	3.57	4.21	95.79	**95.79**
#10	2.00	4.15	2.21	6.42	93.58	**93.58**
#20	0.85	1.69	3.87	3.87	96.13	**89.96**
#40	0.425	3.06	7.00	10.87	89.13	**83.41**
#60	0.250	2.92	6.68	17.55	82.45	**77.16**
#140	0.106	7.63	17.46	35.00	65.00	**60.82**
#200	0.075	4.20	9.61	44.61	55.39	**51.83**
Pan	-	24.21	55.39	100.00	-	-

Notes :

Tested By SD Date 12/7/2009 Checked By GZM Date 12-8-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST36A
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	20097-666-13	Sample No.	L1
Lab ID	2009-666-13-01	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	23.3	5.12	17.9	39.9	0.01267	0.0317	**37.4**
5		19.0	23.3	5.12	13.9	31.0	0.01267	0.0206	**29.0**
15		15.0	23.3	5.12	9.9	22.1	0.01267	0.0122	**20.6**
30		13.0	23.4	5.06	7.9	17.7	0.01266	0.0087	**16.6**
60		11.0	23.6	4.92	6.1	13.6	0.01263	0.0062	**12.7**
250		8.0	23.8	4.79	3.2	7.2	0.01260	0.0031	**6.7**
1440		7.0	23.3	5.12	1.9	4.2	0.01267	0.0013	**3.9**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	43.71	a - Factor	0.976
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	93.58
Weight of Dry Material (gm)	43.71		
		Specific Gravity	2.77 Measured

Note:

Tested By JBD Date 12/4/2009 Checked By GEM Date 12-8-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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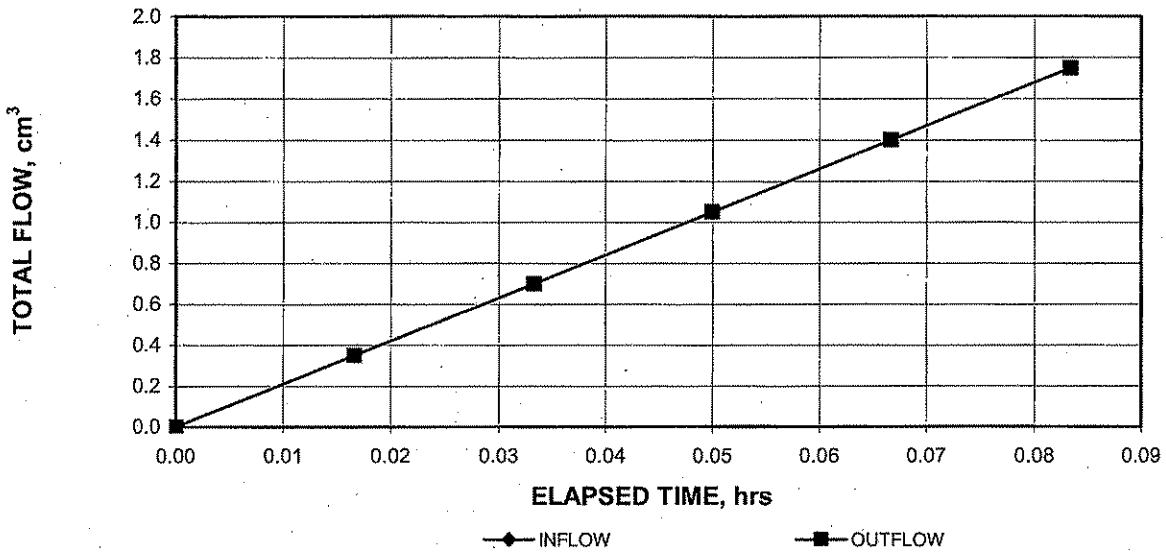
INTEGRITY IN TESTING

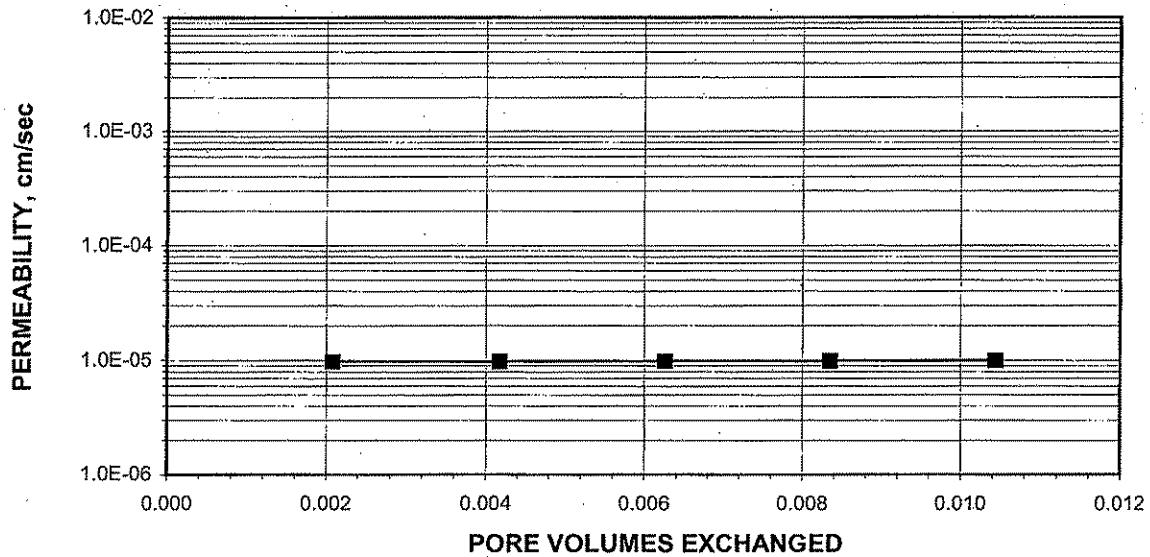
Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID No.	2009-666-13-02		

AVERAGE PERMEABILITY = 9.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.9E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-3-09

DCN: CT-22C DATE: 12/1/2009 REV: 2 [Server\data\Geo\REV2\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID No.	2009-666-13-02		
		Specific Gravity	2.78 Measured
		Sample Condition	Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	212	807
Wt. of Tare & WS (gm.)	441.79	273.57
Wt. of Tare & DS (gm.)	387.43	229.90
Wt. of Tare (gm.)	171.51	105.08
Wt. of Water (gm.)	54.36	43.67
Wt. of DS (gm.)	215.92	124.82
Moisture Content (%)	**25.2**	**35.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	579.31	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	579.31	624.71
Length 1 (in.)	3.237	3.250
Length 2 (in.)	3.243	3.223
Length 3 (in.)	3.239	3.219
Top Diameter (in.)	2.836	2.860
Middle Diameter (in.)	2.832	2.839
Bottom Diameter (in.)	2.837	2.805
Average Length (in.)	3.24	3.23
Average Area (in.^{2})	6.31	6.31
Sample Volume (cm^3)	335.12	334.11
Unit Wet Wt. (gm./ cm^3)	1.73	1.87
Unit Wet Wt. (pcf)	107.9	116.7
Unit Dry Wt. (pcf)	86.2	86.5
Unit Dry Wt. (gm./ cm^3)	1.38	1.39
Void Ratio, e	1.01	1.01
Porosity, n	0.50	0.50
Pore Volume (cm^3)	168.6	167.6
Total Wgt. Of Sample After Test		614.52

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-3-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID No.	2009-666-13-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.21
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.20
Cell (psi)	75.0	Sample Area (cm^2), A	40.72
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.877
Hydraulic Gradient	10.28	Outflow Burette Area (cm^2), a-out	0.886
		B Parameter (%)	95

AVERAGE PERMEABILITY = 9.9E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.9E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/1/2009	9	59	0.00	0.0	0.0	111.0	0	23.2	NA
12/1/2009	10	0	0.02	0.4	0.3	110.3	0	23.2	9.7E-06
12/1/2009	10	1	0.03	0.7	0.7	109.5	0	23.2	9.8E-06
12/1/2009	10	2	0.05	1.1	1.1	108.7	0	23.2	9.9E-06
12/1/2009	10	3	0.07	1.4	1.4	107.9	0	23.2	9.9E-06
12/1/2009	10	4	0.08	1.8	1.8	107.1	1	23.2	1.0E-05

Tested By: TMS Date: 12/1/2009 Checked By: GZM Date: 12-3-09

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID	2009-666-13-02	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

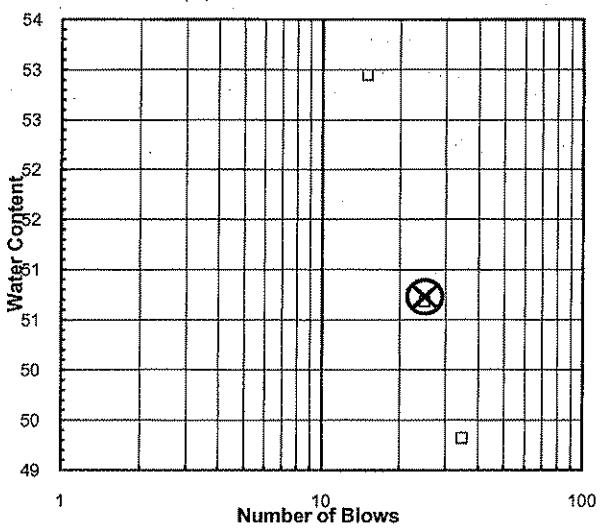
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A-I	P-1	U-1	M U L T I P O I N T
Wt. of Tare & WS (gm)	28.19	30.19	27.63	
Wt. of Tare & DS (gm)	23.78	25.32	23.68	
Wt. of Tare (gm)	15.45	15.71	15.67	
Wt. of Water (gm)	4.4	4.9	4.0	
Wt. of DS (gm)	8.3	9.6	8.0	
Moisture Content (%)	**52.9**	**50.7**	**49.3**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	O	B	
Wt. of Tare & WS (gm)	22.24	21.70	
Wt. of Tare & DS (gm)	20.13	19.73	
Wt. of Tare (gm)	15.20	15.18	
Wt. of Water (gm)	2.1	2.0	
Wt. of DS (gm)	4.9	4.6	
Moisture Content (%)	**42.8**	**43.3**	**-0.5**

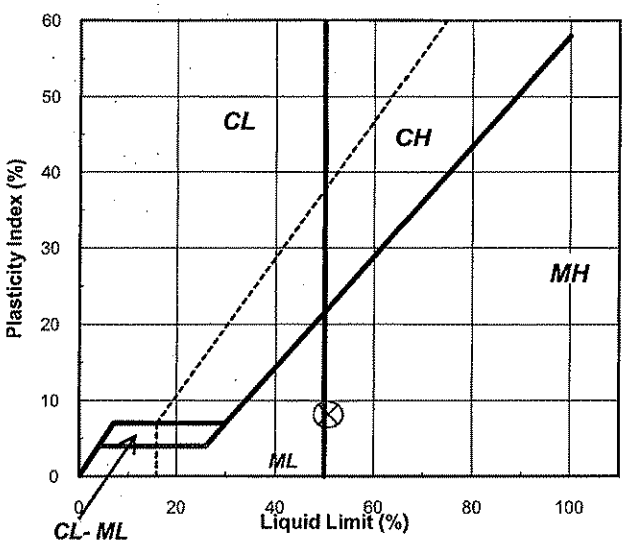
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**51**
Plastic Limit (%)	**43**
Plasticity Index (%)	**8**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/2/2009 *Checked By* Gam *Date* 12-8-09

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INTEGRITY IN TESTING

SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID	2009-666-13-02	Visual Description	**REDDISH BROWN**
			(Minus No.4 sieve material, airdried)

Replicate Number		**1**		**2**
Pycnometer ID	R	27	R	280
Weight of Pycnometer + Soil + Water (gm)		719.1		716.58
Temperature, T (°Celsius)		23.2		23.4
Weight of Pycnometer + Water (gm)		688.10		685.46
Tare Number		200		201
Weight of Tare + Dry Soil (gm)		220.28		219.25
Weight of Tare (gm)		171.75		170.7
Weight of Dry Soil (gm)		48.53		48.55
Specific Gravity of Soil @ T		2.768		2.785
Specific Gravity of Water @ T		0.9975		0.9975
Conversion Factor for Temperature T		0.9993		0.9993
Specific Gravity @ 20° Celsius		2.770		2.787

Average Specific Gravity @ 20° Celsius	2.78

Tested By TMS *Date* 12/2/2009 *Checked By* GBM *Date* 12-3-09

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-02 Sp. Gravity.xls]Sheet1*

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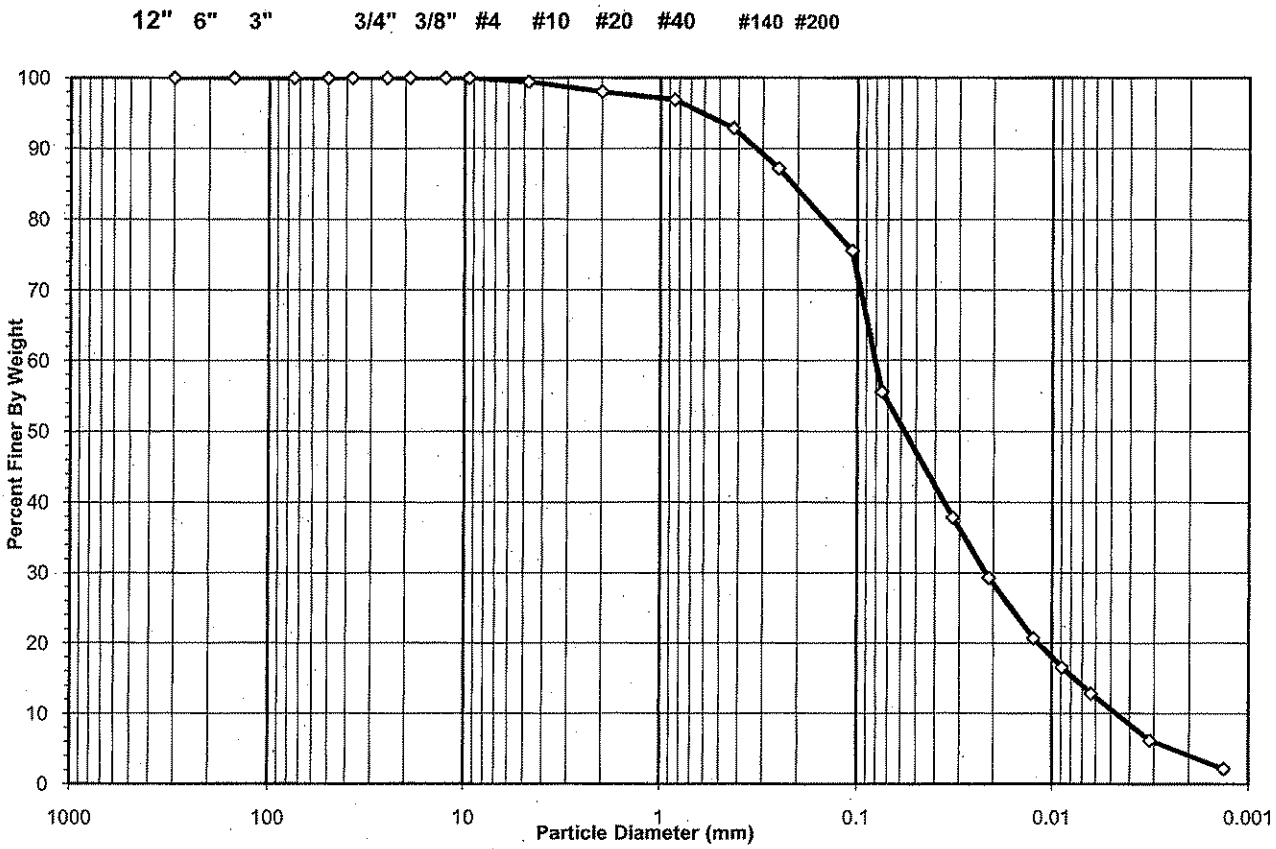
INTEGRITY IN TESTING

SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID	2009-666-13-02	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.53
#4 To #200	*Sand*	43.87
Finer Than #200	*Silt & Clay*	55.61

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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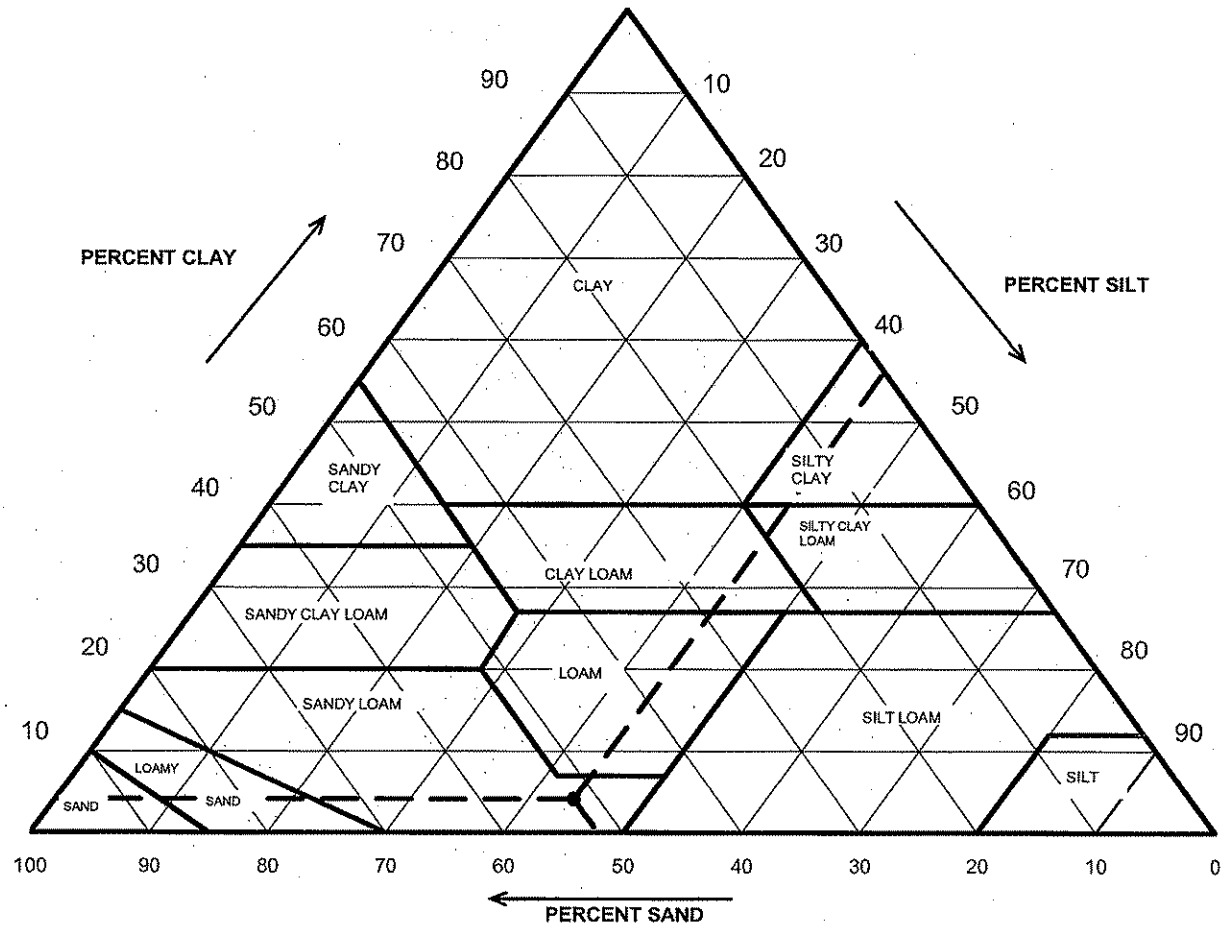
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID	2009-666-13-02	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	1.94	**0.00**
2	98.06	*Sand*	51.05	**52.06**
0.05	47.01	*Silt*	42.97	**43.82**
0.002	4.05	*Clay*	4.05	**4.13**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-735 ARCADIS\[2009-735-01-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID	2009-666-13-02	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	212	Tare No.	P-1
Wgt.Tare + Wet Soil (gm)	441.79	Wgt.Tare + Wet Soil (gm)	40.13
Wgt.Tare + Dry Soil (gm)	387.43	Wgt.Tare + Dry Soil (gm)	37.82
Weight of Tare (gm)	171.51	Weight of Tare (gm)	15.70
Weight of Water (gm)	54.36	Weight of Water (gm)	2.31
Weight of Dry Soil (gm)	215.92	Weight of Dry Soil (gm)	22.12
Moisture Content (%)	**25.2**	**Moisture Content (%)**	**10.4**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	270.28	Weight of the Dry Sample (gm)	261.24
Dry Weight +#10 Material(gm)	215.9	Weight of minus #200 material (gm)	25.70
Wet Weight Hydro. Material.(gm)	50.05	Weight of plus #200 material (gm)	235.54
Dry Weight Hydro. Material (gm)	45.32		
Total Dry Weight Sample (gm)	261.24	**J-FACTOR (%FINER THAN #10)**	**0.9806**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.14	0.53	0.53	99.47	**99.47**
#10	2.00	3.05	1.41	1.94	98.06	**98.06**
#20	0.85	0.53	1.17	1.17	98.83	**96.91**
#40	0.425	1.86	4.10	5.27	94.73	**92.89**
#60	0.250	2.60	5.74	11.01	88.99	**87.26**
#140	0.106	5.39	11.89	22.91	77.09	**75.60**
#200	0.075	9.24	20.39	43.29	56.71	**55.61**
Pan	-	25.70	56.71	100.00	-	-

Notes :

Tested By JBD Date 12/3/2009 Checked By GEM Date 12-8-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST37
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L2
Lab ID	2009-666-13-02	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	23.0	23.0	23.0	5.33	17.7	38.0	0.01268	0.0317	**37.2**
5		19.0	23.0	5.33	13.7	29.4	0.01268	0.0206	**28.8**
15		15.0	23.0	5.33	9.7	20.8	0.01268	0.0122	**20.4**
30		13.0	23.1	5.26	7.7	16.6	0.01266	0.0087	**16.3**
60		11.0	23.5	4.99	6.0	12.9	0.01260	0.0062	**12.7**
250		8.0	23.3	5.12	2.9	6.2	0.01263	0.0031	**6.1**
1440		6.0	23.5	4.99	1.0	2.2	0.01260	0.0013	**2.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	45.32	a - Factor	0.974
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	98.06
Weight of Dry Material (gm)	45.32		
		Specific Gravity	2.78 Measured

Note:

Tested By JBD Date 12/2/2009 Checked By GZM Date 12-8-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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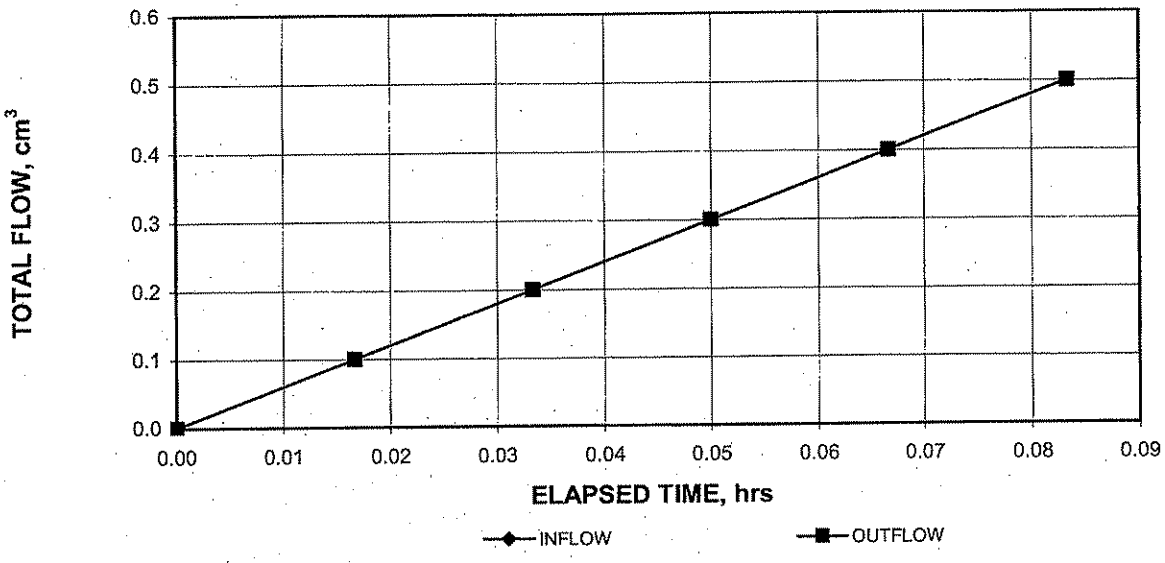
INTEGRITY IN TESTING

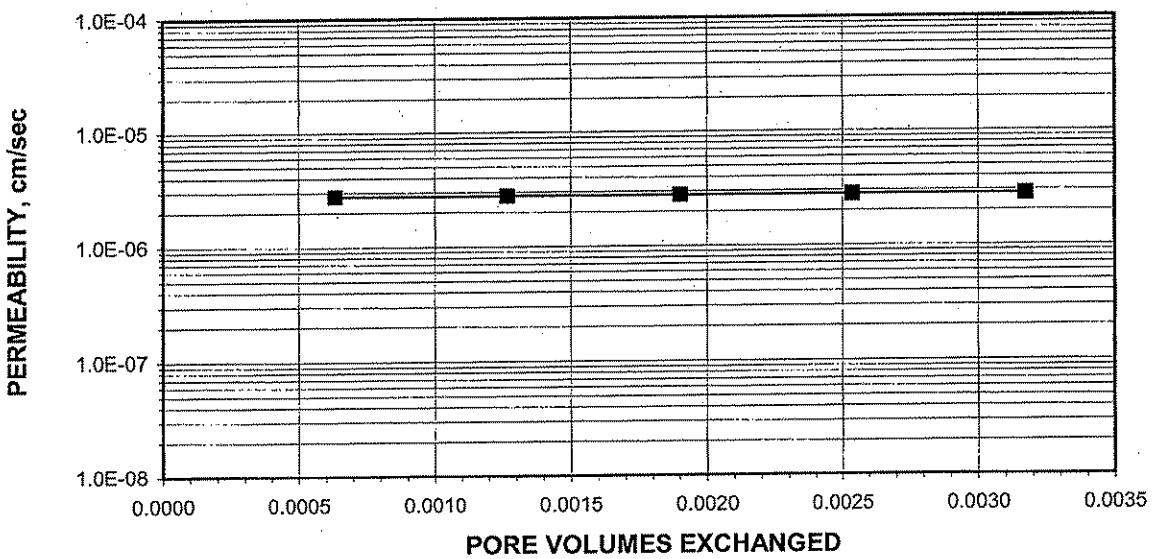
Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID No.	2009-666-13-03		

AVERAGE PERMEABILITY = 2.8E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.8E-08 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/1/2009 Checked By: GZM Date: 12-3-09

DCN: CT-22C DATE: 4/15/09 REVISION: 8 [S:\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-03 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID No.	2009-666-13-03		

Specific Gravity 2.75 Measured
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	215	800
Wt. of Tare & WS (gm.)	475.59	336.39
Wt. of Tare & DS (gm.)	415.17	284.23
Wt. of Tare (gm.)	172.24	104.17
Wt. of Water (gm.)	60.42	52.16
Wt. of DS (gm.)	242.93	180.06
Moisture Content (%)	**24.9**	**29.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	637.92	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	637.92	658.85
Length 1 (in.)	3.249	3.258
Length 2 (in.)	3.249	3.263
Length 3 (in.)	3.241	3.292
Top Diameter (in.)	2.838	2.860
Middle Diameter (in.)	2.840	2.857
Bottom Diameter (in.)	2.841	2.851
Average Length (in.)	3.25	3.27
Average Area (in.^{2})	6.33	6.41
Sample Volume (cm^3)	336.91	343.39
Unit Wet Wt. (gm./ cm^3)	1.89	1.92
Unit Wet Wt. (pcf)	118.2	119.8
Unit Dry Wt. (pcf)	94.7	92.9
Unit Dry Wt. (gm./ cm^3)	1.52	1.49
Void Ratio, e	0.81	0.85
Porosity, n	0.45	0.46
Pore Volume (cm^3)	151.1	157.6
Total Wgt. Of Sample After Test		659.18

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-3-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID No.	2009-666-13-03		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.31
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.25
Cell (psi)	75.0	Sample Area (cm^2), A	41.33
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.891
Hydraulic Gradient	10.15	Outflow Burette Area (cm^2), a-out	0.883
		B Parameter (%)	95

AVERAGE PERMEABILITY = 2.8E-06 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.8E-08 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/1/2009	9	59.5	0.00	0.0	0.0	111.0	0	23.2	NA
12/1/2009	10	0.5	0.02	0.1	0.1	110.8	0	23.2	2.8E-06
12/1/2009	10	1.5	0.03	0.2	0.2	110.6	0	23.2	2.8E-06
12/1/2009	10	2.5	0.05	0.3	0.3	110.4	0	23.2	2.8E-06
12/1/2009	10	3.5	0.07	0.4	0.4	110.1	0	23.2	2.8E-06
12/1/2009	10	4.5	0.08	0.5	0.5	109.9	1	23.2	2.8E-06

Tested By: TMS Date: 12/1/2009 Checked By: GZM Date: 12-3-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID	2009-666-13-03	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description.

(Minus No. 40 sieve material, Airdried)

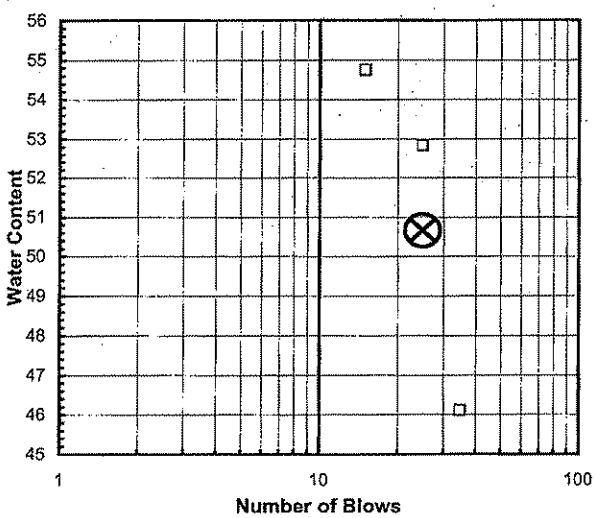
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	W	G	J	MULTIPOINT
Wt. of Tare & WS (gm)	30.19	28.41	25.67	
Wt. of Tare & DS (gm)	24.88	23.82	22.36	
Wt. of Tare (gm)	15.18	15.13	15.18	
Wt. of Water (gm)	5.3	4.6	3.3	
Wt. of DS (gm)	9.7	8.7	7.2	
Moisture Content (%)	**54.7**	**52.8**	**46.1**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	S	T	
Wt. of Tare & WS (gm)	23.41	22.27	
Wt. of Tare & DS (gm)	20.92	20.16	
Wt. of Tare (gm)	15.19	15.20	
Wt. of Water (gm)	2.5	2.1	
Wt. of DS (gm)	5.7	5.0	
Moisture Content (%)	**43.5**	**42.5**	**0.9**

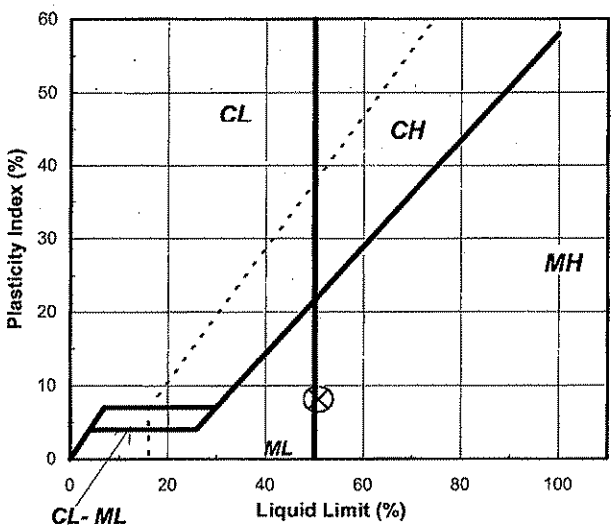
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**51**
Plastic Limit (%)	**43**
Plasticity Index (%)	**8**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By *JBD* *Date* *12/2/2009* *Checked By* GEM *Date* 12-3-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID	2009-666-13-03	Visual Description	**REDDISH BROWN**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 27	R 280
Weight of Pycnometer + Soil + Water (gm)	719.01	716.62
Temperature, T (°Celsius)	22.4	22.1
Weight of Pycnometer + Water (gm)	688.20	685.56
Tare Number	203	215
Weight of Tare + Dry Soil (gm)	219.8	220.91
Weight of Tare (gm)	171.1	172.28
Weight of Dry Soil (gm)	48.70	48.63
Specific Gravity of Soil @ T	2.722	2.768
Specific Gravity of Water @ T	0.9977	0.9978
Conversion Factor for Temperature T	0.9995	0.9996
Specific Gravity @ 20° Celsius	2.724	2.769

Average Specific Gravity @ 20° Celsius	2.75

Tested By TMS *Date* 12/2/2009 *Checked By* GZM *Date* 12-3-09

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-03 Sp. Gravity.xls]Sheet1*

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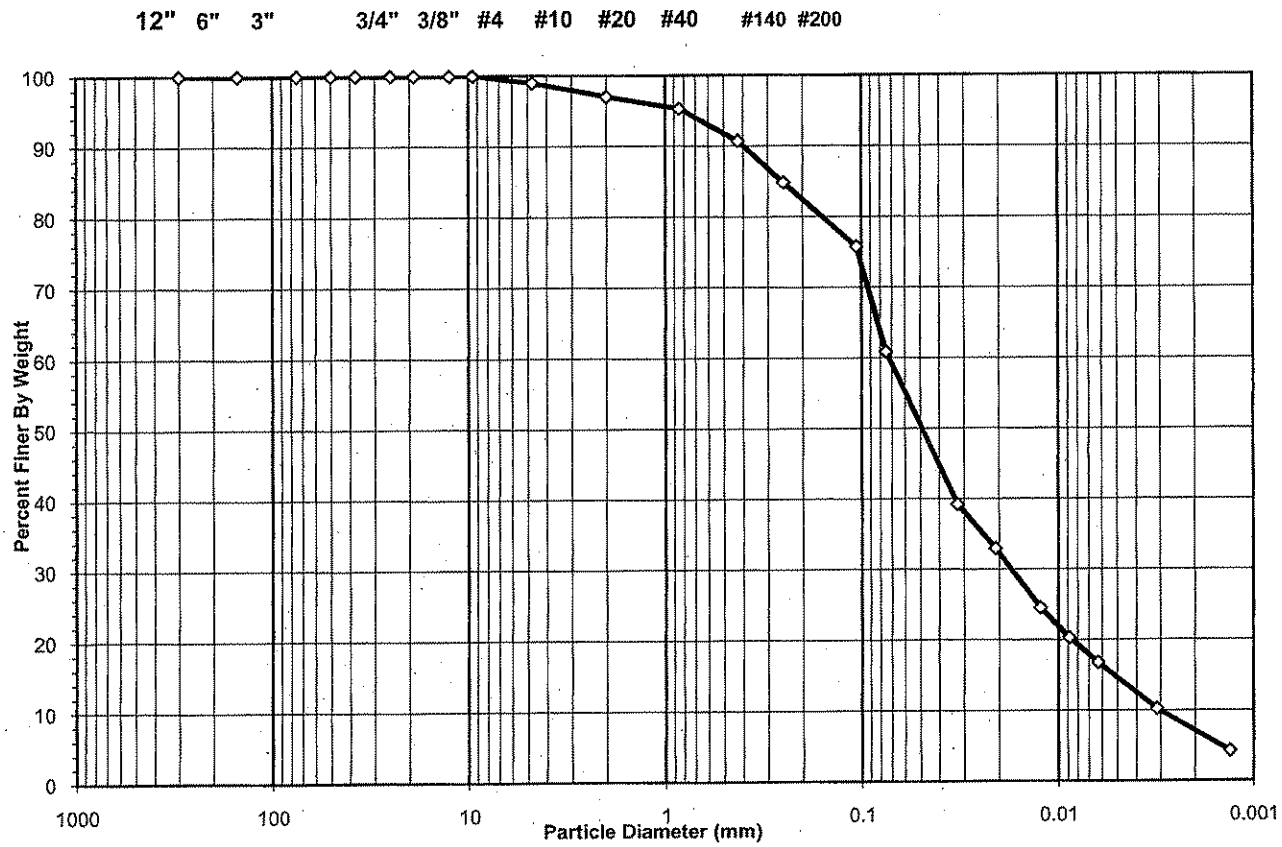
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID	2009-666-13-03	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	0.99
#4 To #200	*Sand*	38.10
Finer Than #200	*Silt & Clay*	60.91

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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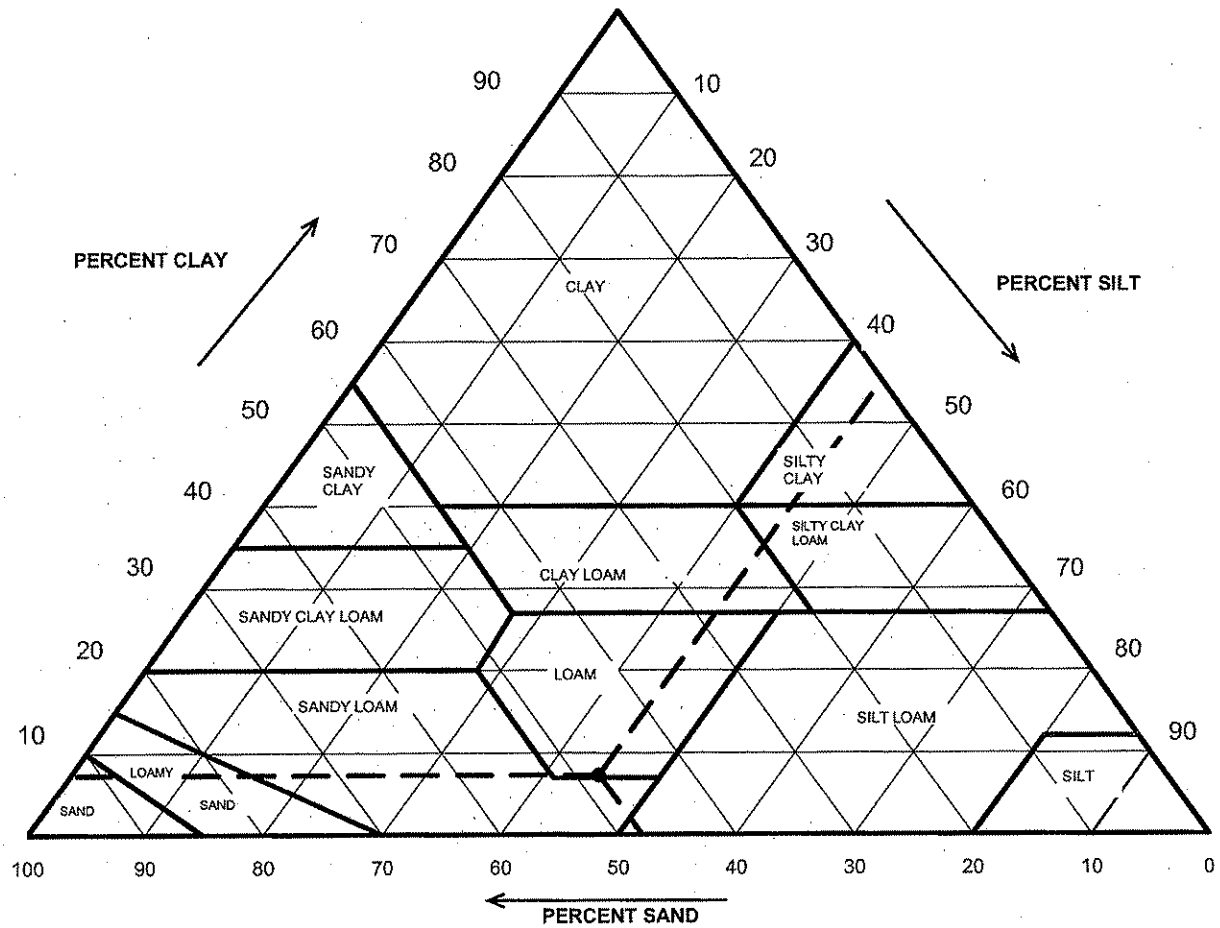
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID	2009-666-13-03	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	2.98	**0.00**
2	97.02	*Sand*	46.54	**47.97**
0.05	50.48	*Silt*	43.37	**44.70**
0.002	7.11	*Clay*	7.11	**7.33**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-735 ARCADIS\[2009-735-01-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID	2009-666-13-03	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	215	Tare No.	B-1
Wgt.Tare + Wet Soil (gm)	475.59	Wgt.Tare + Wet Soil (gm)	45.11
Wgt.Tare + Dry Soil (gm)	415.17	Wgt.Tare + Dry Soil (gm)	42.59
Weight of Tare (gm)	172.24	Weight of Tare (gm)	15.88
Weight of Water (gm)	60.42	Weight of Water (gm)	2.52
Weight of Dry Soil (gm)	242.93	Weight of Dry Soil (gm)	26.71
Moisture Content (%)	**24.9**	**Moisture Content (%)**	**9.4**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	303.35	Weight of the Dry Sample (gm)	288.68
Dry Weight +#10 Material(gm)	242.9	Weight of minus #200 material (gm)	28.72
Wet Weight Hydro. Material.(gm)	50.07	Weight of plus #200 material (gm)	259.96
Dry Weight Hydro. Material (gm)	45.75		
Total Dry Weight Sample (gm)	288.68	**J-FACTOR (%FINER THAN #10)**	**0.9702**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	2.41	0.99	0.99	99.01	**99.01**
#10	2.00	4.83	1.99	2.98	97.02	**97.02**
#20	0.85	0.82	1.79	1.79	98.21	**95.28**
#40	0.425	2.16	4.72	6.51	93.49	**90.70**
#60	0.250	2.77	6.05	12.57	87.43	**84.83**
#140	0.106	4.28	9.35	21.92	78.08	**75.75**
#200	0.075	7.00	15.30	37.22	62.78	**60.91**
Pan	-	28.72	62.78	100.00	-	-

Notes :

Tested By JBD Date 12/3/2009 Checked By RMS Date 12-8-09

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INTEGRITY IN TESTING

HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST38
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	A9B
Project No.	2009-666-13	Sample No.	L3
Lab ID	2009-666-13-03	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	24.0	24.0	23.0	5.33	18.7	40.0	0.01279	0.0318	**38.8**
5		21.0	23.0	5.33	15.7	33.6	0.01279	0.0205	**32.6**
15		17.0	23.0	5.33	11.7	25.0	0.01279	0.0121	**24.3**
30		15.0	23.0	5.33	9.7	20.7	0.01279	0.0087	**20.1**
60		13.0	23.5	4.99	8.0	17.2	0.01271	0.0062	**16.6**
250		10.0	23.3	5.12	4.9	10.4	0.01274	0.0031	**10.1**
1440		7.0	23.5	4.99	2.0	4.3	0.01271	0.0013	**4.2**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	45.75	a - Factor	0.98
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	97.02
Weight of Dry Material (gm)	45.75		
		Specific Gravity	2.75 Measured

Note:

Tested By JBD Date 12/2/2009 Checked By GEM Date 12-8-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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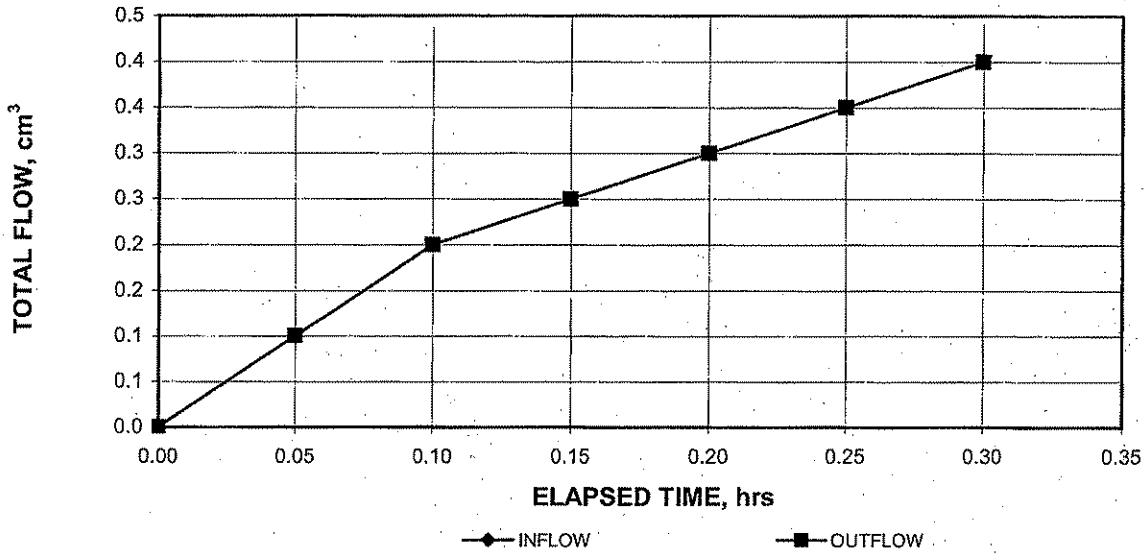
INTEGRITY IN TESTING

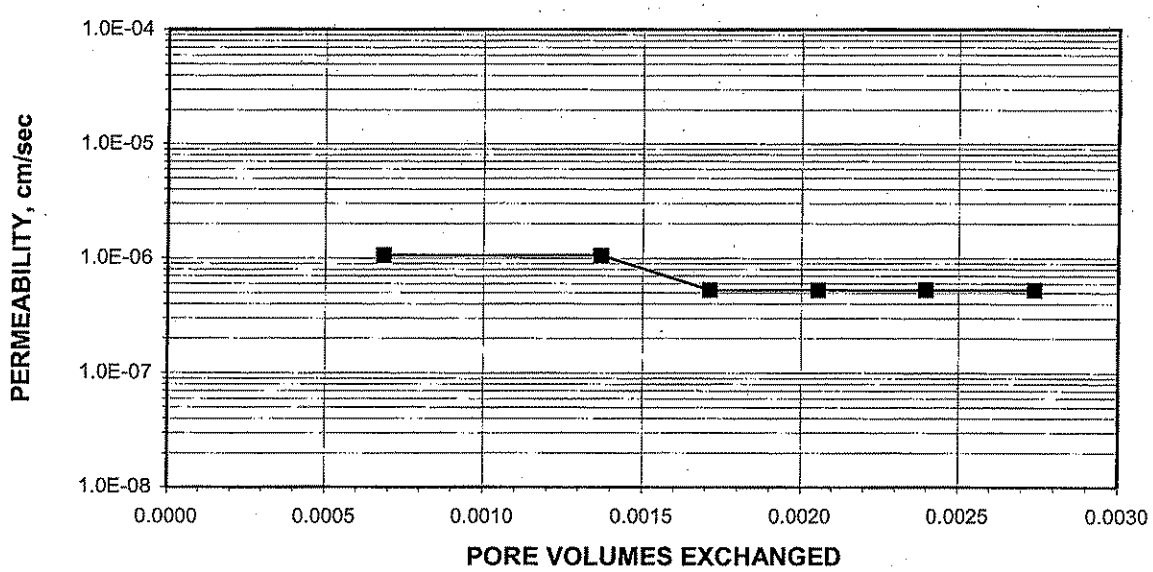
Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID No.	2009-666-10-01		

AVERAGE PERMEABILITY = 5.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.3E-09 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: CEM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 FILE: [...]PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-01 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID No.	2009-666-10-01		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: BROWN CLAYEY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	812	810
Wt. of Tare & WS (gm.)	354.40	525.02
Wt. of Tare & DS (gm.)	307.92	442.63
Wt. of Tare (gm.)	107.98	115.81
Wt. of Water (gm.)	46.48	82.39
Wt. of DS (gm.)	199.94	326.82
Moisture Content (%)	**23.2**	**25.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	727.03	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	727.03	738.61
Length 1 (in.)	3.582	3.577
Length 2 (in.)	3.583	3.545
Length 3 (in.)	3.583	3.566
Top Diameter (in.)	2.839	2.847
Middle Diameter (in.)	2.850	2.802
Bottom Diameter (in.)	2.858	2.809
Average Length (in.)	3.58	3.56
Average Area (in.^{2})	6.37	6.24
Sample Volume (cm^3)	374.27	364.47
Unit Wet Wt. (gm./ cm^3)	1.94	2.03
Unit Wet Wt. (pcf)	121.3	126.5
Unit Dry Wt. (pcf)	98.4	101.0
Unit Dry Wt. (gm./ cm^3)	1.58	1.62
Void Ratio, e	0.71	0.67
Porosity, n	0.42	0.40
Pore Volume (cm^3)	155.8	146.0
Total Wgt. Of Sample After Test		736.29

Tested By: TMS Date: 11/20/2009 Checked By: GZM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 FILE LOCATION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-01 PERM.xls]Sheet1

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INPUT BURETTE NO. AND CONDITIONS

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANC[illegible]RENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID No.	2009-666-10-01		

Pressure Heads (Constant)

Top Cap (psi)	48.8
Bottom Cap (psi)	50.0
Cell (psi)	75.0
Total Pressure Head (cm)	84.4

INFLOW (HEADWATER) BURETTE

BURETTE No.	R 5
BURETTE FACTOR	1
INFLOW AREA (cm^2), a-in	0.977
VOLUME CORR. FACTOR	0.924
SLOPE	1.021
INTERCEPT	68.8

OUTFLOW (HEADWATER) BURETTE

BURETTE No.	R 6
BURETTE FACTOR	1
OUTFLOW AREA (cm^2), a-out	0.868
VOLUME CORR. FACTOR	1.061
SLOPE	1.154
INTERCEPT	72.3

B Parameter (%) 95

Permeability Ratio	DATE (mm/dd/yy)	TIME (hr)	TIME (min)	INFLOW G5 (div.)	OUTFLOW G6 (div.)	FLOW (0 flow) (1 stop)	TEMP. (°C)	FLOW RATIO
	11/20/2009	11	6	0.00	24.0	0	23.8	
0.5	11/20/2009	11	9	0.10	23.9	0	23.8	NA
0.5	11/20/2009	11	12	0.20	23.8	0	23.8	NA
1.0	11/20/2009	11	15	0.25	23.8	0	23.8	1.000
1.0	11/20/2009	11	18	0.30	23.7	0	23.8	1.000
1.0	11/20/2009	11	21	0.35	23.7	0	23.8	1.000
1.0	11/20/2009	11	24	0.40	23.6	1	23.8	1.000

Tested By: TMS Date: 11/20/2009 Checked By: GBM Date: 11-23-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID No.	2009-666-10-01		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	9.05
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.16
Cell (psi)	75.0	Sample Area (cm^2), A	40.28
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.977
Hydraulic Gradient	9.32	Outflow Burette Area (cm^2), a-out	0.868
		B Parameter (%)	95

AVERAGE PERMEABILITY = 5.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.3E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	11	6	0.00	0.0	0.0	108.6	0	23.8	NA
11/20/2009	11	9	0.05	0.1	0.1	108.3	0	23.8	1.1E-06
11/20/2009	11	12	0.10	0.2	0.2	108.1	0	23.8	1.1E-06
11/20/2009	11	15	0.15	0.3	0.3	108.0	0	23.8	5.3E-07
11/20/2009	11	18	0.20	0.3	0.3	107.9	0	23.8	5.3E-07
11/20/2009	11	21	0.25	0.4	0.4	107.8	0	23.8	5.3E-07
11/20/2009	11	24	0.30	0.4	0.4	107.7	1	23.8	5.3E-07

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID	2009-666-10-01	Soil Description	**BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

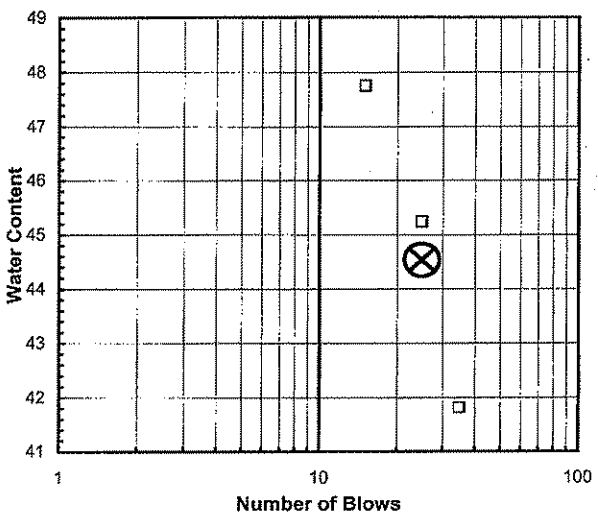
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	R	K	C	MULTIPOINT
Wt. of Tare & WS (gm)	31.87	28.94	26.06	
Wt. of Tare & DS (gm)	26.48	24.67	22.87	
Wt. of Tare (gm)	15.19	15.23	15.24	
Wt. of Water (gm)	5.4	4.3	3.2	
Wt. of DS (gm)	11.3	9.4	7.6	
Moisture Content (%)	**47.7**	**45.2**	**41.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	P	N	
Wt. of Tare & WS (gm)	21.25	22.13	
Wt. of Tare & DS (gm)	19.72	20.44	
Wt. of Tare (gm)	15.19	15.31	
Wt. of Water (gm)	1.5	1.7	
Wt. of DS (gm)	4.5	5.1	
Moisture Content (%)	**33.8**	**32.9**	**0.8**

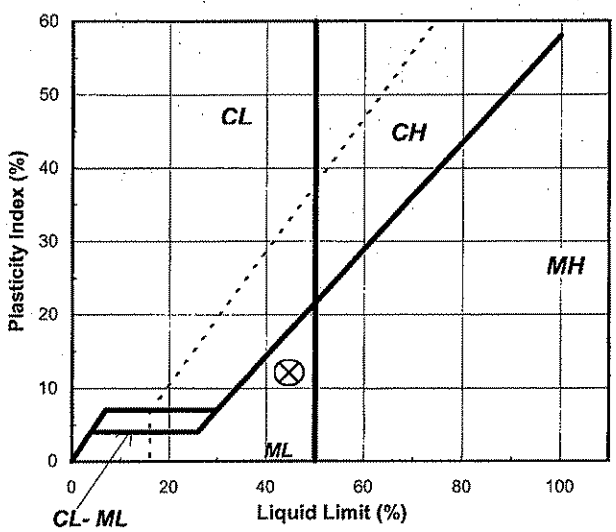
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**45**
Plastic Limit (%)	**33**
Plasticity Index (%)	**12**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By *JBD* *Date* *11/30/2009* *Checked By* GZM *Date* 12-1-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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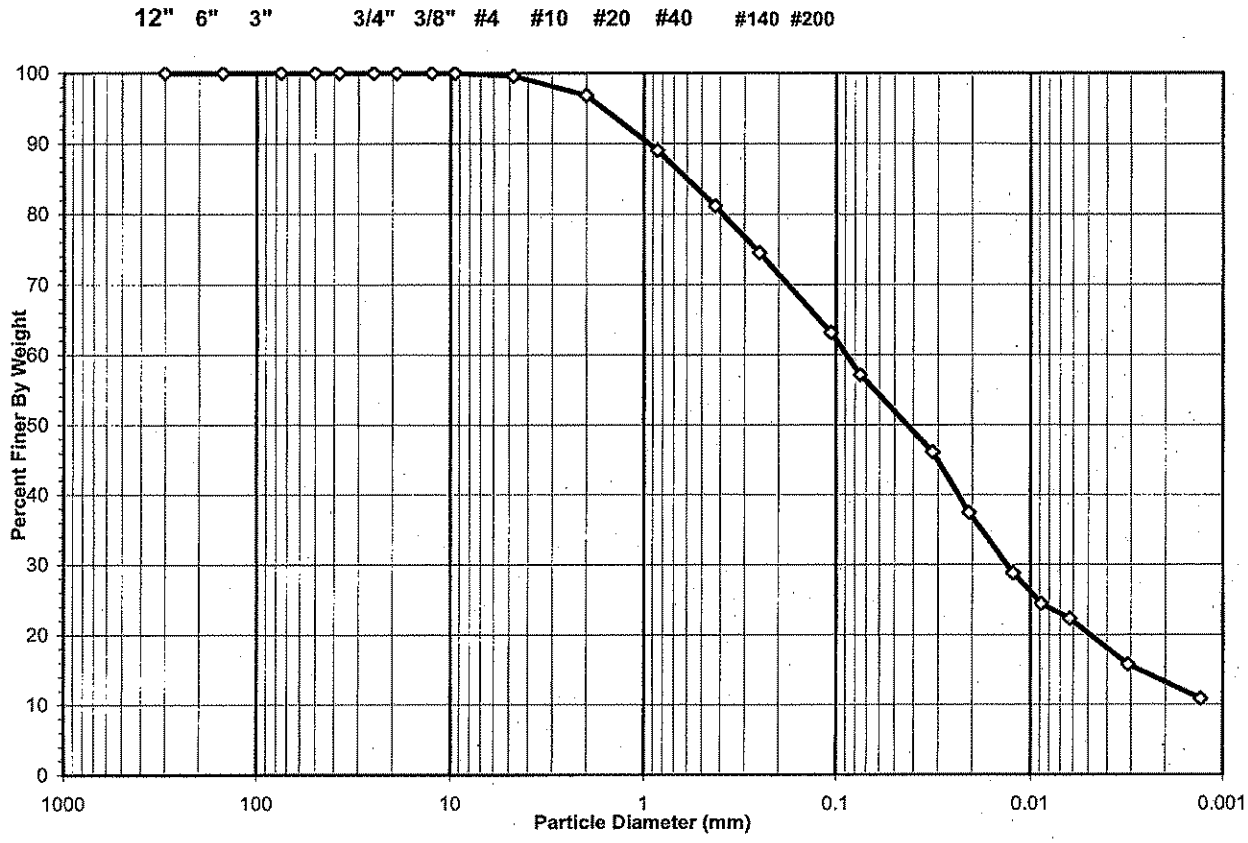
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID	2009-666-10-01	Soil Color	**BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay



USCS Summary		
Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.39
#4 To #200	*Sand*	42.53
Finer Than #200	*Silt & Clay*	57.08

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID	2009-666-10-01	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	215	Tare No.	M-1
Wgt.Tare + Wet Soil (gm)	372.20	Wgt.Tare + Wet Soil (gm)	63.38
Wgt.Tare + Dry Soil (gm)	333.15	Wgt.Tare + Dry Soil (gm)	57.88
Weight of Tare (gm)	172.32	Weight of Tare (gm)	15.91
Weight of Water (gm)	39.05	Weight of Water (gm)	5.50
Weight of Dry Soil (gm)	160.83	Weight of Dry Soil (gm)	41.97
Moisture Content (%)	**24.3**	**Moisture Content (%)**	**13.1**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	199.88	Weight of the Dry Sample (gm)	205.05
Dry Weight +#10 Material(gm)	160.8	Weight of minus #200 material (gm)	26.07
Wet Weight Hydro. Material.(gm)	50.02	Weight of plus #200 material (gm)	178.98
Dry Weight Hydro. Material (gm)	44.22		
Total Dry Weight Sample (gm)	205.05	**J-FACTOR (%FINER THAN #10)**	**0.9682**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.63	0.39	0.39	99.61	**99.61**
#10	2.00	4.49	2.79	3.18	96.82	**96.82**
#20	0.85	3.56	8.05	8.05	91.95	**89.02**
#40	0.425	3.60	8.14	16.19	83.81	**81.14**
#60	0.250	3.04	6.87	23.06	76.94	**74.49**
#140	0.106	5.18	11.71	34.78	65.22	**63.15**
#200	0.075	2.77	6.26	41.04	58.96	**57.08**
Pan	-	26.07	58.96	100.00	-	-

Notes :

Tested By DAW Date 11.25.09 Checked By CZM Date 11-30-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID	2009-666-10-01	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	22.4	5.73	21.3	47.6	0.01307	0.0318	**46.1**
5		23.0	22.4	5.73	17.3	38.7	0.01307	0.0207	**37.4**
15		19.0	22.4	5.73	13.3	29.7	0.01307	0.0122	**28.8**
30		17.0	22.4	5.73	11.3	25.2	0.01307	0.0088	**24.4**
60		16.0	22.4	5.73	10.3	23.0	0.01307	0.0062	**22.3**
250		13.0	22.4	5.73	7.3	16.3	0.01307	0.0031	**15.8**
1440		10.0	23.5	4.99	5.0	11.2	0.01290	0.0013	**10.9**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	44.22	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	96.82
Weight of Dry Material (gm)	44.22		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By GBM Date 11-30-09

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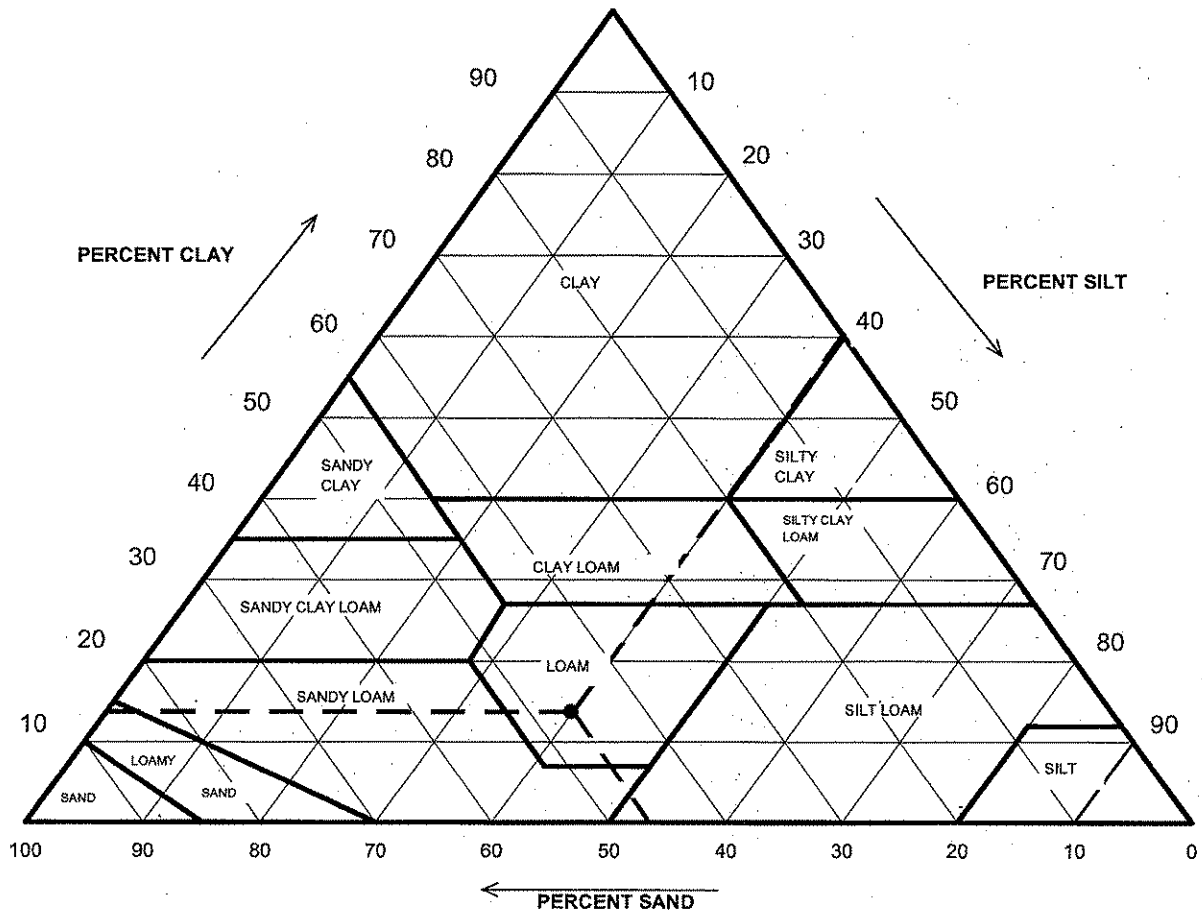
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST1
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH1 CCH3
Lab ID	2009-666-10-01	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	3.18	**0.00**
2	96.82	*Sand*	44.93	**46.41**
0.05	51.89	*Silt*	38.61	**39.88**
0.002	13.28	*Clay*	13.28	**13.71**

USDA Classification: ***LOAM***

 DCN: CT-S3P DATE:08/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-01 #10 Split Hydro rev 9.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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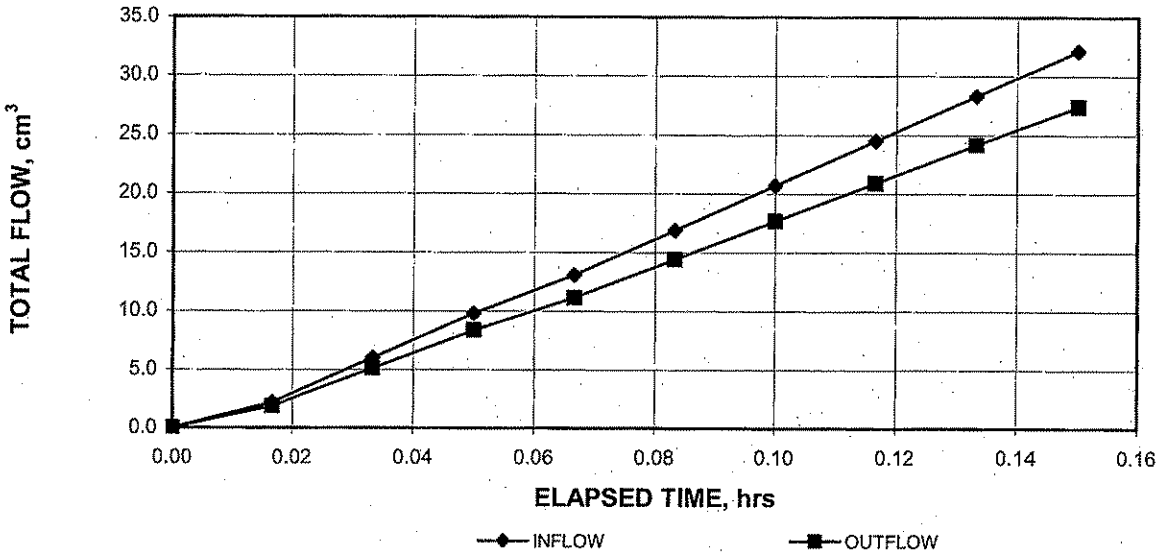
INTEGRITY IN TESTING

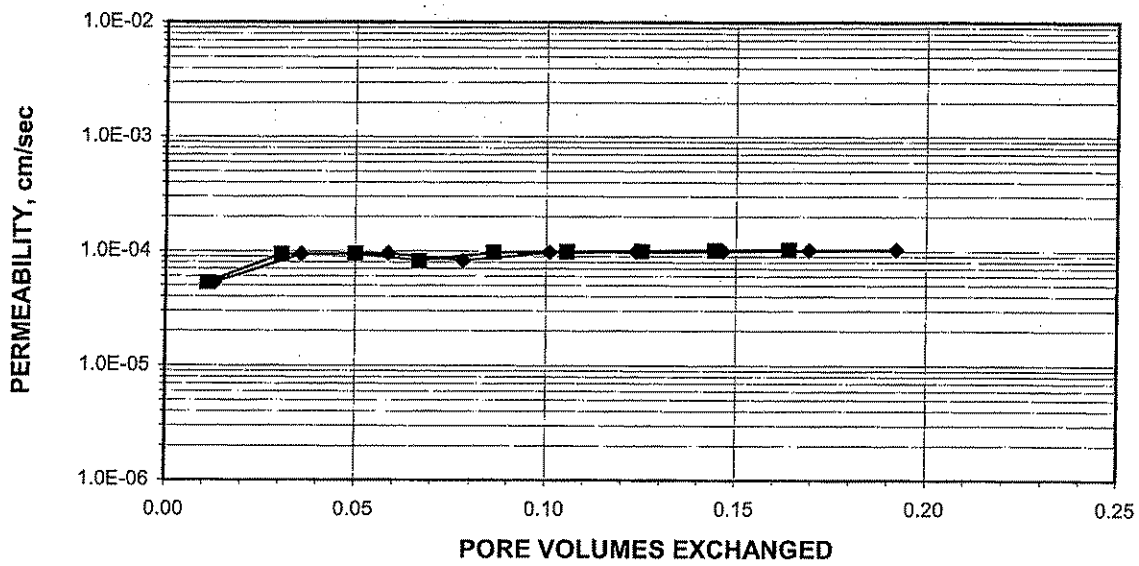
Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID No.	2009-666-10-02		

AVERAGE PERMEABILITY = 1.0E-04 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.0E-06 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 11/20/2009 Checked By: GZM Date: 11-23-09

DCN: CT-22C DATE: 11/20/2009 FILE: [2009-666-10-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID No.	2009-666-10-02		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: RED/BROWN/WHITE SANDY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	811	809
Wt. of Tare & WS (gm.)	408.91	445.21
Wt. of Tare & DS (gm.)	346.38	364.57
Wt. of Tare (gm.)	106.50	116.49
Wt. of Water (gm.)	62.53	80.64
Wt. of DS (gm.)	239.88	248.08
Moisture Content (%)	**26.1**	**32.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	585.44	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	585.44	615.34
Length 1 (in.)	3.319	3.302
Length 2 (in.)	3.317	3.242
Length 3 (in.)	3.318	3.269
Top Diameter (in.)	2.864	2.834
Middle Diameter (in.)	2.835	2.842
Bottom Diameter (in.)	2.837	2.838
Average Length (in.)	3.32	3.27
Average Area (in.^{2})	6.36	6.33
Sample Volume (cm^3)	345.73	339.08
Unit Wet Wt. (gm./ cm^3)	1.69	1.81
Unit Wet Wt. (pcf)	105.7	113.3
Unit Dry Wt. (pcf)	83.8	85.5
Unit Dry Wt. (gm./ cm^3)	1.34	1.37
Void Ratio, e	1.01	0.97
Porosity, n	0.50	0.49
Pore Volume (cm^3)	173.7	167.1
Total Wgt. Of Sample After Test		614.06

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 FILE LOCATION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID No.	2009-666-10-02		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.7	Sample Length (cm), L	8.31
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.21
Cell (psi)	75.0	Sample Area (cm^2), A	40.81
Total Pressure Head (cm)	91.4	Inflow Burette Area (cm^2), a-in	4.664
Hydraulic Gradient	11.00	Outflow Burette Area (cm^2), a-out	4.532
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.0E-04 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.0E-06 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/20/2009	11	56	0.00	0.0	0.0	118.6	0	23.8	NA
11/20/2009	11	57	0.02	2.2	1.9	117.7	0	23.8	5.3E-05
11/20/2009	11	58	0.03	6.0	5.1	116.2	0	23.8	9.4E-05
11/20/2009	11	59	0.05	9.8	8.4	114.6	0	23.8	9.5E-05
11/20/2009	12	0	0.07	13.1	11.1	113.3	0	23.8	8.2E-05
11/20/2009	12	1	0.08	16.9	14.4	111.8	0	23.8	9.7E-05
11/20/2009	12	2	0.10	20.7	17.7	110.3	0	23.8	9.8E-05
11/20/2009	12	3	0.12	24.5	20.9	108.7	0	23.8	1.0E-04
11/20/2009	12	4	0.13	28.3	24.2	107.2	0	23.8	1.0E-04
11/20/2009	12	5	0.15	32.1	27.4	105.7	1	23.8	1.0E-04

Tested By: TMS Date: 11/20/2009 Checked By: GEM Date: 11-23-09

DCN: CT-22C DATE: 11-11-09 REV/BY: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-10-02 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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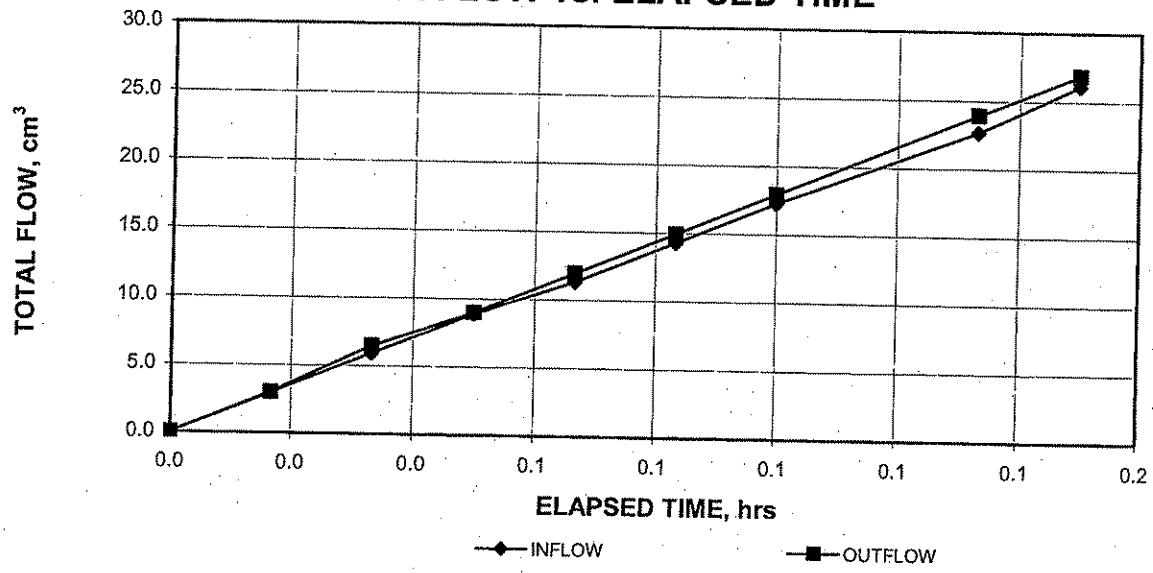
INTEGRITY IN TESTING

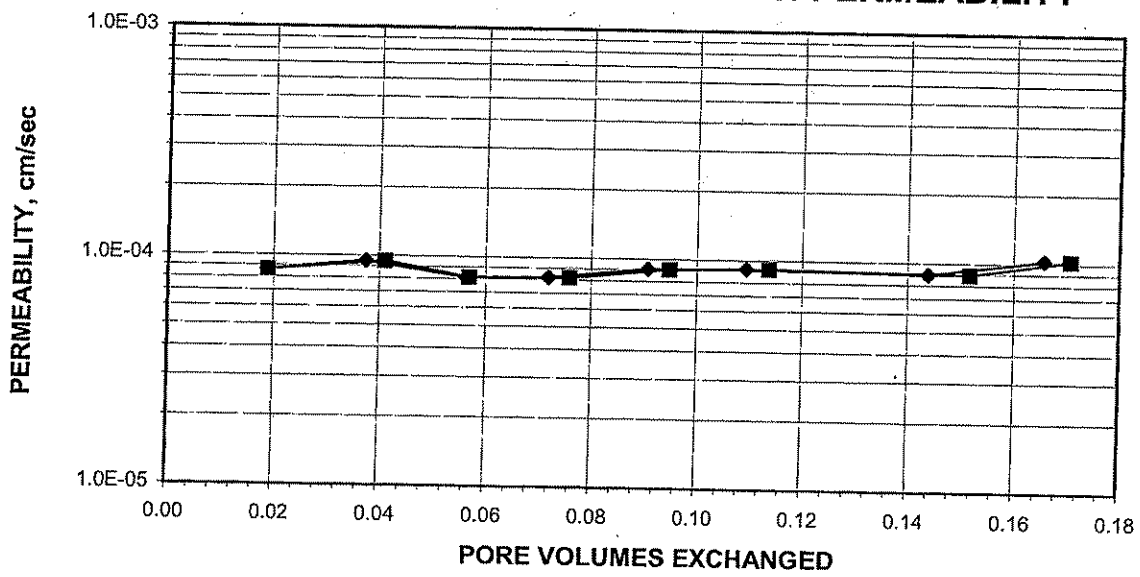
Client	JOYCE ENGINEERING, INC.	Boring No.	ST-2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2 B
Lab ID No.	2009-666-10-02		

AVERAGE PERMEABILITY = 9.3E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.3E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2 B
Lab ID No.	2009-666-10-02		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: WHITE RED BROWN SILTY SAND

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	811	809
Wt. of Tare & WS (gm.)	502.33	668.26
Wt. of Tare & DS (gm.)	418.61	534.84
Wt. of Tare (gm.)	106.59	115.99
Wt. of Water (gm.)	83.72	133.42
Wt. of DS (gm.)	312.02	418.85
Moisture Content (%)	**26.8**	**31.9**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	1730.77	NA
Wt. of Tube (gm.)	1096.40	NA
Wt. of WS (calc.)(gm.)	634.37	659.49
Length 1 (in.)	3.236	3.294
Length 2 (in.)	3.219	3.321
Length 3 (in.)	3.223	3.312
Top Diameter (in.)	2.837	2.841
Middle Diameter (in.)	2.867	2.833
Bottom Diameter (in.)	2.872	2.837
Average Length (in.)	3.23	3.31
Average Area (in.^{2})	6.42	6.32
Sample Volume (cm^3)	339.30	342.77
Unit Wet Wt. (gm./ cm^3)	1.87	1.92
Unit Wet Wt. (pcf)	116.7	120.1
Unit Dry Wt. (pcf)	92.0	91.1
Unit Dry Wt. (gm./ cm^3)	1.47	1.46
Void Ratio, e	0.83	0.85
Porosity, n	0.45	0.46
Pore Volume (cm^3)	154.1	157.5
Total Wgt. Of Sample After Test		654.2

Tested By: MPS Date: 11/25/2009 Checked By: GZM Date: 11-30-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST-2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2 B
Lab ID No.	2009-666-10-02		

Pressure Heads (Constant)

Top Cap (psi)	48.7
Bottom Cap (psi)	50.0
Cell (psi)	75.0
Total Pressure Head (cm)	91.4
Hydraulic Gradient	10.87

Final Sample Dimensions

Sample Length (cm), L	8.40
Sample Diameter (cm)	7.21
Sample Area (cm^2), A	40.78
Inflow Burette Area (cm^2), a-in	4.730
Outflow Burette Area (cm^2), a-out	4.899
B Parameter (%)	97

AVERAGE PERMEABILITY = 9.3E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.3E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
11/25/2009	11	19	0.0	0.0	0.0	109.9	0	23.4	NA
11/25/2009	11	20	0.0	3.0	3.0	108.7	0	23.4	8.6E-05
11/25/2009	11	21	0.0	5.9	6.5	107.4	0	23.4	9.4E-05
11/25/2009	11	22	0.1	8.9	9.0	106.2	0	23.4	8.1E-05
11/25/2009	11	23	0.1	11.3	12.0	105.1	0	23.4	8.2E-05
11/25/2009	11	24	0.1	14.3	14.9	103.9	0	23.4	9.0E-05
11/25/2009	11	25	0.1	17.2	17.9	102.6	0	23.4	9.1E-05
11/25/2009	11	27	0.1	22.7	23.9	100.3	0	23.4	8.9E-05
11/25/2009	11	28	0.2	26.1	26.9	98.9	1	23.4	1.0E-04

Tested By: MPS Date: 11/25/2009 Checked By: GEM Date: 11-30-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID	2009-666-10-02	Soil Description	**RED BROWN WHITE SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

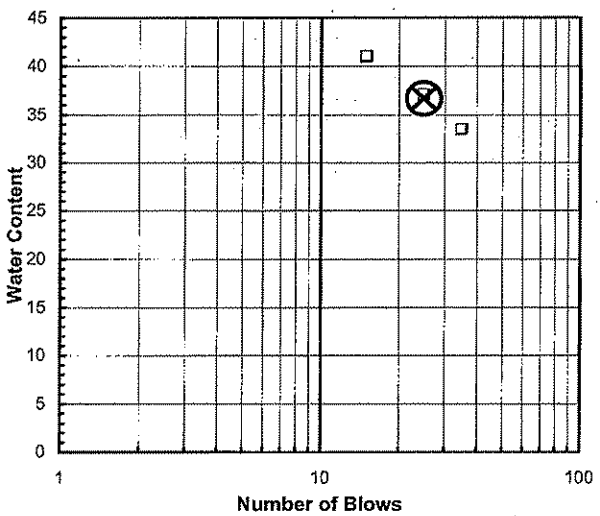
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	W	L	V	MULTIPOINT
Wt. of Tare & WS (gm)	29.83	28.19	27.84	
Wt. of Tare & DS (gm)	25.57	24.69	24.68	
Wt. of Tare (gm)	15.19	15.25	15.24	
Wt. of Water (gm)	4.3	3.5	3.2	
Wt. of DS (gm)	10.4	9.4	9.4	
Moisture Content (%)	**41.0**	**37.1**	**33.5**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	K-A	A-C	
Wt. of Tare & WS (gm)	23.55	24.02	
Wt. of Tare & DS (gm)	21.36	21.96	
Wt. of Tare (gm)	15.62	15.56	
Wt. of Water (gm)	2.2	2.1	
Wt. of DS (gm)	5.7	6.4	
Moisture Content (%)	**38.2**	**32.2**	**6.0**

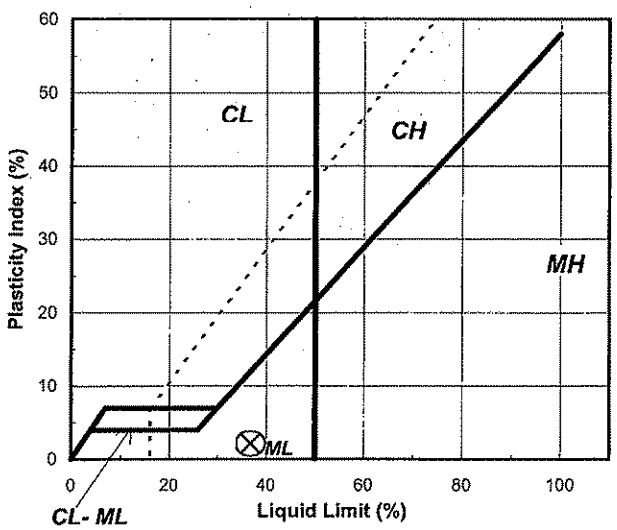
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**37**
Plastic Limit (%)	**35**
Plasticity Index (%)	**2**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 11/20/2009 *Checked By* GM *Date* 11-23-09

page 1 of 1 **DCN:** CT-S4B **DATE:** 10/8/2001 **REVISION:** 2

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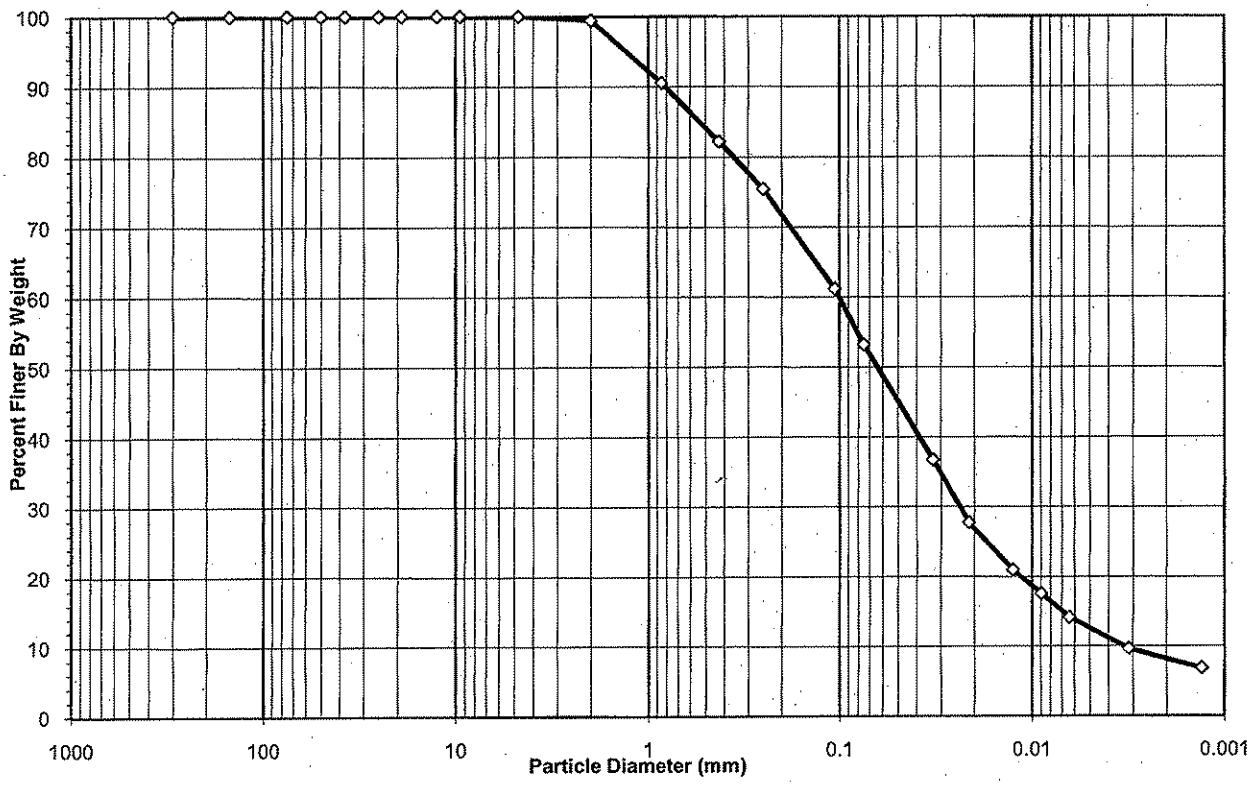
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID	2009-666-10-02	Soil Color	**RED / BROWN / WHITE**

	SIEVE ANALYSIS					HYDROMETER
USCS	**cobbles**	**gravel**	**sand**			**silt and clay fraction**
USDA	**cobbles**	**gravel**	**sand**		**silt**	**clay**

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	0.00
#4 To #200	*Sand*	46.81
Finer Than #200	*Silt & Clay*	53.19

USCS Symbol ***ML, TESTED***

USCS Classification ***SANDY SILT***

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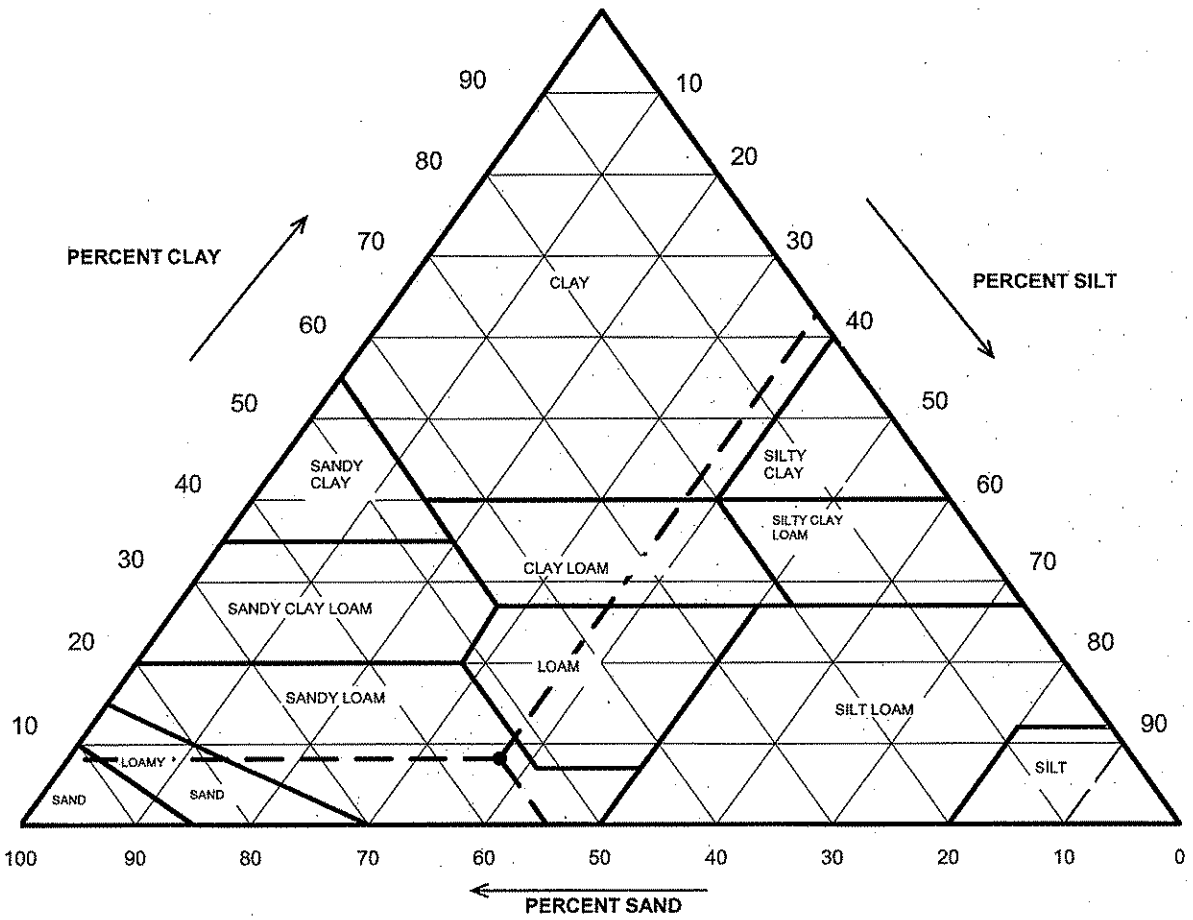
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID	2009-666-10-02	Soil Color	RED / BROWN / WHITE



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	0.58	**0.00**
2	99.42	*Sand*	54.32	**54.64**
0.05	45.10	*Silt*	36.94	**37.16**
0.002	8.16	*Clay*	8.16	**8.21**

USDA Classification: ***SANDY LOAM***

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID	2009-666-10-02	Soil Color	**RED / BROWN / WHITE**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	208	Tare No.	B-1
Wgt.Tare + Wet Soil (gm)	546.37	Wgt.Tare + Wet Soil (gm)	66.00
Wgt.Tare + Dry Soil (gm)	467.11	Wgt.Tare + Dry Soil (gm)	59.56
Weight of Tare (gm)	169.77	Weight of Tare (gm)	15.86
Weight of Water (gm)	79.26	Weight of Water (gm)	6.44
Weight of Dry Soil (gm)	297.34	Weight of Dry Soil (gm)	43.70
Moisture Content (%)	**26.7**	**Moisture Content (%)**	**14.7**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	376.60	Weight of the Dry Sample (gm)	340.91
Dry Weight +#10 Material(gm)	297.3	Weight of minus #200 material (gm)	23.31
Wet Weight Hydro. Material.(gm)	49.99	Weight of plus #200 material (gm)	317.60
Dry Weight Hydro. Material (gm)	43.57		
Total Dry Weight Sample (gm)	340.91	**J-FACTOR (%FINER THAN #10)**	**0.9942**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	1.73	0.58	0.58	99.42	**99.42**
#20	0.85	3.88	8.91	8.91	91.09	**90.56**
#40	0.425	3.66	8.40	17.31	82.69	**82.21**
#60	0.250	2.97	6.82	24.12	75.88	**75.44**
#140	0.106	6.26	14.37	38.49	61.51	**61.15**
#200	0.075	3.49	8.01	46.50	53.50	**53.19**
Pan	-	23.31	53.50	100.00	-	**-**

Notes :

Tested By JRB Date 11.25.09 Checked By JRB Date 11.25.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH. III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-10	Sample No.	PH2
Lab ID	2009-666-10-02	Soil Color	**RED / BROWN / WHITE**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	22.0	22.0	22.4	5.73	16.3	37.0	0.01307	0.0329	**36.8**
5		18.0	22.4	5.73	12.3	27.9	0.01307	0.0213	**27.7**
15		15.0	22.4	5.73	9.3	21.1	0.01307	0.0125	**20.9**
30		13.5	22.4	5.73	7.8	17.7	0.01307	0.0090	**17.6**
60		12.0	22.4	5.73	6.3	14.2	0.01307	0.0064	**14.2**
250		10.0	22.4	5.73	4.3	9.7	0.01307	0.0032	**9.6**
1440		8.0	23.5	4.99	3.0	6.8	0.01290	0.0013	**6.8**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	43.57	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	99.42
Weight of Dry Material (gm)	43.57		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 11.23.09 Checked By JRB Date 11.25.09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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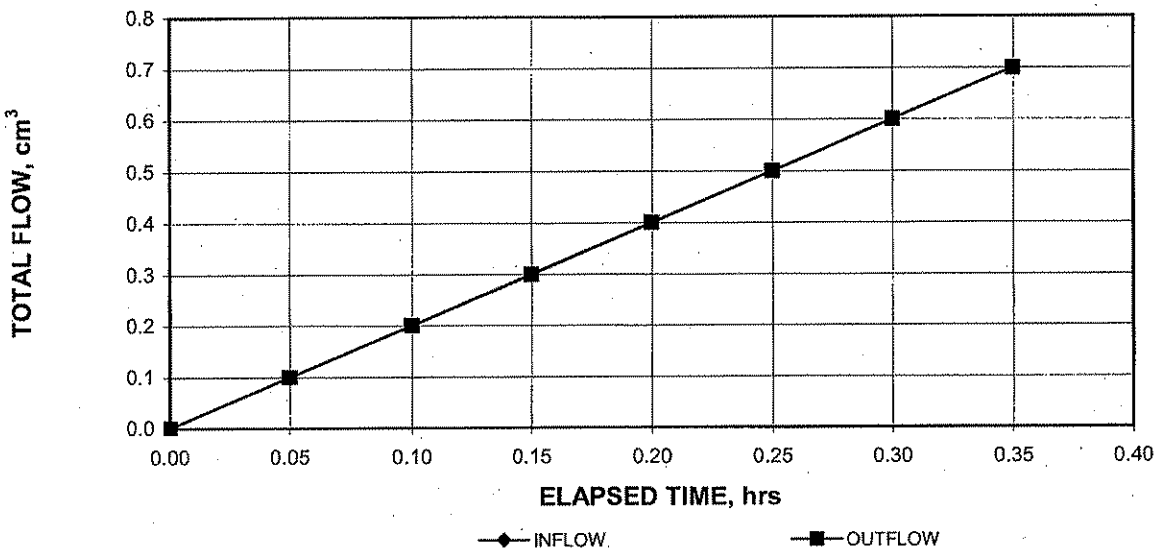
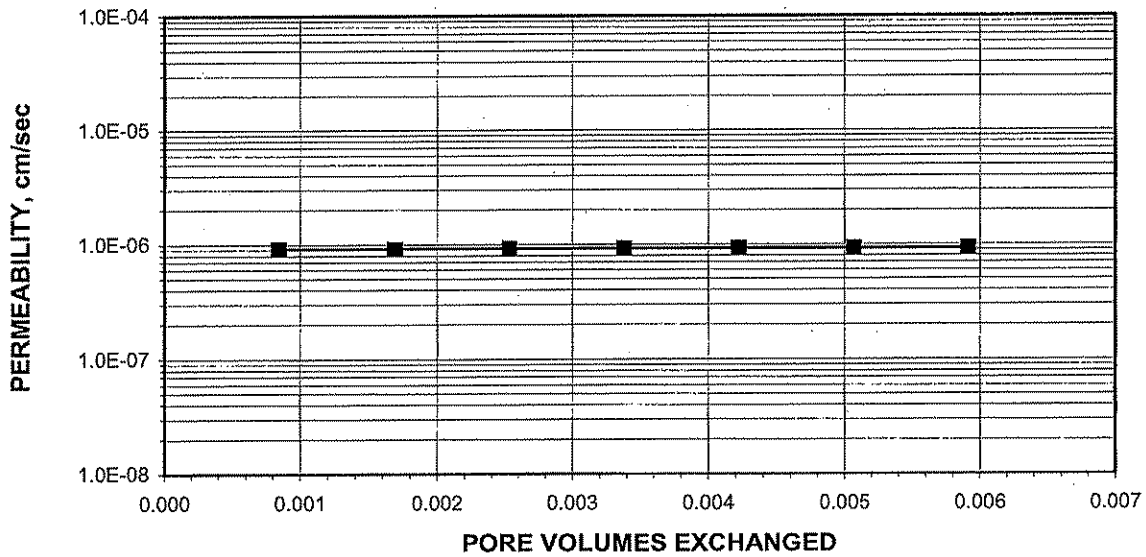
Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH PH2 RETEST
Lab ID No.	2009-666-15-04		

AVERAGE PERMEABILITY = 9.2E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.2E-09 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/10/2009 Checked By: MMS Date: 12-17-09

DCN: CT-22C DATE: [illegible] FILE: [illegible]\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID No.	2009-666-15-04		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: REDDISH BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	209	824
Wt. of Tare & WS (gm.)	785.29	315.38
Wt. of Tare & DS (gm.)	642.80	276.73
Wt. of Tare (gm.)	171.62	135.47
Wt. of Water (gm.)	142.49	38.65
Wt. of DS (gm.)	471.18	141.26
Moisture Content (%)	**30.2**	**27.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	581.24	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	581.24	568.39
Length 1 (in.)	2.993	2.856
Length 2 (in.)	2.991	2.914
Length 3 (in.)	2.996	2.868
Top Diameter (in.)	2.812	2.782
Middle Diameter (in.)	2.819	2.762
Bottom Diameter (in.)	2.817	2.755
Average Length (in.)	2.99	2.88
Average Area (in.^{2})	6.23	6.01
Sample Volume (cm^3)	305.50	283.59
Unit Wet Wt. (gm./ cm^3)	1.90	2.00
Unit Wet Wt. (pcf)	118.8	125.1
Unit Dry Wt. (pcf)	91.2	98.2
Unit Dry Wt. (gm./ cm^3)	1.46	1.57
Void Ratio, e	0.85	0.72
Porosity, n	0.46	0.42
Pore Volume (cm^3)	140.2	118.3
Total Wgt. Of Sample After Test		563.95

Tested By: TMS Date: 12/10/2009 Checked By: MWS Date: 12-17-09

DCN: CT-22C DATE: 11-11-09 REVISION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID No.	2009-666-15-04		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.9	Sample Length (cm), L	7.31
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.03
Cell (psi)	75.0	Sample Area (cm^2), A	38.78
Total Pressure Head (cm)	77.3	Inflow Burette Area (cm^2), a-in	0.878
Hydraulic Gradient	10.57	Outflow Burette Area (cm^2), a-out	0.871
		B Parameter (%)	95

AVERAGE PERMEABILITY = 9.2E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 9.2E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/10/2009	10	8	0.00	0.0	0.0	103.9	0	23.3	NA
12/10/2009	10	11	0.05	0.1	0.1	103.7	0	23.3	9.2E-07
12/10/2009	10	14	0.10	0.2	0.2	103.5	0	23.3	9.2E-07
12/10/2009	10	17	0.15	0.3	0.3	103.2	0	23.3	9.2E-07
12/10/2009	10	20	0.20	0.4	0.4	103.0	0	23.3	9.2E-07
12/10/2009	10	23	0.25	0.5	0.5	102.8	0	23.3	9.2E-07
12/10/2009	10	26	0.30	0.6	0.6	102.6	0	23.3	9.3E-07
12/10/2009	10	29	0.35	0.7	0.7	102.3	1	23.3	9.3E-07

Tested By: TMS Date: 12/10/2009 Checked By: MAS Date: 12-17-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-04 PERM.xls]Sheet1

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID	2009-666-15-04	Soil Description	**REDDISH BROWN ELASTIC SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

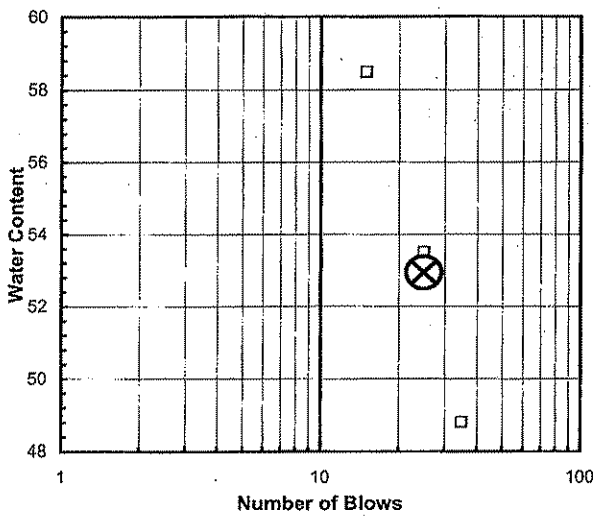
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	N	R	C	MULTIPOINT
Wt. of Tare & WS (gm)	28.19	30.04	26.93	
Wt. of Tare & DS (gm)	23.43	24.84	23.09	
Wt. of Tare (gm)	15.29	15.12	15.22	
Wt. of Water (gm)	4.8	5.2	3.8	
Wt. of DS (gm)	8.1	9.7	7.9	
Moisture Content (%)	**58.5**	**53.5**	**48.8**	
Number of Blows	**15**	**25**	**35**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	K	P	
Wt. of Tare & WS (gm)	22.02	22.10	
Wt. of Tare & DS (gm)	20.12	20.16	
Wt. of Tare (gm)	15.23	15.18	
Wt. of Water (gm)	1.9	1.9	
Wt. of DS (gm)	4.9	5.0	
Moisture Content (%)	**38.9**	**39.0**	**-0.1**

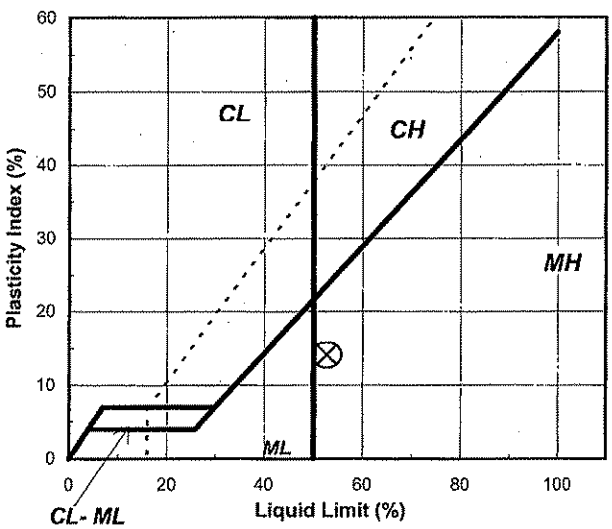
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**53**
Plastic Limit (%)	**39**
Plasticity Index (%)	**14**
USCS Symbol	**MH**

Flow Curve



Plasticity Chart



Tested By JBD *Date* 12/10/2009 *Checked By* Gen *Date* 12-11-09

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SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

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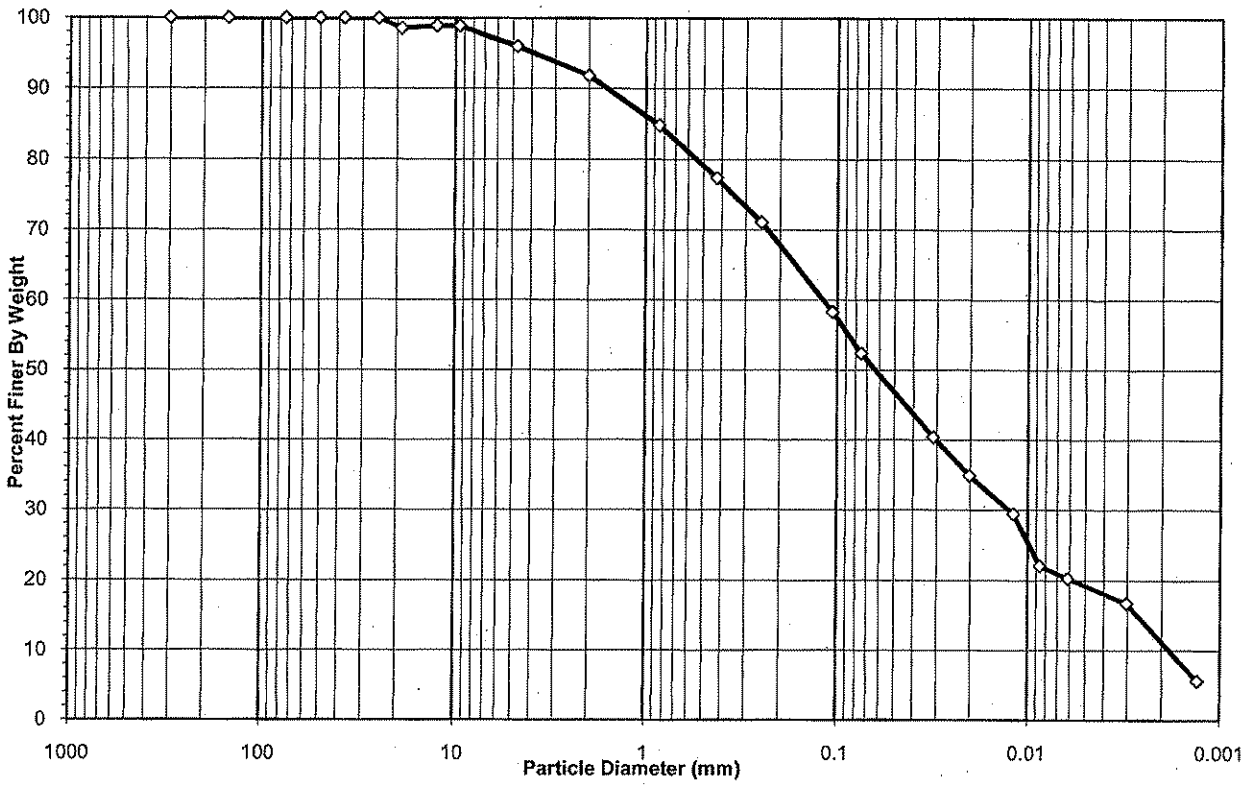
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID	2009-666-15-04	Soil Color	**REDDISH BROWN**

	SIEVE ANALYSIS			*HYDROMETER*	
USCS	**cobbles**	**gravel**	**sand**	**silt and clay fraction**	
USDA	**cobbles**	**gravel**	**sand**	**silt**	**clay**

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



USCS Summary

Sieve Sizes (mm)		**Percentage**
Greater Than #4	*Gravel*	4.04
#4 To #200	*Sand*	43.58
Finer Than #200	*Silt & Clay*	52.37

USCS Symbol ***MH, TESTED***

USCS Classification ***SANDY ELASTIC SILT***

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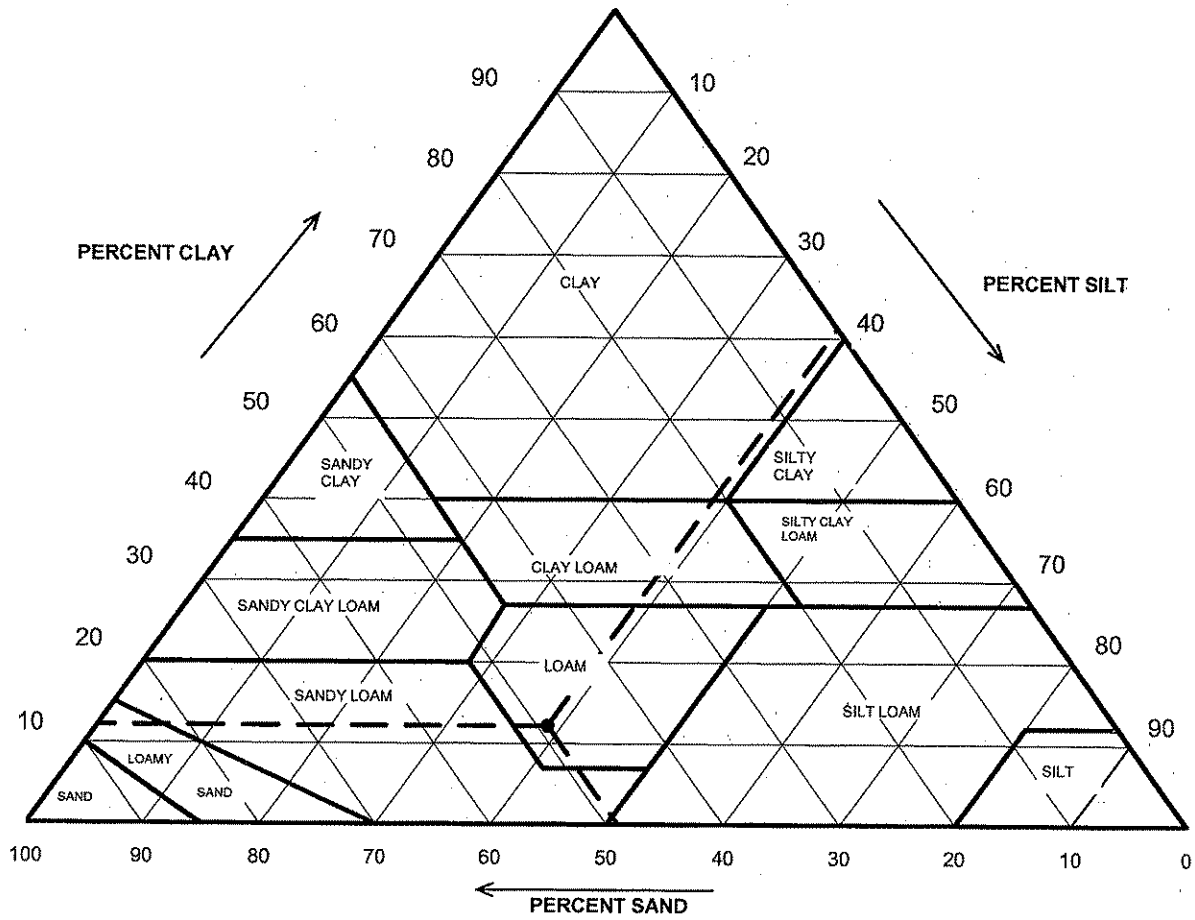
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID	2009-666-15-04	Soil Color	REDDISH BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	8.19	**0.00**
2	91.81	*Sand*	45.01	**49.03**
0.05	46.80	*Silt*	35.62	**38.80**
0.002	11.18	*Clay*	11.18	**12.18**

USDA Classification: ***LOAM***

 DCN: CT-93P DATE:05/12/09 REVISION:9 \\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-15-04 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID	2009-666-15-04	Soil Color	**REDDISH BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	209	Tare No.	U-1
Wgt.Tare + Wet Soil (gm)	785.29	Wgt.Tare + Wet Soil (gm)	53.22
Wgt.Tare + Dry Soil (gm)	642.80	Wgt.Tare + Dry Soil (gm)	52.92
Weight of Tare (gm)	171.62	Weight of Tare (gm)	15.67
Weight of Water (gm)	142.49	Weight of Water (gm)	0.30
Weight of Dry Soil (gm)	471.18	Weight of Dry Soil (gm)	37.25
Moisture Content (%)	**30.2**	**Moisture Content (%)**	**0.8**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	613.67	Weight of the Dry Sample (gm)	520.86
Dry Weight +#10 Material(gm)	471.2	Weight of minus #200 material (gm)	28.34
Wet Weight Hydro. Material.(gm)	50.08	Weight of plus #200 material (gm)	492.52
Dry Weight Hydro. Material (gm)	49.68		
Total Dry Weight Sample (gm)	520.86	**J-FACTOR (%FINER THAN #10)**	**0.9181**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	7.51	1.44	1.44	98.56	**98.56**
1/2"	12.5	5.17	1.10	1.10	98.90	**98.90**
3/8"	9.50	0.00	0.00	1.10	98.90	**98.90**
#4	4.75	13.88	2.95	4.04	95.96	**95.96**
#10	2.00	19.53	4.14	8.19	91.81	**91.81**
#20	0.85	3.79	7.63	7.63	92.37	**84.81**
#40	0.425	4.04	8.13	15.76	84.24	**77.34**
#60	0.250	3.39	6.82	22.58	77.42	**71.08**
#140	0.106	6.92	13.93	36.51	63.49	**58.29**
#200	0.075	3.20	6.44	42.96	57.04	**52.37**
Pan	-	28.34	57.04	100.00	-	-

Notes :

Tested By JBD Date 12.17.09 Checked By JRB Date 12.17.09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST2
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-15	Sample No.	ANCHOR TRENCH
Lab ID	2009-666-15-04	Soil Color	**REDDISH BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	27.0	27.0	23.6	4.92	22.1	44.0	0.01288	0.0314	**40.4**
5		24.0	23.6	4.92	19.1	38.0	0.01288	0.0203	**34.9**
15		21.0	23.6	4.92	16.1	32.0	0.01288	0.0119	**29.4**
30		17.0	23.6	4.92	12.1	24.1	0.01288	0.0086	**22.1**
60		16.0	23.6	4.92	11.1	22.1	0.01288	0.0061	**20.3**
250		14.0	23.7	4.85	9.1	18.2	0.01287	0.0030	**16.7**
1440		8.0	23.6	4.92	3.1	6.1	0.01288	0.0013	**5.6**

Soil Specimen Data		Other Corrections	
Tare + Dry Material (gm)	49.68	a - Factor	0.99
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	91.81
Weight of Dry Material (gm)	49.68		
		Specific Gravity	2.7 Assumed

Note:

Tested By JBD Date 12.15.09 Checked By JRB Date 12.17.09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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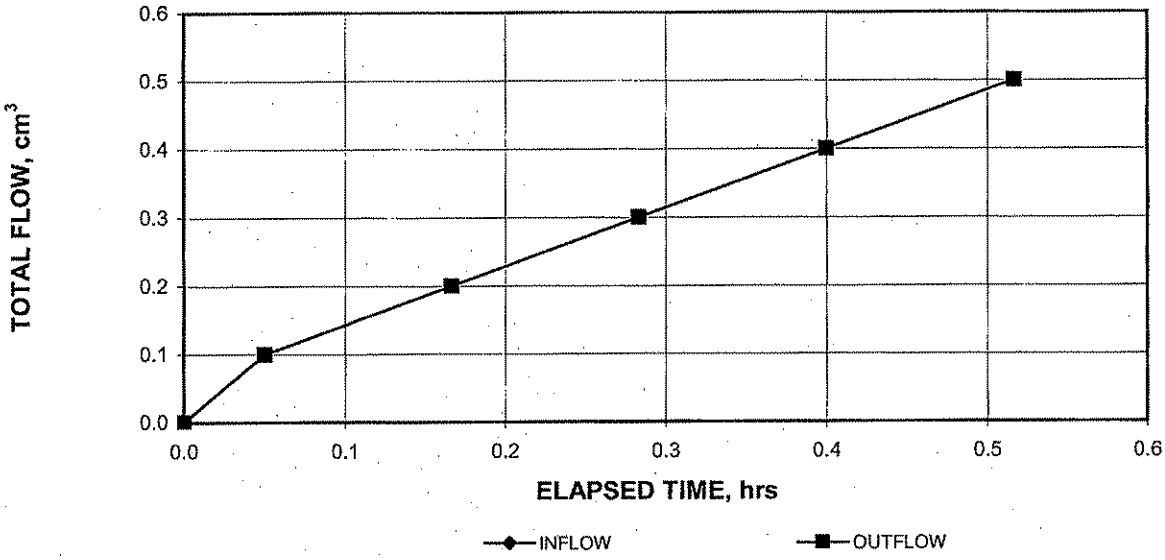
INTEGRITY IN TESTING

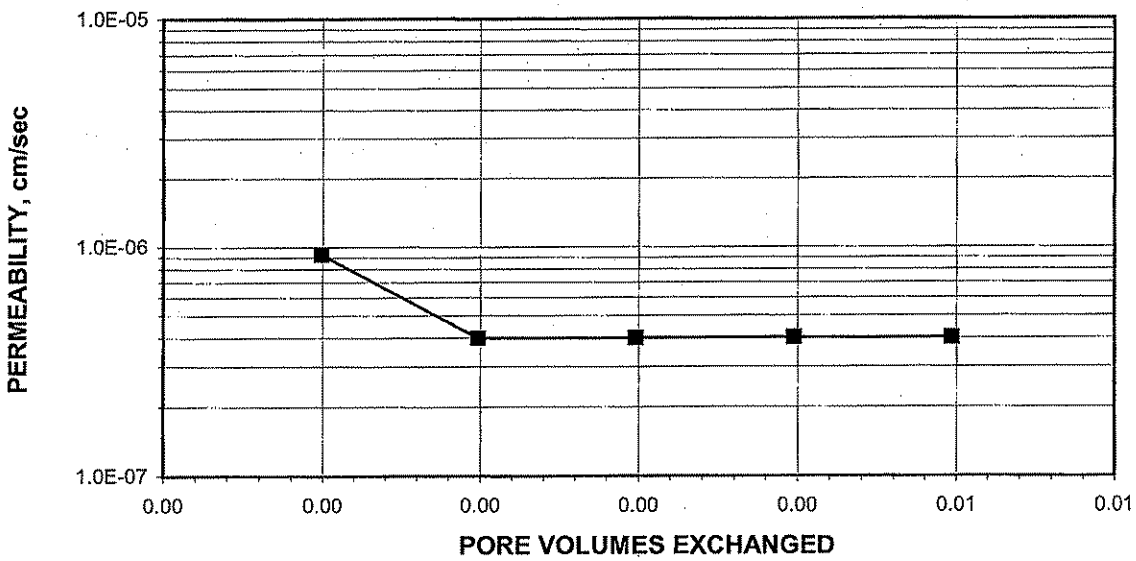
Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID No.	2009-666-13-04		

AVERAGE PERMEABILITY = 4.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.0E-09 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-3-09

DCN: CT-22C DATE: 12/1/2009 REV: 0 [S:\PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID No.	2009-666-13-04		

Specific Gravity 2.74 Measured
Sample Condition Undisturbed

Visual Description: BROWN SANDY CLAY

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	214	802
Wt. of Tare & WS (gm.)	585.64	432.82
Wt. of Tare & DS (gm.)	526.38	374.75
Wt. of Tare (gm.)	171.33	103.78
Wt. of Water (gm.)	59.26	58.07
Wt. of DS (gm.)	355.05	270.97
Moisture Content (%)	**16.7**	**21.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	649.56	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.)(gm.)	649.56	675.94
Length 1 (in.)	3.046	2.966
Length 2 (in.)	3.032	3.005
Length 3 (in.)	3.029	2.999
Top Diameter (in.)	2.858	2.780
Middle Diameter (in.)	2.867	2.828
Bottom Diameter (in.)	2.871	2.820
Average Length (in.)	3.04	2.99
Average Area (in.^{2})	6.45	6.20
Sample Volume (cm^3)	320.77	303.72
Unit Wet Wt. (gm./ cm^3)	2.02	2.23
Unit Wet Wt. (pcf)	126.4	138.9
Unit Dry Wt. (pcf)	108.3	114.4
Unit Dry Wt. (gm./ cm^3)	1.74	1.83
Void Ratio, e	0.58	0.49
Porosity, n	0.37	0.33
Pore Volume (cm^3)	117.6	100.6
Total Wgt. Of Sample After Test		657.4

Tested By: TMS Date: 12/1/2009 Checked By: GZM Date: 12-3-09

DCN: CT-22C DATE: 11-11-09 [illegible] drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-04 PERM.xls]Sheet1

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID No.	2009-666-13-04		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.9	Sample Length (cm), L	7.59
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.14
Cell (psi)	75.0	Sample Area (cm^2), A	39.99
Total Pressure Head (cm)	77.3	Inflow Burette Area (cm^2), a-in	0.852
Hydraulic Gradient	10.18	Outflow Burette Area (cm^2), a-out	0.972
		B Parameter (%)	95

AVERAGE PERMEABILITY = 4.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/1/2009	10	42	0.0	0.0	0.0	105.0	0	23.2	NA
12/1/2009	10	45	0.1	0.1	0.1	104.7	0	23.2	9.3E-07
12/1/2009	10	52	0.2	0.2	0.2	104.5	0	23.2	4.0E-07
12/1/2009	10	59	0.3	0.3	0.3	104.3	0	23.2	4.0E-07
12/1/2009	11	6	0.4	0.4	0.4	104.1	0	23.2	4.0E-07
12/1/2009	11	13	0.5	0.5	0.5	103.9	1	23.2	4.0E-07

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-3-09

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INTEGRITY IN TESTING

ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH1
Lab ID	2009-666-13-04	Soil Description	**BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

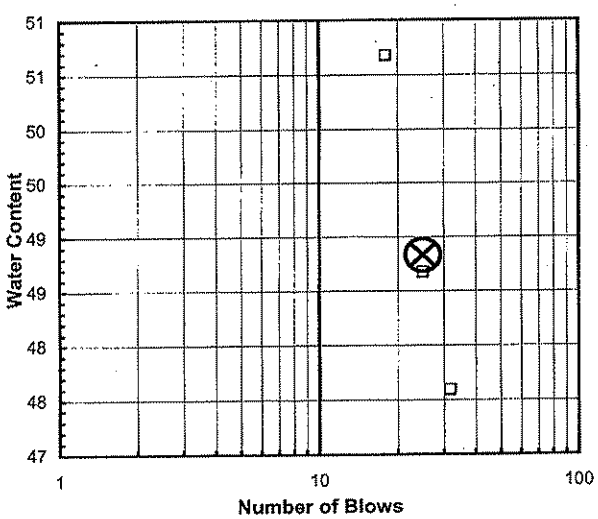
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	A	E	Y	MULTIPOINT
Wt. of Tare & WS (gm)	28.73	27.61	27.53	
Wt. of Tare & DS (gm)	24.20	23.58	23.68	
Wt. of Tare (gm)	15.26	15.30	15.59	
Wt. of Water (gm)	4.5	4.0	3.9	
Wt. of DS (gm)	8.9	8.3	8.1	
Moisture Content (%)	**50.7**	**48.7**	**47.6**	
Number of Blows	**18**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	I	U	
Wt. of Tare & WS (gm)	21.35	21.66	
Wt. of Tare & DS (gm)	19.89	20.12	
Wt. of Tare (gm)	15.22	15.18	
Wt. of Water (gm)	1.5	1.5	
Wt. of DS (gm)	4.7	4.9	
Moisture Content (%)	**31.3**	**31.2**	**0.1**

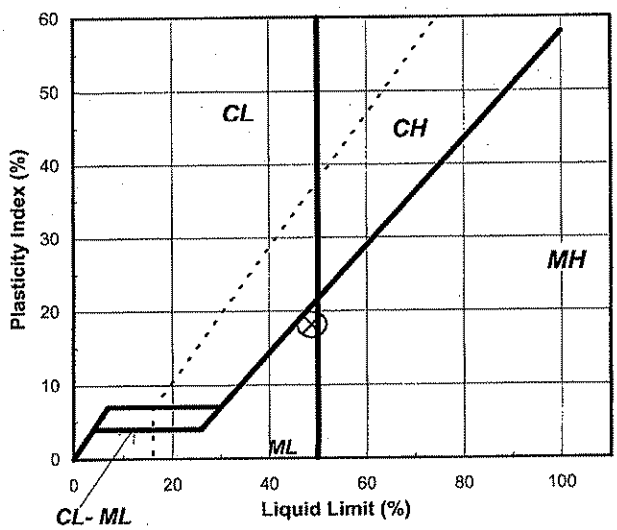
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**49**
Plastic Limit (%)	**31**
Plasticity Index (%)	**18**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/2/2009 *Checked By* GEM *Date* 12-2-09

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PHI
Lab ID	2009-666-13-04	Visual Description	**BROWN**
			(MInus No.4 sieve material, airdried)

Replicate Number		**1**		**2**
Pycnometer ID	R	27	R	280
Weight of Pycnometer + Soil + Water (gm)		719.32		716.54
Temperature, T (°Celsius)		21.3		22.0
Weight of Pycnometer + Water (gm)		688.32		685.68
Tare Number		214		208
Weight of Tare + Dry Soil (gm)		220.08		212.53
Weight of Tare (gm)		171.39		163.76
Weight of Dry Soil (gm)		48.69		48.77
Specific Gravity of Soil @ T		2.752		2.723
Specific Gravity of Water @ T		0.9980		0.9978
Conversion Factor for Temperature T		0.9997		0.9996
Specific Gravity @ 20° Celsius		2.753		2.724

Average Specific Gravity @ 20° Celsius	2.74

Tested By TMS *Date* 12/2/2009 *Checked By* GEM *Date* 12-3-09

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-04 Sp. Gravity.xls]Sheet1*

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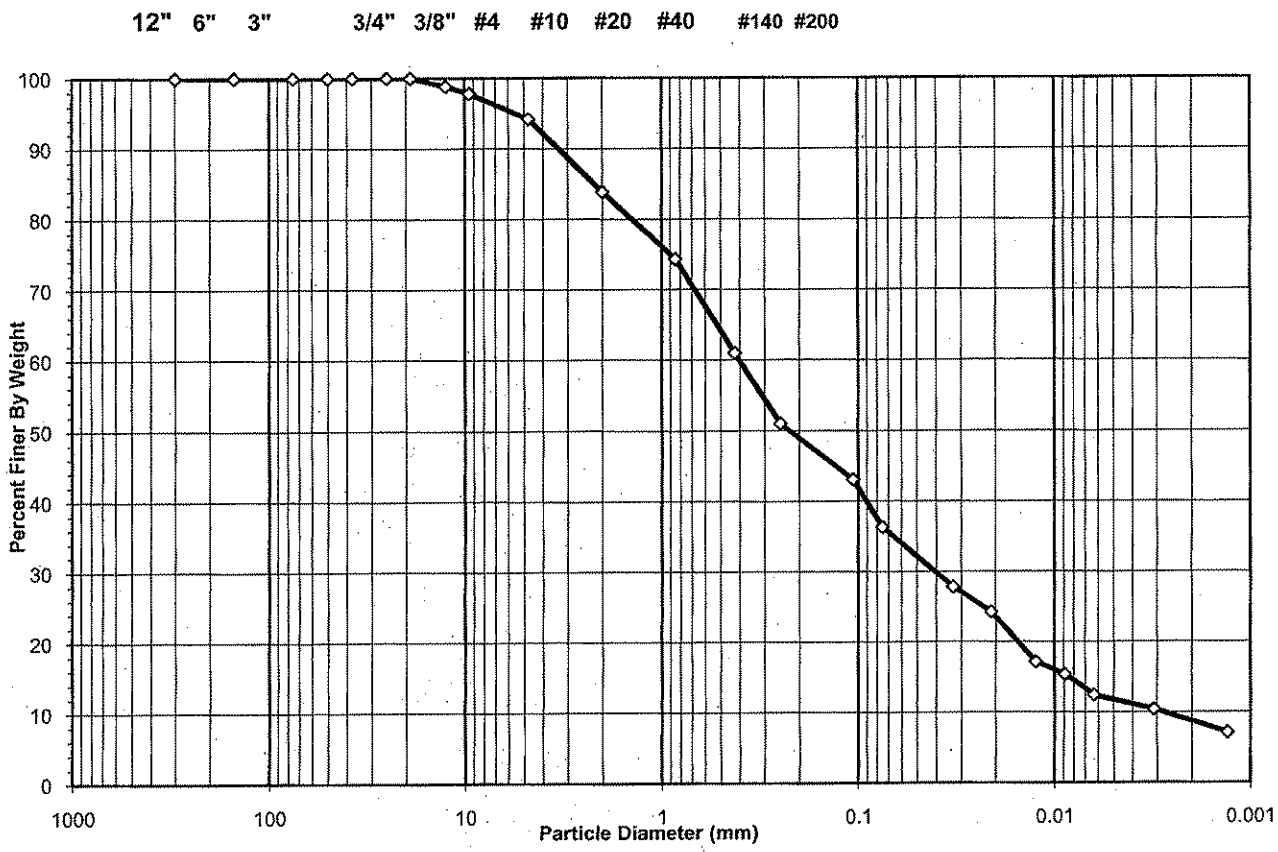
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID	2009-666-13-04	Soil Color	**BROWN**

	SIEVE ANALYSIS					HYDROMETER
USCS	cobbles	gravel	sand			silt and clay fraction
USDA	cobbles	gravel	sand		silt	clay



USCS Summary

Sieve Sizes (mm)		Percentage
Greater Than #4	*Gravel*	5.78
#4 To #200	*Sand*	57.89
Finer Than #200	*Silt & Clay*	36.34

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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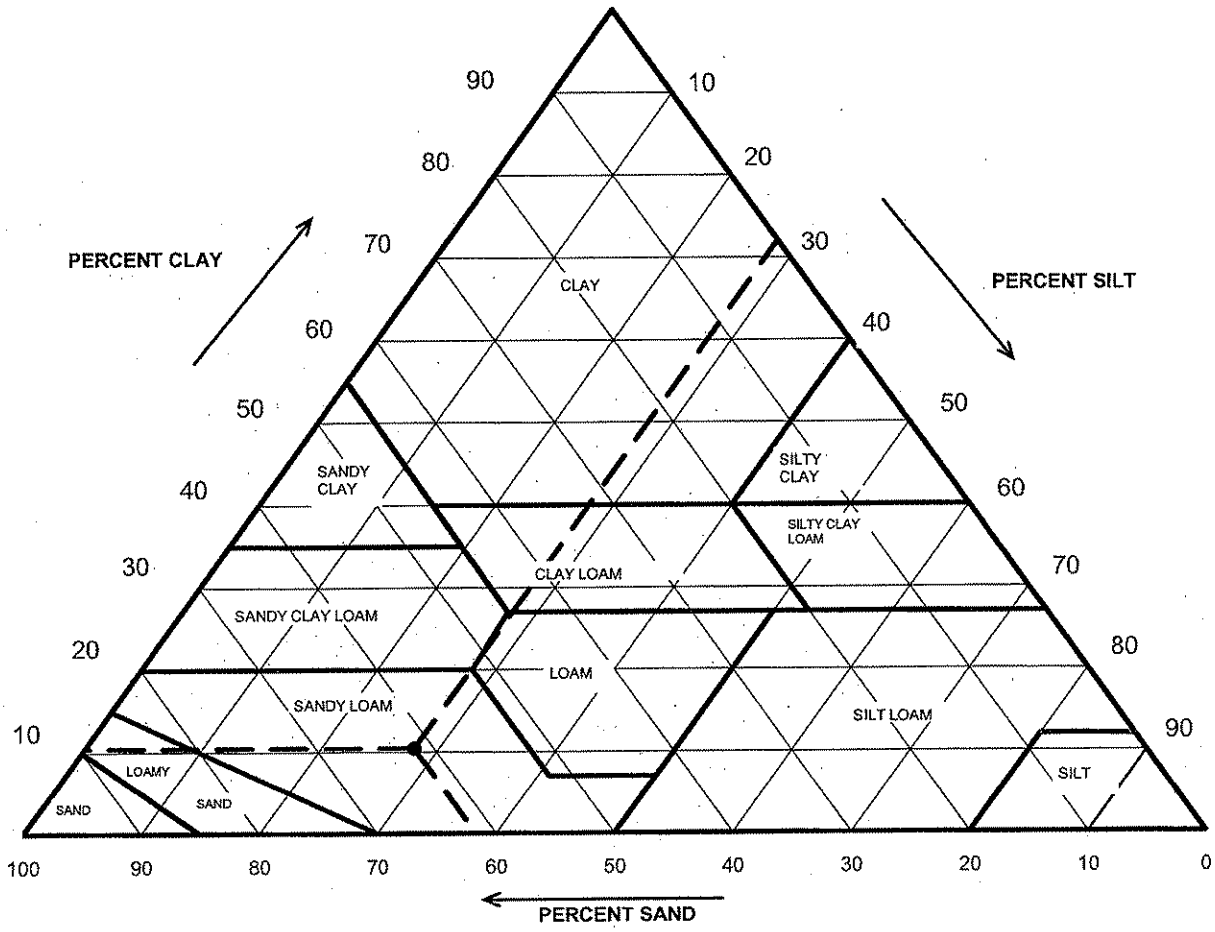
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID	2009-666-13-04	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	16.13	**0.00**
2	83.87	*Sand*	51.72	**61.66**
0.05	32.16	*Silt*	23.41	**27.91**
0.002	8.75	*Clay*	8.75	**10.43**

USDA Classification: ***SANDY LOAM***

 DCN: CT-S3P DATE:06/12/08 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-735 ARCADIS\[2009-735-01-02 #10 Split Hydro rev 9.xls]Sheet1

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WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID	2009-666-13-04	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	214	Tare No.	C-2
Wgt.Tare + Wet Soil (gm)	585.64	Wgt.Tare + Wet Soil (gm)	40.41
Wgt.Tare + Dry Soil (gm)	526.38	Wgt.Tare + Dry Soil (gm)	38.80
Weight of Tare (gm)	171.33	Weight of Tare (gm)	15.66
Weight of Water (gm)	59.26	Weight of Water (gm)	1.61
Weight of Dry Soil (gm)	355.05	Weight of Dry Soil (gm)	23.14
Moisture Content (%)	**16.7**	**Moisture Content (%)**	**7.0**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	414.31	Weight of the Dry Sample (gm)	401.81
Dry Weight +#10 Material(gm)	355.1	Weight of minus #200 material (gm)	20.26
Wet Weight Hydro. Material.(gm)	50.01	Weight of plus #200 material (gm)	381.55
Dry Weight Hydro. Material (gm)	46.76		
Total Dry Weight Sample (gm)	401.81	**J-FACTOR (%FINER THAN #10)**	**0.8387**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	4.15	1.17	1.17	98.83	**98.83**
3/8"	9.50	3.56	1.00	2.17	97.83	**97.83**
#4	4.75	12.80	3.61	5.78	94.22	**94.22**
#10	2.00	36.75	10.35	16.13	83.87	**83.87**
#20	0.85	5.30	11.34	11.34	88.66	**74.37**
#40	0.425	7.44	15.91	27.25	72.75	**61.02**
#60	0.250	5.55	11.87	39.12	60.88	**51.06**
#140	0.106	4.43	9.47	48.59	51.41	**43.12**
#200	0.075	3.78	8.08	56.68	43.32	**36.34**
Pan	-	20.26	43.32	100.00	-	-

Notes :

Tested By JBD Date 12/3/2009 Checked By [illegible] Date 12-9-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST3
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID	2009-666-13-04	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	21.0	21.0	23.0	5.33	15.7	32.9	0.01282	0.0325	**27.6**
5		19.0	23.0	5.33	13.7	28.7	0.01282	0.0208	**24.1**
15		15.0	23.0	5.33	9.7	20.3	0.01282	0.0123	**17.0**
30		14.0	23.0	5.33	8.7	18.2	0.01282	0.0088	**15.3**
60		12.0	23.5	4.99	7.0	14.7	0.01275	0.0062	**12.4**
250		11.0	23.3	5.12	5.9	12.3	0.01278	0.0031	**10.4**
1440		9.0	23.5	4.99	4.0	8.4	0.01275	0.0013	**7.1**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	46.76	a - Factor	0.982
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than # 10	83.87
Weight of Dry Material (gm)	46.76		
		Specific Gravity	2.74 Measured

Note:

Tested By JBD Date 12/2/2009 Checked By GEM Date 12-8-09

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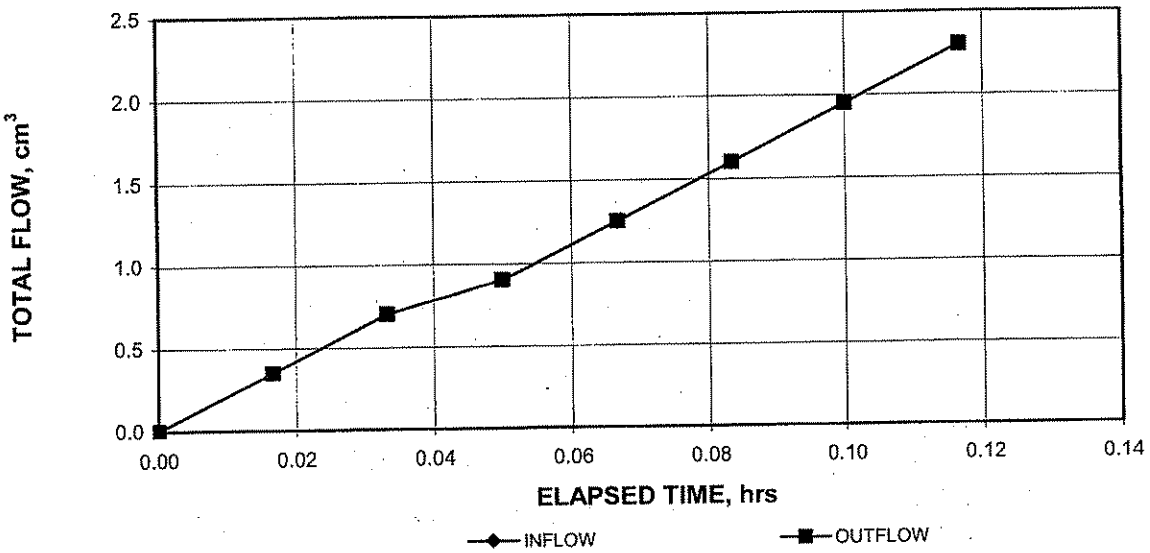
PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

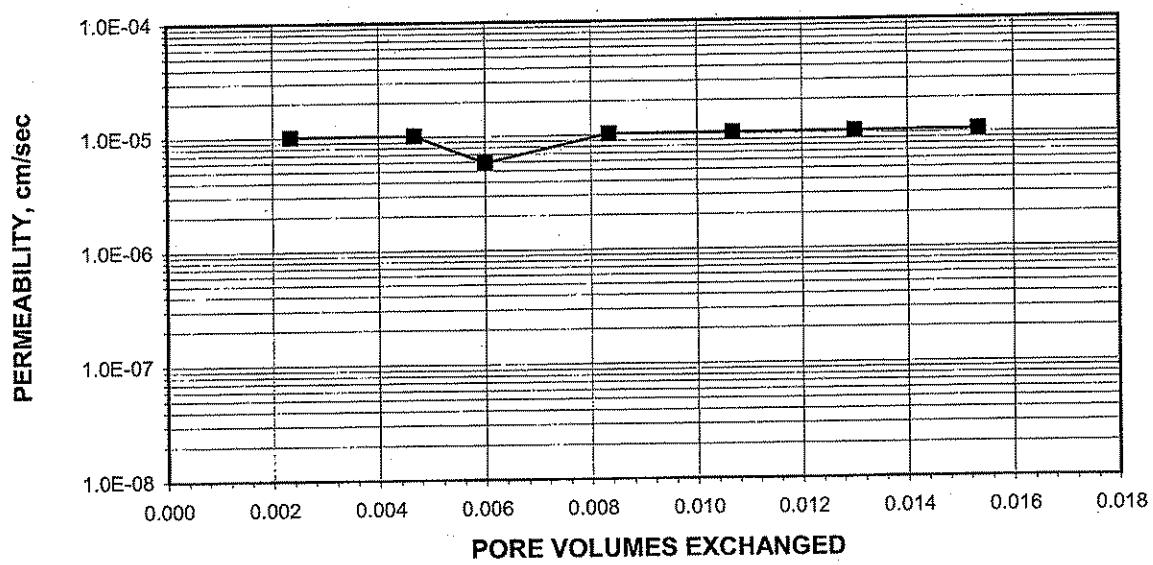
Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID No.	2009-666-13-05		

AVERAGE PERMEABILITY = 1.0E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.0E-07 m/sec @ 20°C

TOTAL FLOW vs. ELAPSED TIME



PORE VOLUMES EXCHANGED vs. PERMEABILITY



Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-8-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID No.	2009-666-13-05		
		Specific Gravity	2.77 Measured
		Sample Condition	Undisturbed

Visual Description: GRAY BROWN SANDY SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	208	810
Wt. of Tare & WS (gm.)	529.54	512.29
Wt. of Tare & DS (gm.)	460.00	426.78
Wt. of Tare (gm.)	169.73	114.71
Wt. of Water (gm.)	69.54	85.51
Wt. of DS (gm.)	290.27	312.07
Moisture Content (%)	**24.0**	**27.4**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	1786.69	NA
Wt. of Tube (gm.)	1095.91	NA
Wt. of WS (calc.)(gm.)	690.78	709.97
Length 1 (in.)	3.279	3.356
Length 2 (in.)	3.276	3.278
Length 3 (in.)	3.273	3.339
Top Diameter (in.)	2.887	2.855
Middle Diameter (in.)	2.873	2.865
Bottom Diameter (in.)	2.869	2.873
Average Length (in.)	3.28	3.32
Average Area (in.^{2})	6.50	6.44
Sample Volume (cm^3)	348.83	351.03
Unit Wet Wt. (gm./ cm^3)	1.98	2.02
Unit Wet Wt. (pcf)	123.6	126.3
Unit Dry Wt. (pcf)	99.7	99.1
Unit Dry Wt. (gm./ cm^3)	1.60	1.59
Void Ratio, e	0.73	0.74
Porosity, n	0.42	0.43
Pore Volume (cm^3)	147.6	149.8
Total Wgt. Of Sample After Test		699.16

Tested By: TMS Date: 12/1/2009 Checked By: GM Date: 12-8-09

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PERMEABILITY TEST

ASTM D 5084-03
(SOP-S22A & S22B)

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INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID No.	2009-666-13-05		

Pressure Heads (Constant)		Final Sample Dimensions	
Top Cap (psi)	48.8	Sample Length (cm), L	8.44
Bottom Cap (psi)	50.0	Sample Diameter (cm)	7.28
Cell (psi)	75.0	Sample Area (cm^2), A	41.57
Total Pressure Head (cm)	84.4	Inflow Burette Area (cm^2), a-in	0.977
Hydraulic Gradient	9.99	Outflow Burette Area (cm^2), a-out	0.868
		B Parameter (%)	95

AVERAGE PERMEABILITY = 1.0E-05 cm/sec @ 20°C
AVERAGE PERMEABILITY = 1.0E-07 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (hr)	TOTAL INFLOW (cm^3)	TOTAL OUTFLOW (cm^3)	TOTAL HEAD h (cm)	FLOW (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
12/1/2009	10	42.5	0.00	0.0	0.0	108.6	0	23.2	NA
12/1/2009	10	43.5	0.02	0.4	0.4	107.8	0	23.2	1.0E-05
12/1/2009	10	44.5	0.03	0.7	0.7	107.0	0	23.2	1.0E-05
12/1/2009	10	45.5	0.05	0.9	0.9	106.6	0	23.2	5.9E-06
12/1/2009	10	46.5	0.07	1.3	1.3	105.8	0	23.2	1.0E-05
12/1/2009	10	47.5	0.08	1.6	1.6	105.1	0	23.2	1.0E-05
12/1/2009	10	48.5	0.10	2.0	2.0	104.3	0	23.2	1.0E-05
12/1/2009	10	49.5	0.12	2.3	2.3	103.6	1	23.2	1.1E-05

Tested By: TMS Date: 12/1/2009 Checked By: GEM Date: 12-8-09

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ATTERBERG LIMITS

ASTM D 4318-05 / AASHTO T89 (SOP - S4A)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH 1
Lab ID	2009-666-13-05	Soil Description	**BROWN SILT**

Note: The USCS symbol used with this test refers only to the minus No. 40 sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description. (Minus No. 40 sieve material, Airdried)

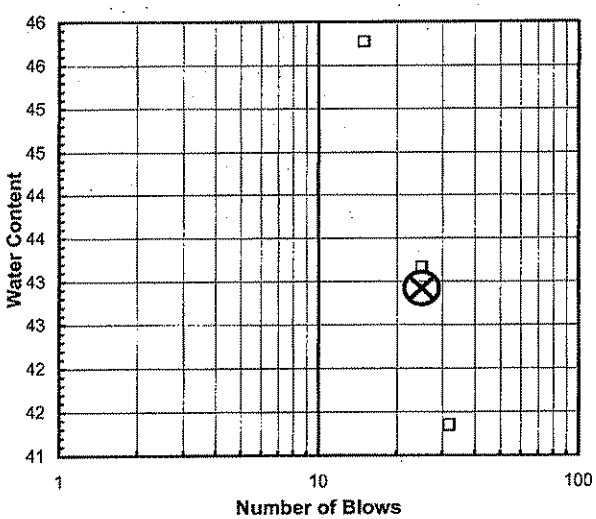
Liquid Limit Test	**1**	**2**	**3**	
Tare Number	P	K	C	MULTIPOINT
Wt. of Tare & WS (gm)	29.13	28.10	29.35	
Wt. of Tare & DS (gm)	24.75	24.22	25.22	
Wt. of Tare (gm)	15.18	15.23	15.23	
Wt. of Water (gm)	4.4	3.9	4.1	
Wt. of DS (gm)	9.6	9.0	10.0	
Moisture Content (%)	**45.8**	**43.2**	**41.3**	
Number of Blows	**15**	**25**	**32**	

Plastic Limit Test	**1**	**2**	**Range**
Tare Number	R	N	
Wt. of Tare & WS (gm)	21.37	21.51	
Wt. of Tare & DS (gm)	19.87	20.00	
Wt. of Tare (gm)	15.12	15.30	
Wt. of Water (gm)	1.5	1.5	
Wt. of DS (gm)	4.8	4.7	
Moisture Content (%)	**31.6**	**32.1**	**-0.5**

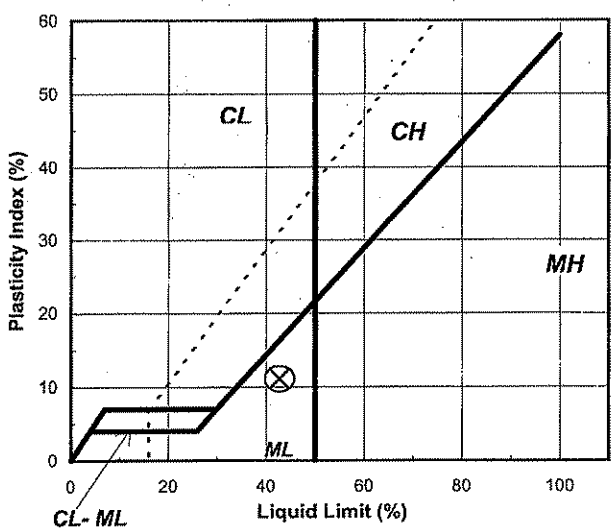
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%)	**43**
Plastic Limit (%)	**32**
Plasticity Index (%)	**11**
USCS Symbol	**ML**

Flow Curve



Plasticity Chart



Tested By SD *Date* 12/2/2009 *Checked By* GEM *Date* 12-3-09

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SPECIFIC GRAVITY

ASTM D 854-00 (SOP - S5)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	2009-666-13	Sample No.	PH I
Lab ID	2009-666-13-05	Visual Description	**BROWN SILT**
			(MInus No.4 sieve material, airdried)

Replicate Number	**1**	**2**
Pycnometer ID	R 27	R 280
Weight of Pycnometer + Soil + Water (gm)	718.54	715.9
Temperature, T (°Celsius)	22.4	22.6
Weight of Pycnometer + Water (gm)	688.20	685.56
Tare Number	833	837
Weight of Tare + Dry Soil (gm)	306.77	308.33
Weight of Tare (gm)	259.24	260.86
Weight of Dry Soil (gm)	47.53	47.47
Specific Gravity of Soil @ T	2.765	2.771
Specific Gravity of Water @ T	0.9977	0.9977
Conversion Factor for Temperature T	0.9995	0.9994
Specific Gravity @ 20° Celsius	2.767	2.773

Average Specific Gravity @ 20° Celsius	2.77

Tested By TMS *Date* 12/3/2009 *Checked By* GPM *Date* 12-8-09

DCN: CT-S5 Date: 03/24/05 Revision: 10R *\\SERVER\Data Drive\2009.PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-05 Sp. Gravity.xls]Sheet1*

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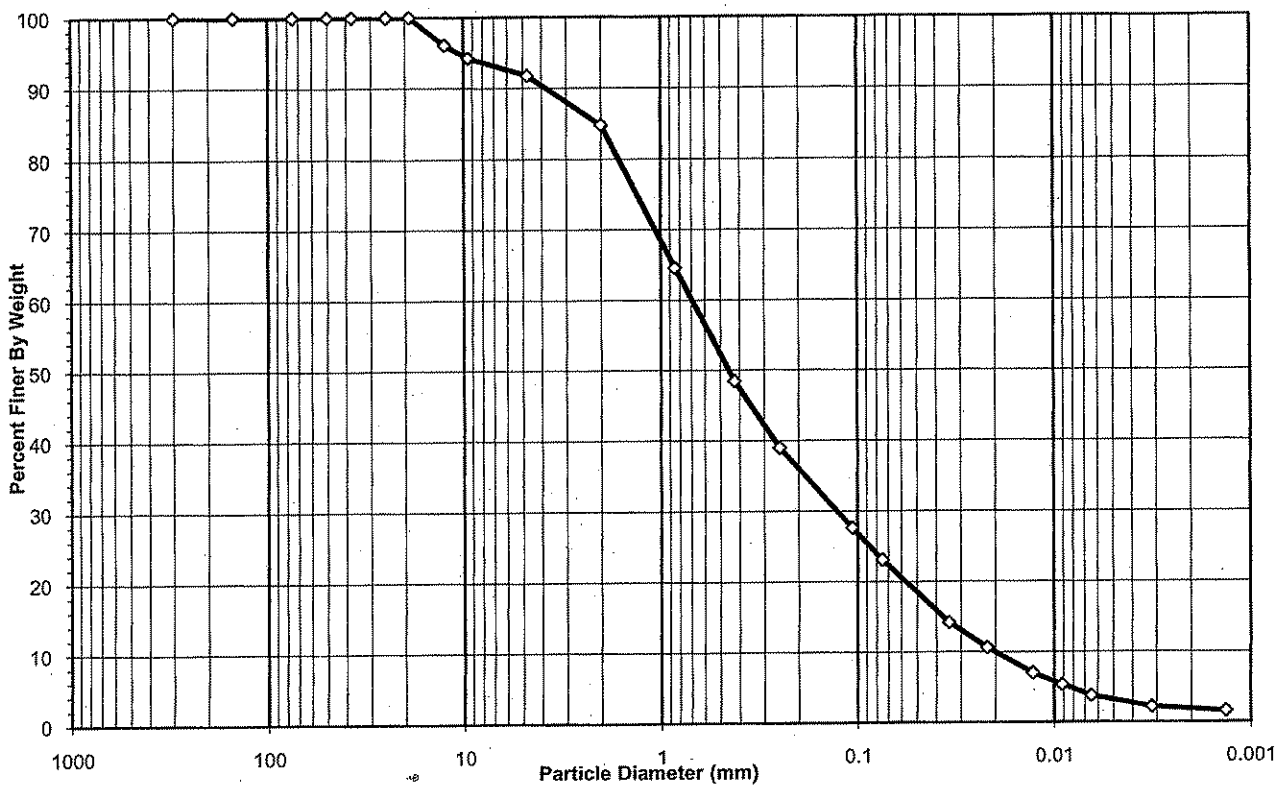
SIEVE AND HYDROMETER ANALYSIS
ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	20097-666-13	Sample No.	PH I
Lab ID	2009-666-13-05	Soil Color	**BROWN**

	SIEVE ANALYSIS			HYDROMETER	
USCS	cobbles	gravel	sand	silt and clay fraction	
USDA	cobbles	gravel	sand	silt	clay

12" 6" 3" 3/4" 3/8" #4 #10 #20 #40 #140 #200



Sieve Sizes (mm)	USCS Summary	Percentage
Greater Than #4	*Gravel*	8.22
#4 To #200	*Sand*	68.68
Finer Than #200	*Silt & Clay*	23.10

USCS Symbol ***SM, TESTED***

USCS Classification ***SILTY SAND***

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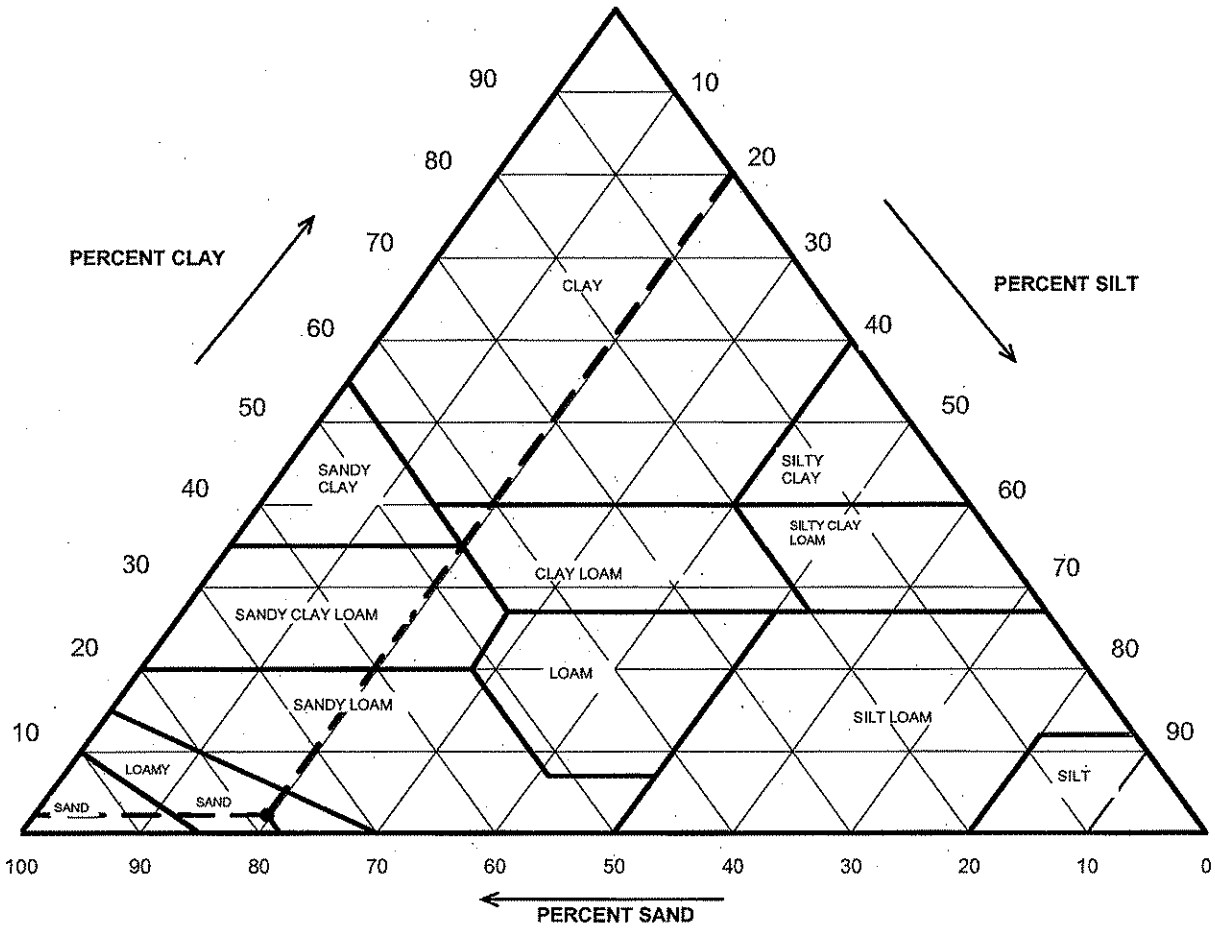
USDA CLASSIFICATION CHART

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	20097-666-13	Sample No.	PH I
Lab ID	2009-666-13-05	Soil Color	BROWN



Particle Size (mm)	Percent Finer	USDA SUMMARY	Actual Percentage	Corrected % of Minus 2.0 mm material for USDA Classificat.
		Gravel	15.17	**0.00**
2	84.83	*Sand*	66.33	**78.18**
0.05	18.51	*Silt*	16.63	**19.61**
0.002	1.87	*Clay*	1.87	**2.21**

USDA Classification: ***LOAMY SAND***

 DCN: CT-S3P DATE:06/12/09 REVISION:9 \\SERVER\Data Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-05 #10 Split Hydro rev 9.xls]Sheet1

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS #10 SPLIT

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	20097-666-13	Sample No.	PH I
Lab ID	2009-666-13-05	Soil Color	**BROWN**

Moisture Content/sieve +10 Material		Moisture Content for Hydrometer Portion	
Tare No.	208	Tare No.	U-1
Wgt.Tare + Wet Soil (gm)	529.54	Wgt.Tare + Wet Soil (gm)	42.63
Wgt.Tare + Dry Soil (gm)	460.00	Wgt.Tare + Dry Soil (gm)	40.66
Weight of Tare (gm)	169.73	Weight of Tare (gm)	15.70
Weight of Water (gm)	69.54	Weight of Water (gm)	1.97
Weight of Dry Soil (gm)	290.27	Weight of Dry Soil (gm)	24.96
Moisture Content (%)	**24.0**	**Moisture Content (%)**	**7.9**

Soil Specimen Data			
Wet Weight +#10 Material (gm)	359.81	Weight of the Dry Sample (gm)	336.62
Dry Weight +#10 Material(gm)	290.3	Weight of minus #200 material (gm)	12.62
Wet Weight Hydro. Material.(gm)	50.01	Weight of plus #200 material (gm)	324.00
Dry Weight Hydro. Material (gm)	46.35		
Total Dry Weight Sample (gm)	336.62	**J-FACTOR (%FINER THAN #10)**	**0.8483**

Sieve Size	Sieve Opening (mm)	Wgt.of Soil Retained (gm)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	**Accumulated Percent Finer (%)**
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.5	11.35	3.91	3.91	96.09	**96.09**
3/8"	9.50	5.33	1.84	5.75	94.25	**94.25**
#4	4.75	7.19	2.48	8.22	91.78	**91.78**
#10	2.00	20.16	6.95	15.17	84.83	**84.83**
#20	0.85	11.05	23.84	23.84	76.16	**64.61**
#40	0.425	8.80	18.99	42.82	57.18	**48.50**
#60	0.250	5.20	11.22	54.04	45.96	**38.99**
#140	0.106	6.21	13.40	67.44	32.56	**27.62**
#200	0.075	2.47	5.33	72.77	27.23	**23.10**
Pan	-	12.62	27.23	100.00	-	-

Notes :

Tested By SD Date 12/7/2009 Checked By GZM Date 12-8-09

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HYDROMETER ANALYSIS

ASTM D 422-63 (SOP-S3)

Client	JOYCE ENGINEERING, INC.	Boring No.	ST4
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	ANCHOR TRENCH
Project No.	20097-666-13	Sample No.	PH I
Lab ID	2009-666-13-05	Soil Color	**BROWN**

Elapsed Time (min)		R Measured	Temp. (°C)	Composite Correction	R Corrected	N (%)	K Factor	Diameter (mm)	N' (%)
0	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	13.0	13.0	23.3	5.12	7.9	16.6	0.01267	0.0337	**14.1**
5		11.0	23.3	5.12	5.9	12.4	0.01267	0.0216	**10.5**
15		9.0	23.3	5.12	3.9	8.2	0.01267	0.0126	**6.9**
30		8.0	23.4	5.06	2.9	6.2	0.01266	0.0089	**5.3**
60		7.0	23.6	4.92	2.1	4.4	0.01263	0.0063	**3.7**
250		6.0	23.8	4.79	1.2	2.6	0.01260	0.0031	**2.2**
1440		6.0	23.3	5.12	0.9	1.8	0.01267	0.0013	**1.6**

Soil Specimen Data		**Other Corrections**	
Tare + Dry Material (gm)	46.35	a - Factor	0.976
Weight of Tare (gm)	0		
Weight of Deflocculant (gm)	5.0	Percent Finer than #10	84.83
Weight of Dry Material (gm)	46.35		
		Specific Gravity	2.77 Measured

Note:

Tested By JBD Date 12/4/2009 Checked By GEM Date 12-8-09

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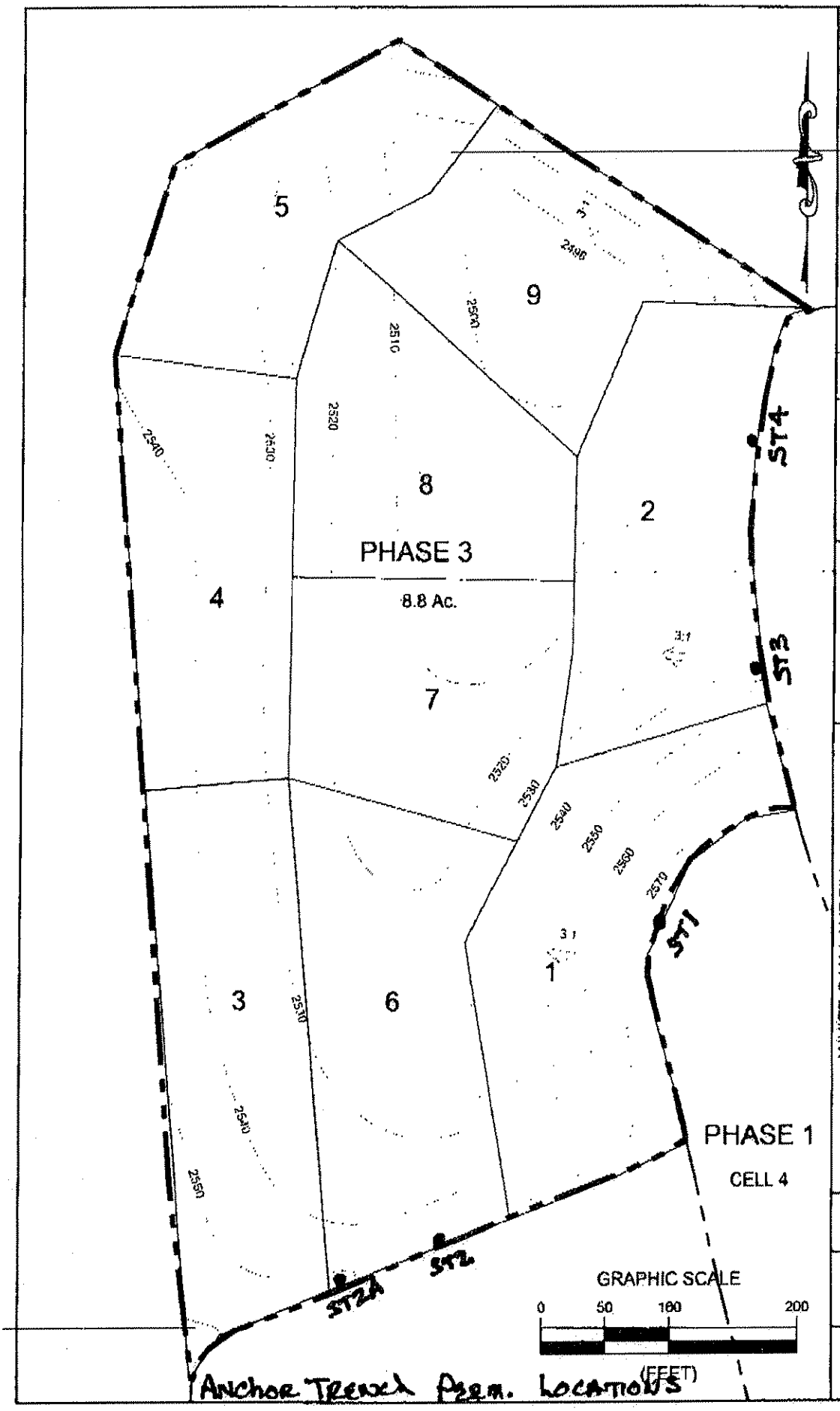

NO	BY	CK	APP

DATE	REVISIONS AND RECORD OF ISSUE

DESIGNED ____ CADD: ____
DRAWN ____
CHECKED ____
APPROVED ____
DATE ____

LORE ENGINEERING, INC.
2211 W. MEADOWVIEW ROAD
GREENSBORO, NC 27407
PHONE (336) 323-0092

WHITE OAK LANDFILL
CLYDE, NORTH CAROLINA

PHASE 3-ACRE MAP

PROJECT NO.

SCALE
AS NOTED

DRAWING NO.
AM-1

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WHITE OAK LF
FLEXIBLE WALL PERMEABILITY
FINAL TEST RESULTS

LAB ID NO.	BORING NO.	DEPTH (FT)	SAMPLE NO.	MOISTURE CONTENT (%)		UNIT DRY WT. (pcf)		AVERAGE PERMEABILITY cm/sec
				BEFORE	AFTER	BEFORE	AFTER	
2009-666-05-02	T. P. 1	LIFT 1	ST1	17.8	22.6	105	106.6	2.30E-07
2009-666-05-04	T. P. 1	LIFT 2	ST3	21.3	23.7	99.1	101.8	4.40E-07
2009-666-05-06	T. P. 1	LIFT 3	ST5	22.8	23	100.2	101.5	3.00E-07
2009-666-05-08	T. P. 1	LIFT 4	ST7	21.6	23.3	99.6	101.9	3.10E-07
2009-666-05-03	T. P. 2	LIFT 1	ST2	18.4	22.5	100.7	104.1	3.40E-07
2009-666-05-05	T. P. 2	LIFT 2	ST4	24.2	21.8	98.5	101.2	2.30E-07
2009-666-05-07	T. P. 2	LIFT 3	ST6	22.2	24.2	100.7	100.6	5.20E-07
2009-666-05-09	T. P. 2	LIFT 4	ST8	15.7	24.2	104.3	103.9	6.30E-07

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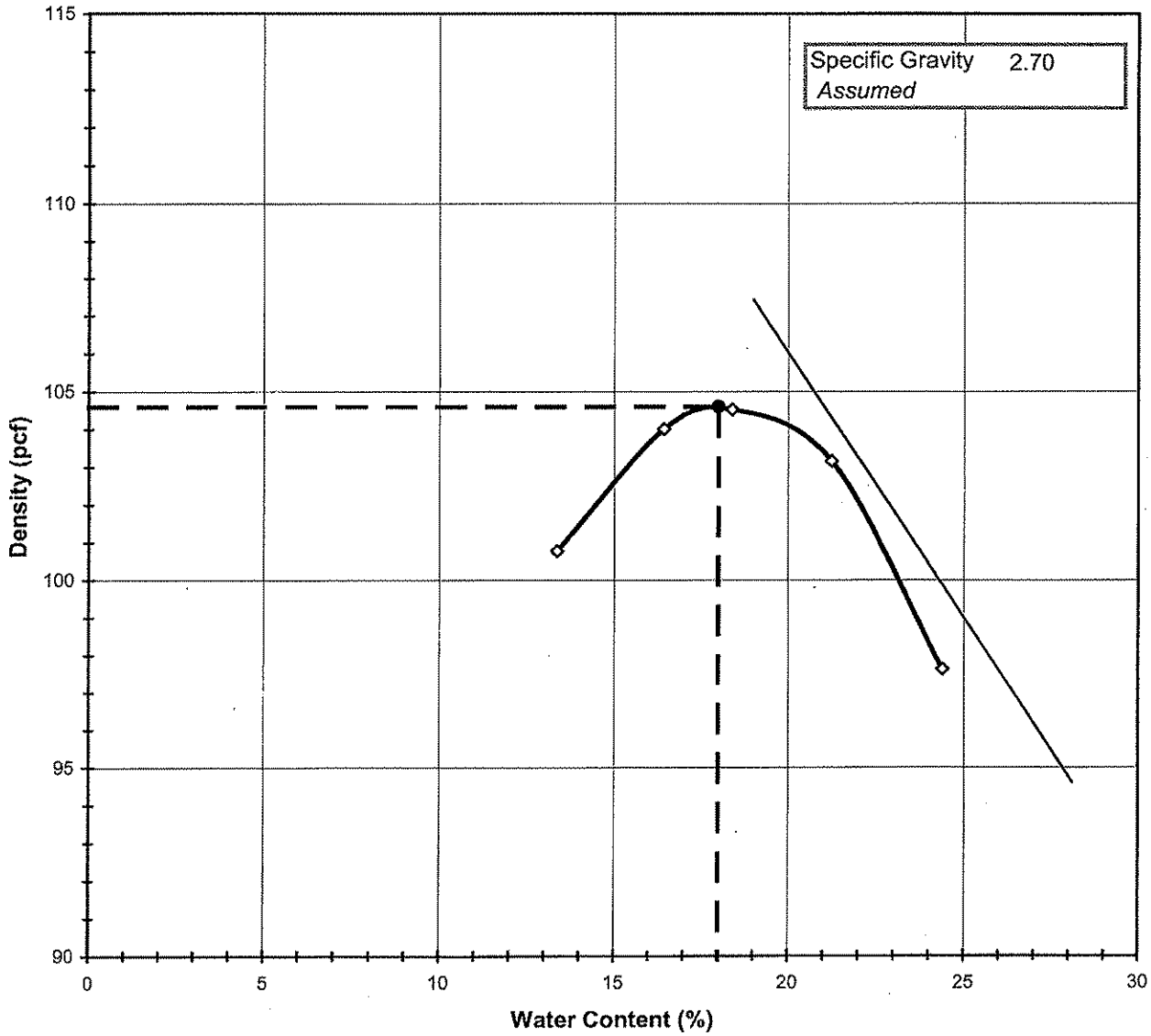
MOISTURE DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-05	Sample No.	CCL9
Lab ID	2009-666-05-01	Test Method	**STANDARD**

Visual Description BROWN SILT

Optimum Water Content 18.0
Maximum Dry Density 104.6



Tested By SD *Date* 9/7/2009 *Checked By* GEM *Date* 9-9-09

 DCN:CT-S12 DATE:12/11/00 REVISION 5 *\\Server\data drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-01 Proctor.XLS]Sheet1*

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MOISTURE - DENSITY RELATIONSHIP

ASTM D698-91 SOP-S12

Client	JOYCE ENGINEERING INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth (ft)	NA
Project No.	2009-666-05	Sample No.	CCL9
Lab ID	2009-666-05-01		

Visual Description BROWN SILT

Total Weight of the Sample (gm)	21089
As Received Water Content(%)	NA
Assumed Specific Gravity	2.70
Percent Retained on 3/4"	NA
Percent Retained on 3/8"	NA
Percent Retained on #4	NA
Oversize Material	Not included
Procedure Used	A

TestType		**STANDARD**
Rammer Weight (lbs)		5.5
Rammer Drop (in)		12
Rammer Type		MECHANICAL
Machine ID	R	174
Mold ID	R	172
Mold diameter		4"
Weight of the Mold		4315
Volume of the Mold(cc)		942

Mold / Specimen

Point No.	**1**	**2**	**3**	**4**	**5**
Wt. of Mold & WS (gm)	6040	6143	6183	6203	6148
Wt.of Mold (gm)	4315	4315	4315	4315	4315
Wt. of WS	1725	1828	1868	1888	1833
Mold Volume (cc)	942	942	942	942	942

Moisture Content / Density

Tare Number	301	306	303	305	317
Wt. of Tare & WS (gm)	537.40	521.70	516.40	491.50	494.10
Wt. of Tare & DS (gm)	483.92	460.53	453.40	420.18	413.68
Wt. of Tare (gm)	84.10	88.30	110.90	84.40	84.10
Wt. of Water (gm)	53.48	61.17	63.00	71.32	80.42
Wt. of DS (gm)	399.82	372.23	342.50	335.78	329.58

Wet Density (gm/cc)	1.83	1.94	1.98	2.00	1.95
Wet Density (pcf)	114.3	121.1	123.8	125.1	121.4
Moisture Content (%)	**13.4**	**16.4**	**18.4**	**21.2**	**24.4**
Dry Density (pcf)	**100.8**	**104.0**	**104.5**	**103.2**	**97.6**

Zero Air Voids

Moisture Content (%)	19.0	22.7	28.1
Dry Unit Weight (pcf)	107.4	102.2	94.6

Tested By SD *Date* 9/4/2009 *Checked By* GM *Date* 9-9-09

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

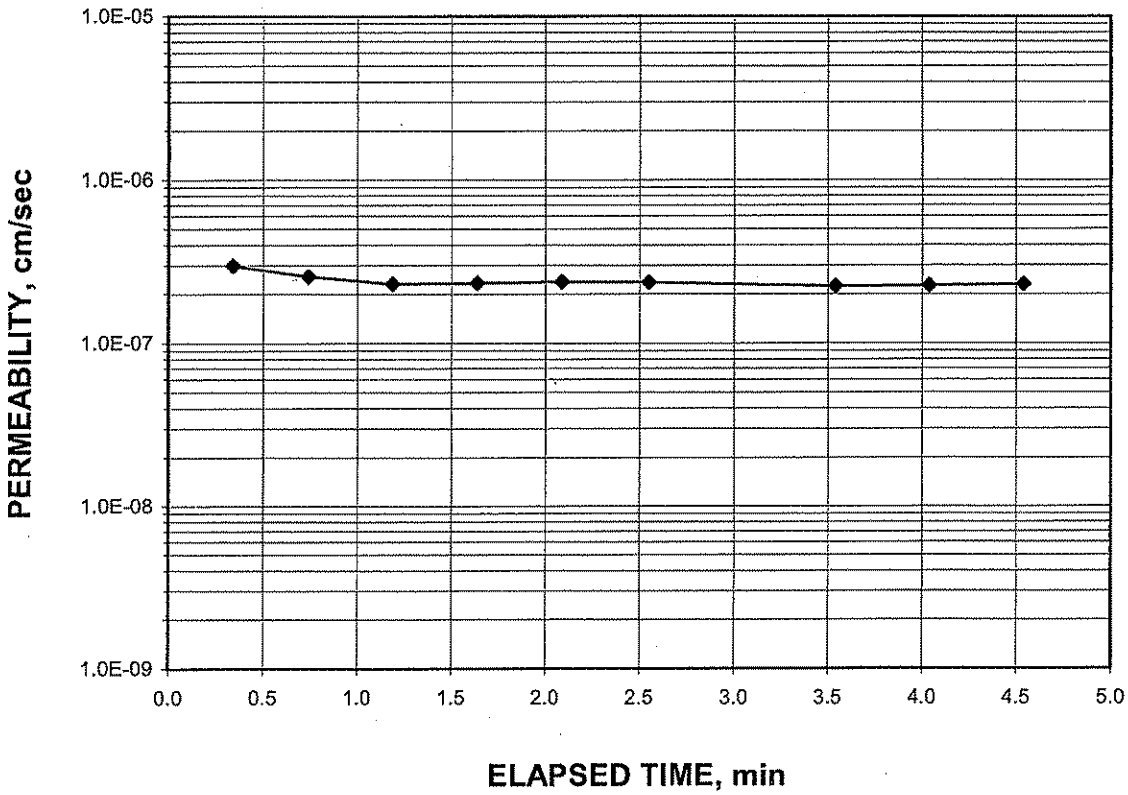
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 1
Project No.	2009-666-05	Sample No.	ST1
Lab ID No.	2009-666-05-02		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 2.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.3E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/3/2009 Checked By: GZM Date: 9-4-09

DCN: CT-22C DATE:12-21-05 REVISION: 1 \\Server\Shared Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-02 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 1
Project No.	2009-666-05	Sample No.	ST1
Lab ID No.	2009-666-05-02		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	802	808
Wt. of Tare & WS (gm.)	460.75	486.37
Wt. of Tare & DS (gm.)	406.87	416.17
Wt. of Tare (gm.)	103.74	105.09
Wt. of Water (gm.)	53.88	70.20
Wt. of DS (gm.)	303.13	311.08
Moisture Content (%)	**17.8**	**22.6**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	721.35	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	721.35	750.70
Length 1 (in.)	3.504	3.455
Length 2 (in.)	3.500	3.422
Length 3 (in.)	3.513	3.464
Top Diameter (in.)	2.854	2.871
Middle Diameter (in.)	2.842	2.844
Bottom Diameter (in.)	2.827	2.813
Average Length (in.)	3.51	3.45
Average Area (in.^{2})	6.34	6.35
Sample Volume (cm^3)	364.17	358.50
Unit Wet Wt. (gm./ cm^3)	1.981	2.094
Unit Wet Wt. (pcf)	123.6	130.7
Unit Dry Wt. (pcf)	105.0	106.6
Unit Dry Wt. (gm./ cm^3)	1.682	1.708
Void Ratio, e	0.605	0.580
Porosity, n	0.377	0.367
Pore Volume (cm^3)	137.3	131.7
Total Wt. Of Sample After Test		727.42

Tested By: TMS Date: 9/3/2009 Checked By: GAM Date: 9-4-09

DCN: CT-22C DATE:12-21 [illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-02 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 1
Project No.	2009-666-05	Sample No.	ST1
Lab ID No.	2009-666-05-02		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.76
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.95
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	100	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 2.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.3E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READI NG R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/3/2009	8	32.18	0	9.5	11.6	0	24.0	NA
9/3/2009	8	32.52	0	9.4	11.4	0	24.0	3.0E-07
9/3/2009	8	32.92	1	9.3	11.3	0	24.0	2.6E-07
9/3/2009	8	33.37	1	9.2	11.1	0	24.0	2.3E-07
9/3/2009	8	33.82	2	9.1	11.0	0	24.0	2.3E-07
9/3/2009	8	34.27	2	9.0	10.8	0	24.0	2.4E-07
9/3/2009	8	34.73	3	8.9	10.7	0	24.0	2.4E-07
9/3/2009	8	35.72	4	8.7	10.4	0	24.0	2.2E-07
9/3/2009	8	36.22	4	8.6	10.2	0	24.0	2.3E-07
9/3/2009	8	36.72	5	8.5	10.1	1	24.0	2.3E-07

Tested By: TMS Date: 9/3/2009 Checked By: GEM Date: 9-4-09

DCN: CT-22C DATE:12-21 [illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-02 PERMOM.xls]Sheet1

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PERMOMETER METHOD

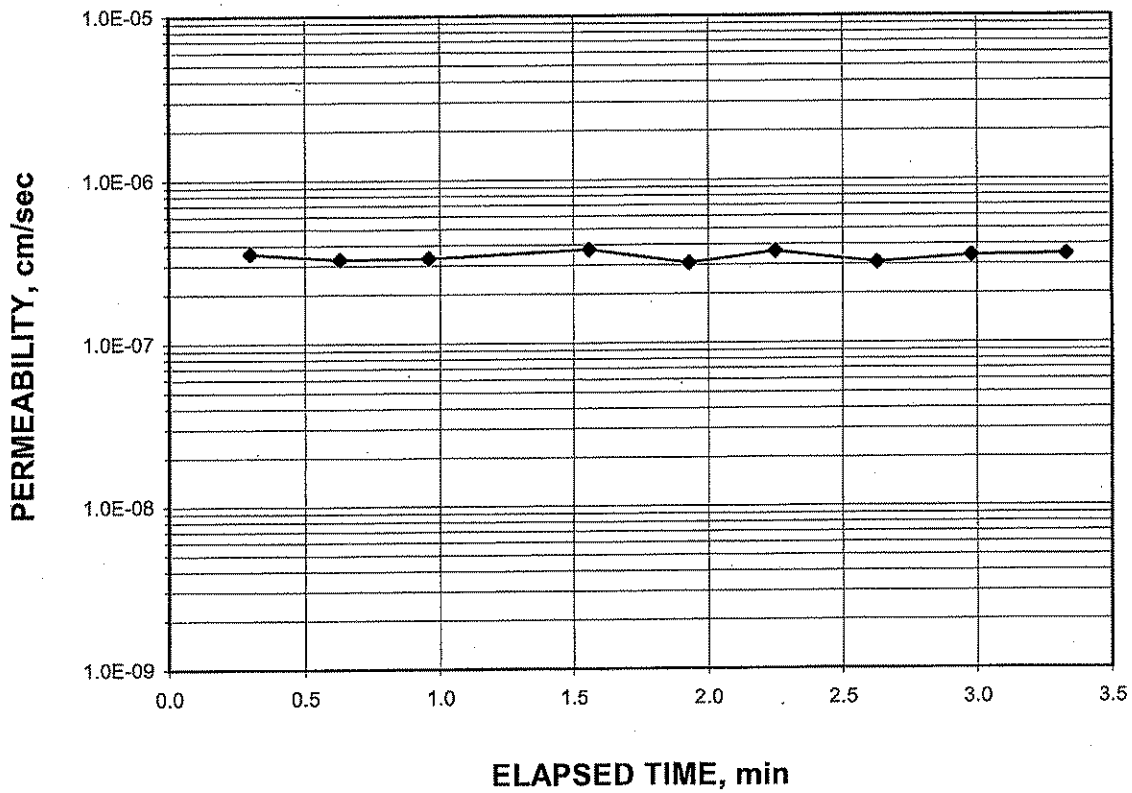
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 1
Project No.	2009-666-05	Sample No.	ST2
Lab ID No.	2009-666-05-03		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/3/2009 Checked By: CAM Date: 9-4-09

DCN: CT-22C DATE:12-21-[illegible] [illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-03 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 1
Project No.	2009-666-05	Sample No.	ST2
Lab ID No.	2009-666-05-03		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	814	801
Wt. of Tare & WS (gm.)	428.28	512.51
Wt. of Tare & DS (gm.)	379.00	438.07
Wt. of Tare (gm.)	111.88	106.77
Wt. of Water (gm.)	49.28	74.44
Wt. of DS (gm.)	267.12	331.30
Moisture Content (%)	**18.4**	**22.5**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	740.61	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	740.61	765.75
Length 1 (in.)	3.720	3.633
Length 2 (in.)	3.701	3.612
Length 3 (in.)	3.711	3.644
Top Diameter (in.)	2.852	2.849
Middle Diameter (in.)	2.854	2.842
Bottom Diameter (in.)	2.842	2.809
Average Length (in.)	3.71	3.63
Average Area (in.^{2})	6.38	6.31
Sample Volume (cm^3)	387.73	375.02
Unit Wet Wt. (gm./ cm^3)	1.910	2.042
Unit Wet Wt. (pcf)	119.2	127.5
Unit Dry Wt. (pcf)	100.7	104.1
Unit Dry Wt. (gm./ cm^3)	1.613	1.667
Void Ratio, e	0.674	0.619
Porosity, n	0.403	0.382
Pore Volume (cm^3)	156.2	143.4
Total Wt. Of Sample After Test		748.12

Tested By: TMS Date: 9/3/2009 Checked By: GEM Date: 9-4-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 1
Project No.	2009-666-05	Sample No.	ST2
Lab ID No.	2009-666-05-03		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	9.22
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.68
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	100	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 3.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READI NG R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/3/2009	8	42.27	0	9.5	11.0	0	24.0	NA
9/3/2009	8	42.57	0	9.4	10.9	0	24.0	3.6E-07
9/3/2009	8	42.90	1	9.3	10.8	0	24.0	3.3E-07
9/3/2009	8	43.23	1	9.2	10.6	0	24.0	3.3E-07
9/3/2009	8	43.83	2	9.0	10.3	0	24.0	3.7E-07
9/3/2009	8	44.20	2	8.9	10.2	0	24.0	3.1E-07
9/3/2009	8	44.52	2	8.8	10.1	0	24.0	3.6E-07
9/3/2009	8	44.90	3	8.7	9.9	0	24.0	3.1E-07
9/3/2009	8	45.25	3	8.6	9.8	0	24.0	3.4E-07
9/3/2009	8	45.60	3	8.5	9.6	1	24.0	3.4E-07

Tested By: TMS Date: 9/3/2009 Checked By: GM Date: 9-4-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

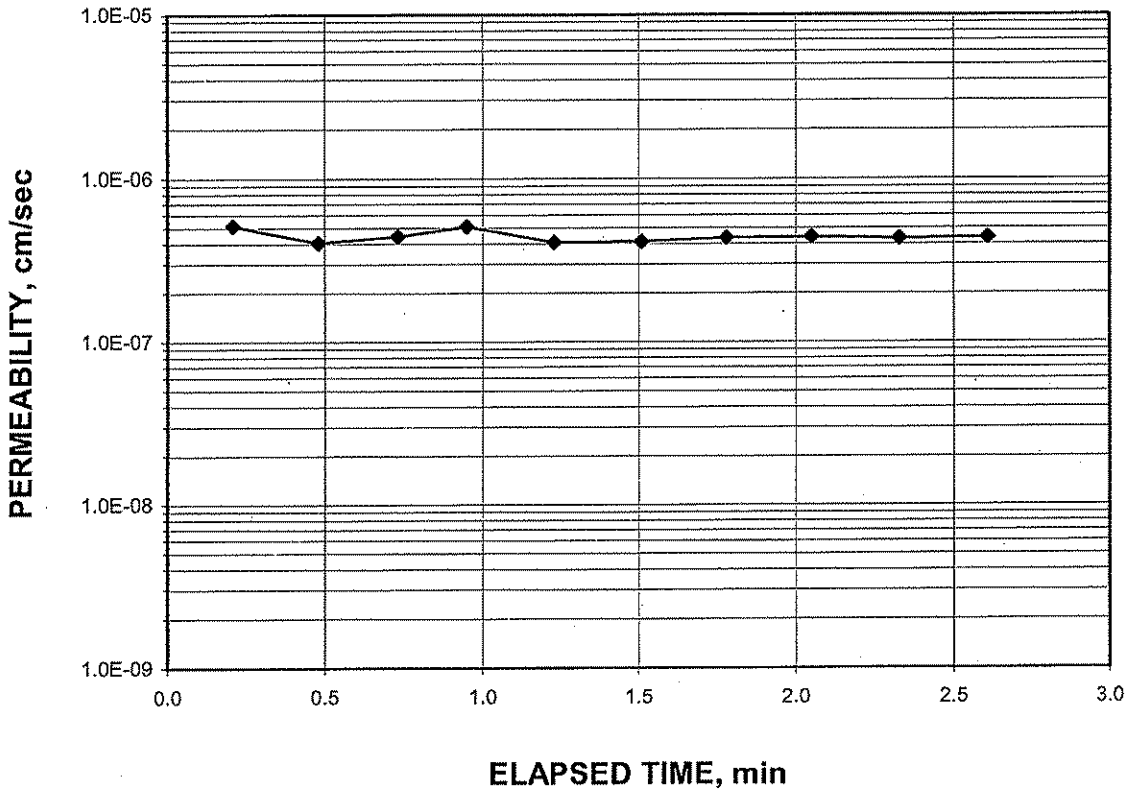
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 2
Project No.	2009-666-05	Sample No.	ST3
Lab ID No.	2009-666-05-04		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 4.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.4E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/3/2009 Checked By: GZM Date: 9-4-09

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 2
Project No.	2009-666-05	Sample No.	ST3
Lab ID No.	2009-666-05-04		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	807	804
Wt. of Tare & WS (gm.)	380.04	456.59
Wt. of Tare & DS (gm.)	331.67	389.34
Wt. of Tare (gm.)	104.76	105.63
Wt. of Water (gm.)	48.37	67.25
Wt. of DS (gm.)	226.91	283.71
Moisture Content (%)	**21.3**	**23.7**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	738.65	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	738.65	753.18
Length 1 (in.)	3.688	3.657
Length 2 (in.)	3.676	3.626
Length 3 (in.)	3.670	3.615
Top Diameter (in.)	2.836	2.845
Middle Diameter (in.)	2.883	2.821
Bottom Diameter (in.)	2.820	2.812
Average Length (in.)	3.68	3.63
Average Area (in.^{2})	6.36	6.27
Sample Volume (cm^3)	383.51	373.39
Unit Wet Wt. (gm./ cm^3)	1.926	2.017
Unit Wet Wt. (pcf)	120.2	125.9
Unit Dry Wt. (pcf)	99.1	101.8
Unit Dry Wt. (gm./ cm^3)	1.588	1.631
Void Ratio, e	0.701	0.656
Porosity, n	0.412	0.396
Pore Volume (cm^3)	158.0	147.9
Total Wt. Of Sample After Test		745.15

Tested By: TMS Date: 9/3/2009 Checked By: GZM Date: 9-4-09

DCN: CT-22C DATE:12-21 \\Server\Archive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-04 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 2
Project No.	2009-666-05	Sample No.	ST3
Lab ID No.	2009-666-05-04		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	9.23
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.47
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	96	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 4.4E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 4.4E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/3/2009	9	15.17	0	9.5	11.0	0	24.0	NA
9/3/2009	9	15.38	0	9.4	10.8	0	24.0	5.1E-07
9/3/2009	9	15.65	0	9.3	10.7	0	24.0	4.1E-07
9/3/2009	9	15.90	1	9.2	10.5	0	24.0	4.4E-07
9/3/2009	9	16.12	1	9.1	10.4	0	24.0	5.1E-07
9/3/2009	9	16.40	1	9.0	10.3	0	24.0	4.1E-07
9/3/2009	9	16.68	2	8.9	10.1	0	24.0	4.1E-07
9/3/2009	9	16.95	2	8.8	10.0	0	24.0	4.3E-07
9/3/2009	9	17.22	2	8.7	9.8	0	24.0	4.4E-07
9/3/2009	9	17.50	2	8.6	9.7	0	24.0	4.3E-07
9/3/2009	9	17.78	3	8.5	9.6	1	24.0	4.4E-07

Tested By: TMS Date: 9/3/2009 Checked By: GZM Date: 9-4-09

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PERMOMETER METHOD

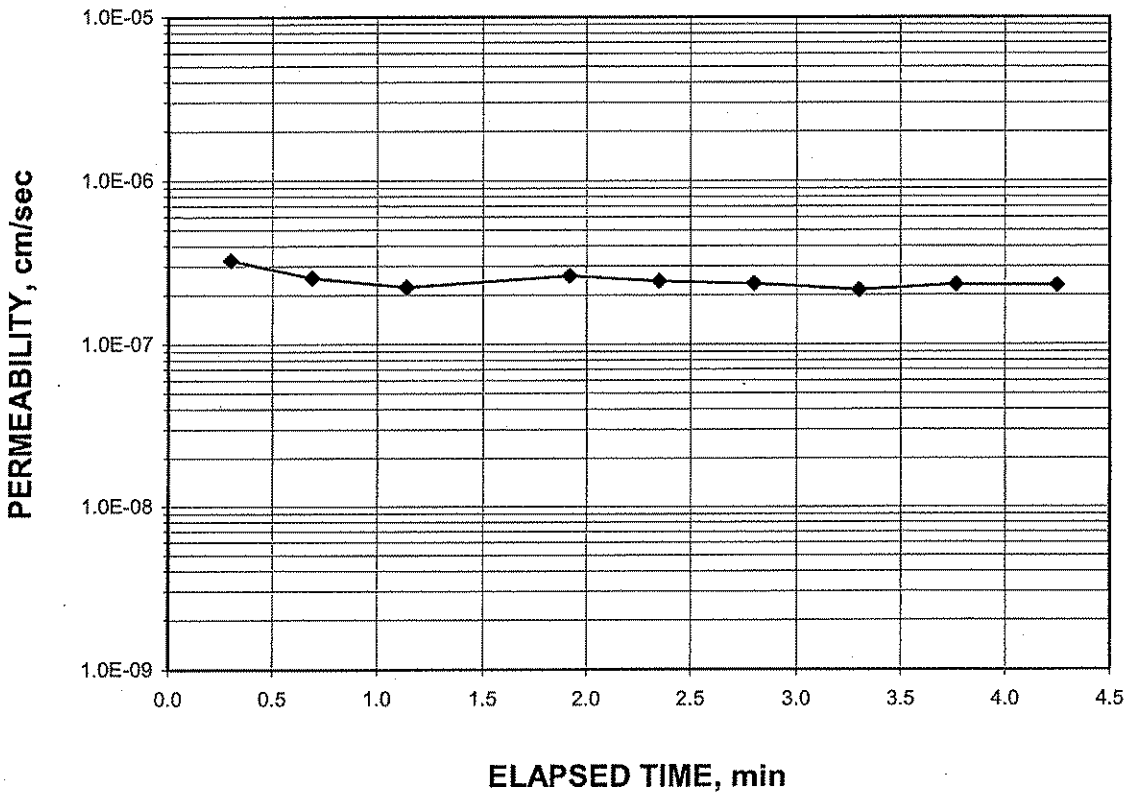
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 2
Project No.	2009-666-05	Sample No.	ST4
Lab ID No.	2009-666-05-05		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 2.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.3E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/4/2009 Checked By: TMS Date: 9-8-09

DCN: CT-22C DATE:12-21-98 REVISION: 4 \\Server\Shared Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-05 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 2
Project No.	2009-666-05	Sample No.	ST4
Lab ID No.	2009-666-05-05		

Specific Gravity 2.70 Assumed
Sample Condition Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	809	809
Wt. of Tare & WS (gm.)	411.57	359.03
Wt. of Tare & DS (gm.)	353.99	315.53
Wt. of Tare (gm.)	115.83	115.83
Wt. of Water (gm.)	57.58	43.50
Wt. of DS (gm.)	238.16	199.70
Moisture Content (%)	**24.2**	**21.8**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	688.55	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	688.55	675.27
Length 1 (in.)	3.409	3.316
Length 2 (in.)	3.432	3.331
Length 3 (in.)	3.444	3.321
Top Diameter (in.)	2.835	2.840
Middle Diameter (in.)	2.803	2.814
Bottom Diameter (in.)	2.830	2.830
Average Length (in.)	3.43	3.32
Average Area (in.^{2})	6.26	6.28
Sample Volume (cm^3)	351.55	342.01
Unit Wet Wt. (gm./ cm^3)	1.959	1.974
Unit Wet Wt. (pcf)	122.3	123.2
Unit Dry Wt. (pcf)	98.5	101.2
Unit Dry Wt. (gm./ cm^3)	1.577	1.621
Void Ratio, e	0.712	0.665
Porosity, n	0.416	0.400
Pore Volume (cm^3)	146.2	136.6
Total Wt. Of Sample After Test		685.45

Tested By: TMS Date: 9/4/2009 Checked By: MMS Date: 9-8-09

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ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 2
Project No.	2009-666-05	Sample No.	ST4
Lab ID No.	2009-666-05-05		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.44
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.52
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 2.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 2.3E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/2009	10	12.28	0	9.5	12.1	0	24.2	NA
9/4/2009	10	12.58	0	9.4	11.9	0	24.2	3.3E-07
9/4/2009	10	12.97	1	9.3	11.8	0	24.2	2.5E-07
9/4/2009	10	13.42	1	9.2	11.6	0	24.2	2.2E-07
9/4/2009	10	14.20	2	9.0	11.3	0	24.2	2.6E-07
9/4/2009	10	14.63	2	8.9	11.1	0	24.2	2.4E-07
9/4/2009	10	15.08	3	8.8	11.0	0	24.2	2.4E-07
9/4/2009	10	15.58	3	8.7	10.8	0	24.2	2.1E-07
9/4/2009	10	16.05	4	8.6	10.7	0	24.2	2.3E-07
9/4/2009	10	16.53	4	8.5	10.5	1	24.2	2.3E-07

Tested By: TMS Date: 9/4/2009 Checked By: RMS Date: 9-8-09

DCN: CT-22C DATE:12-21 [illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-05 PERMOM.xls]Sheet1

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PERMOMETER METHOD

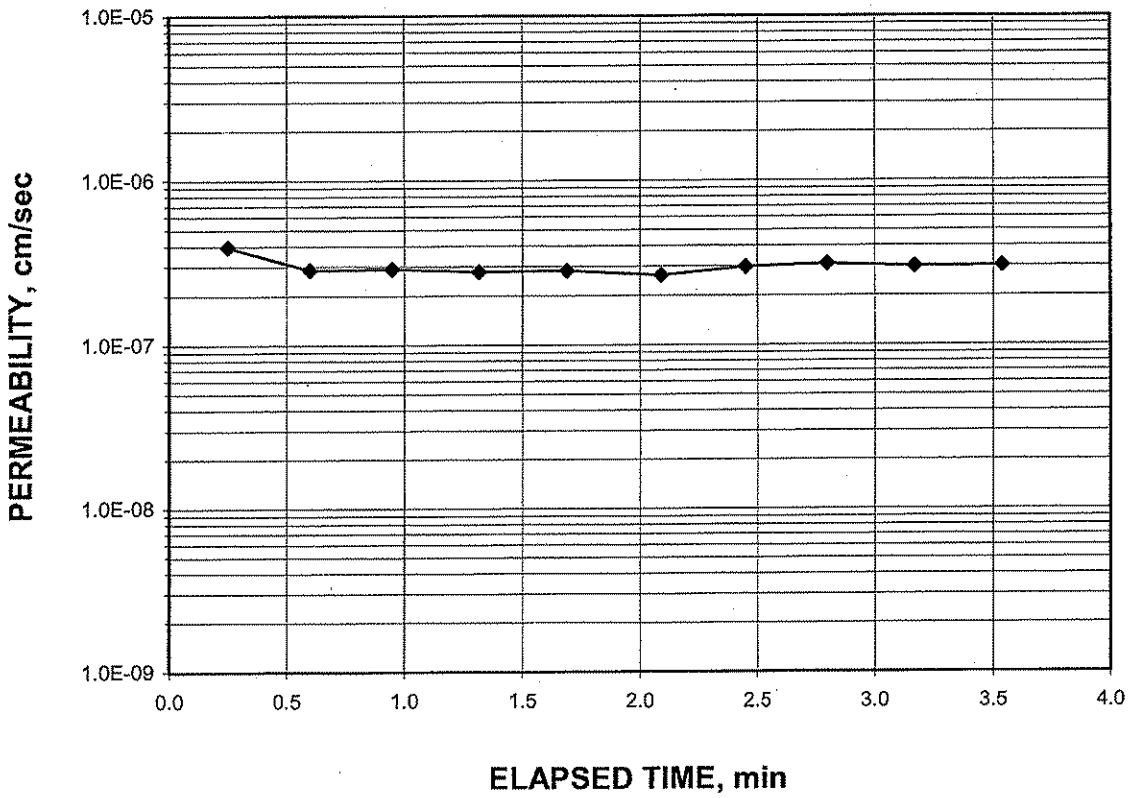
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 3
Project No.	2009-666-05	Sample No.	ST5
Lab ID No.	2009-666-05-06		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 3.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.0E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/4/2009 Checked By: MPJ Date: 9-8-09

DCN: CT-22C DATE:12-21-05 REVISION: 1 \\Server\Shared Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-06 PERMOM.xls]Sheet1

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ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 3
Project No.	2009-666-05	Sample No.	ST5
Lab ID No.	2009-666-05-06		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	811	811
Wt. of Tare & WS (gm.)	437.52	360.96
Wt. of Tare & DS (gm.)	376.16	313.44
Wt. of Tare (gm.)	106.58	106.56
Wt. of Water (gm.)	61.36	47.52
Wt. of DS (gm.)	269.58	206.88
Moisture Content (%)	**22.8**	**23.0**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	695.53	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	695.53	696.71
Length 1 (in.)	3.432	3.364
Length 2 (in.)	3.459	3.365
Length 3 (in.)	3.435	3.345
Top Diameter (in.)	2.846	2.856
Middle Diameter (in.)	2.805	2.859
Bottom Diameter (in.)	2.818	2.804
Average Length (in.)	3.44	3.36
Average Area (in.^{2})	6.26	6.33
Sample Volume (cm^3)	353.04	348.50
Unit Wet Wt. (gm./ cm^3)	1.970	1.999
Unit Wet Wt. (pcf)	123.0	124.8
Unit Dry Wt. (pcf)	100.2	101.5
Unit Dry Wt. (gm./ cm^3)	1.605	1.626
Void Ratio, e	0.682	0.661
Porosity, n	0.406	0.398
Pore Volume (cm^3)	143.2	138.7
Total Wt. Of Sample After Test		697.82

Tested By: TMS Date: 9/4/2009 Checked By: MMS Date: 9-8-09

DCN: CT-22C DATE:12-21[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-06 PERMOM.xls]Sheet1

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 3
Project No.	2009-666-05	Sample No.	ST5
Lab ID No.	2009-666-05-06		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.53
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.86
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 3.0E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.0E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/2009	10	22.03	0	9.5	11.9	0	24.1	NA
9/4/2009	10	22.28	0	9.4	11.7	0	24.1	3.9E-07
9/4/2009	10	22.63	1	9.3	11.6	0	24.1	2.9E-07
9/4/2009	10	22.98	1	9.2	11.4	0	24.1	2.9E-07
9/4/2009	10	23.35	1	9.1	11.3	0	24.1	2.8E-07
9/4/2009	10	23.72	2	9.0	11.1	0	24.1	2.8E-07
9/4/2009	10	24.12	2	8.9	10.9	0	24.1	2.6E-07
9/4/2009	10	24.48	2	8.8	10.8	0	24.1	3.0E-07
9/4/2009	10	24.83	3	8.7	10.6	0	24.1	3.1E-07
9/4/2009	10	25.20	3	8.6	10.5	0	24.1	3.0E-07
9/4/2009	10	25.57	4	8.5	10.3	0	24.1	3.0E-07

Tested By: TMS Date: 9/4/2009 Checked By: MM Date: 9-8-09

DCN: CT-22C DATE:12-21-[illegible] \\Server[illegible]\Archive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-06 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

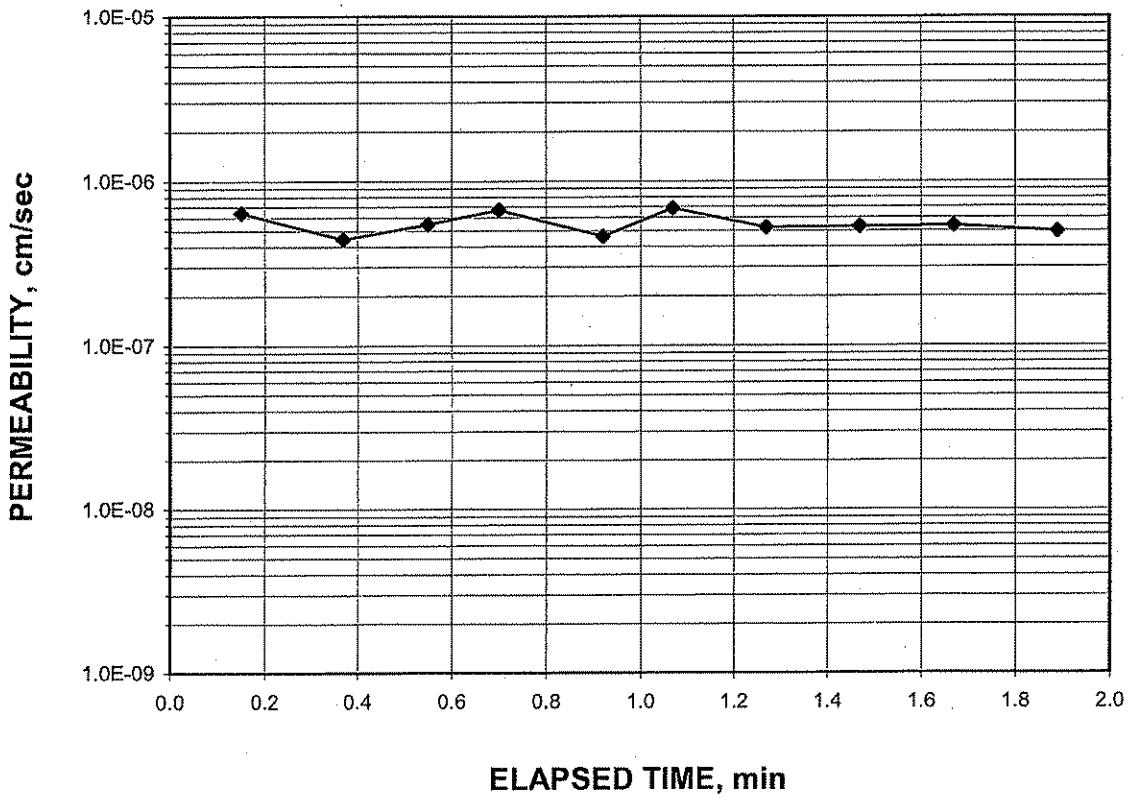
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 3
Project No.	2009-666-05	Sample No.	ST6
Lab ID No.	2009-666-05-07		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 5.2E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.2E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/4/2009 Checked By: MMM Date: 9-8-09

DCN: CT-22C DATE:12-21-08 REVISION:0 \\Server\Shared\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-07 PERMOM.xls]Sheet1

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ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 3
Project No.	2009-666-05	Sample No.	ST6
Lab ID No.	2009-666-05-07		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	800	802
Wt. of Tare & WS (gm.)	396.93	349.87
Wt. of Tare & DS (gm.)	343.74	301.9
Wt. of Tare (gm.)	103.94	103.76
Wt. of Water (gm.)	53.19	47.97
Wt. of DS (gm.)	239.80	198.14
Moisture Content (%)	**22.2**	**24.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	658.22	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	658.22	669.15
Length 1 (in.)	3.289	3.267
Length 2 (in.)	3.316	3.242
Length 3 (in.)	3.318	3.268
Top Diameter (in.)	2.822	2.827
Middle Diameter (in.)	2.797	2.821
Bottom Diameter (in.)	2.785	2.820
Average Length (in.)	3.31	3.26
Average Area (in.^{2})	6.16	6.26
Sample Volume (cm^3)	334.07	334.19
Unit Wet Wt. (gm./ cm^3)	1.970	2.002
Unit Wet Wt. (pcf)	123.0	125.0
Unit Dry Wt. (pcf)	100.7	100.6
Unit Dry Wt. (gm./ cm^3)	1.613	1.612
Void Ratio, e	0.674	0.675
Porosity, n	0.403	0.403
Pore Volume (cm^3)	134.5	134.7
Total Wt. Of Sample After Test		665.80

Tested By: TMS Date: 9/4/2009 Checked By: MMS Date: 9-8-09

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 3
Project No.	2009-666-05	Sample No.	ST6
Lab ID No.	2009-666-05-07		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.28
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.37
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 5.2E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 5.2E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READI NG R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/2009	10	36.98	0	9.5	12.3	0	24.2	NA
9/4/2009	10	37.13	0	9.4	12.1	0	24.2	6.4E-07
9/4/2009	10	37.35	0	9.3	12.0	0	24.2	4.4E-07
9/4/2009	10	37.53	1	9.2	11.8	0	24.2	5.5E-07
9/4/2009	10	37.68	1	9.1	11.7	0	24.2	6.7E-07
9/4/2009	10	37.90	1	9.0	11.5	0	24.2	4.6E-07
9/4/2009	10	38.05	1	8.9	11.4	0	24.2	6.8E-07
9/4/2009	10	38.25	1	8.8	11.2	0	24.2	5.2E-07
9/4/2009	10	38.45	1	8.7	11.0	0	24.2	5.3E-07
9/4/2009	10	38.65	2	8.6	10.9	0	24.2	5.4E-07
9/4/2009	10	38.87	2	8.5	10.7	1	24.2	4.9E-07

Tested By: TMS Date: 9/4/2009 Checked By: MJB Date: 9-8-09

DCN: CT-22C DATE:12-21\[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-07 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

geotechnics
INTEGRITY IN TESTING

PERMOMETER METHOD

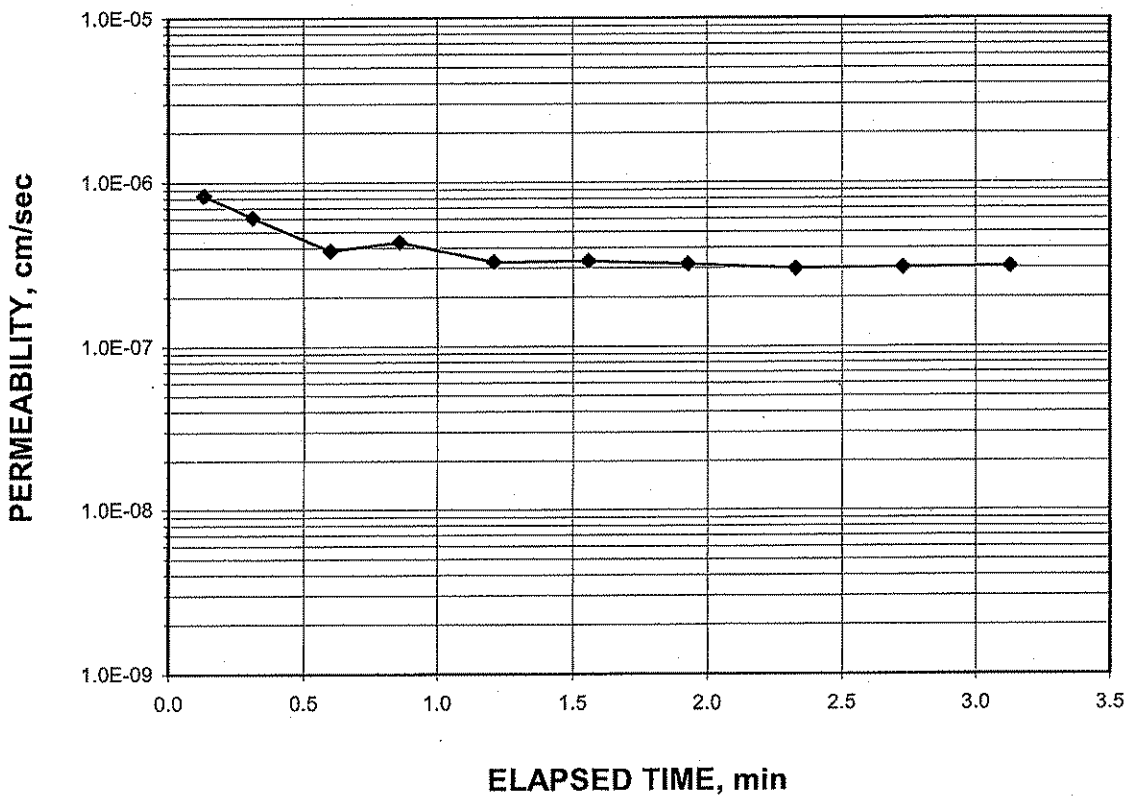
ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 4
Project No.	2009-666-05	Sample No.	ST7
Lab ID No.	2009-666-05-08		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 3.1E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.1E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/4/2009 Checked By: [illegible] Date: 9-8-09

DCN: CT-22C DATE:12-21-05 REVISION: 1 \\Server\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-08 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 4
Project No.	2009-666-05	Sample No.	ST7
Lab ID No.	2009-666-05-08		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	805	814
Wt. of Tare & WS (gm.)	453.93	388.64
Wt. of Tare & DS (gm.)	392.10	336.3
Wt. of Tare (gm.)	106.28	111.91
Wt. of Water (gm.)	61.83	52.34
Wt. of DS (gm.)	285.82	224.39
Moisture Content (%)	**21.6**	**23.3**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	742.57	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	742.57	752.91
Length 1 (in.)	3.712	3.639
Length 2 (in.)	3.671	3.646
Length 3 (in.)	3.698	3.645
Top Diameter (in.)	2.861	2.840
Middle Diameter (in.)	2.833	2.825
Bottom Diameter (in.)	2.816	2.807
Average Length (in.)	3.69	3.64
Average Area (in.^{2})	6.32	6.26
Sample Volume (cm^3)	382.53	373.95
Unit Wet Wt. (gm./ cm^3)	1.941	2.013
Unit Wet Wt. (pcf)	121.2	125.7
Unit Dry Wt. (pcf)	99.6	101.9
Unit Dry Wt. (gm./ cm^3)	1.596	1.633
Void Ratio, e	0.692	0.654
Porosity, n	0.409	0.395
Pore Volume (cm^3)	156.4	147.8
Total Wt. Of Sample After Test		749.87

Tested By: TMS Date: 9/4/2009 Checked By: RMS Date: 9-8-09

DCN: CT-22C DATE:12-21-09 REVISION: 0 \\Server\Shared Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-08 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

Geotechnics
INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 1
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 4
Project No.	2009-666-05	Sample No.	ST7
Lab ID No.	2009-666-05-08		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	9.25
Back Pressure(psi)	50.0	Sample Area (cm^2), A	40.41
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.75

AVERAGE PERMEABILITY = 3.1E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 3.1E-09 m/sec @ 20°C

DATE (mm/dd/yy)	(hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READING R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/2009	11	51.47	0	9.5	10.9	0	24.2	NA
9/4/2009	11	51.60	0	9.4	10.8	0	24.2	8.3E-07
9/4/2009	11	51.78	0	9.3	10.7	0	24.2	6.1E-07
9/4/2009	11	52.07	1	9.2	10.5	0	24.2	3.8E-07
9/4/2009	11	52.33	1	9.1	10.4	0	24.2	4.3E-07
9/4/2009	11	52.68	1	9.0	10.2	0	24.2	3.3E-07
9/4/2009	11	53.03	2	8.9	10.1	0	24.2	3.3E-07
9/4/2009	11	53.40	2	8.8	9.9	0	24.2	3.2E-07
9/4/2009	11	53.80	2	8.7	9.8	0	24.2	3.0E-07
9/4/2009	11	54.20	3	8.6	9.7	0	24.2	3.0E-07
9/4/2009	11	54.60	3	8.5	9.5	0	24.2	3.1E-07

Tested By: TMS Date: 9/4/2009 Checked By: RMS Date: 9-8-09

DCN: CT-22C DATE:12-21 [illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-08 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

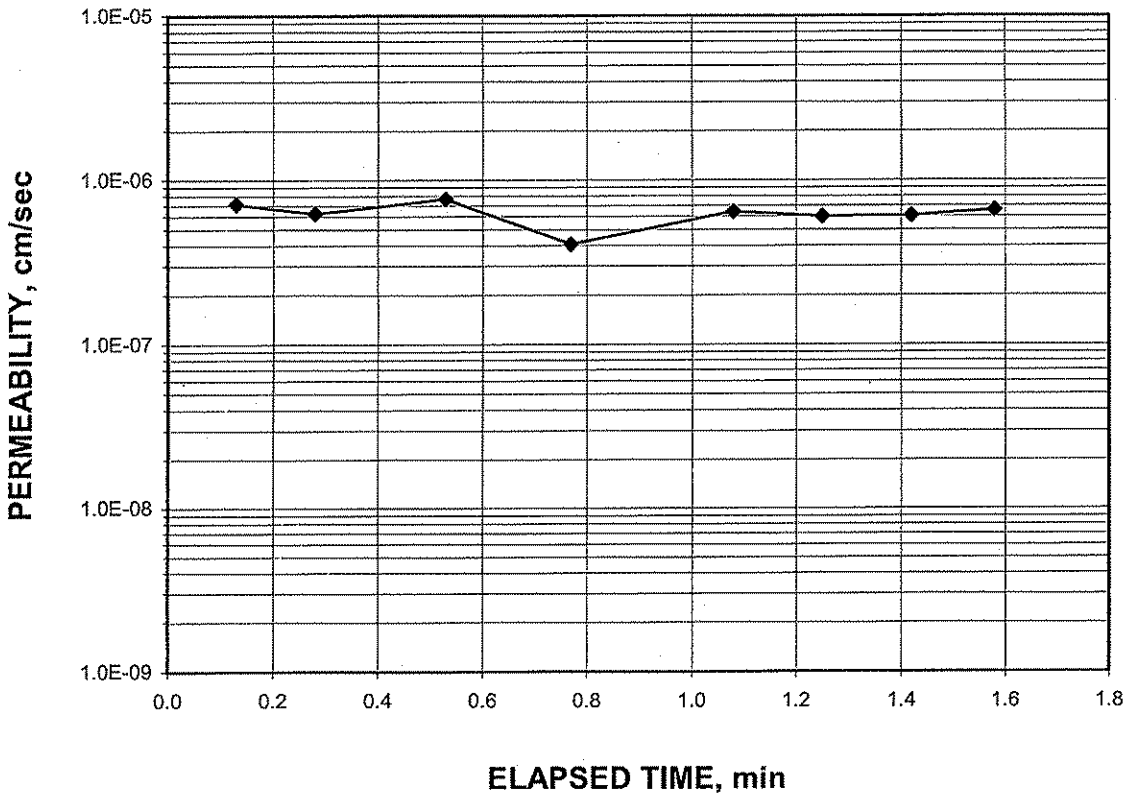
geotechnics
INTEGRITY IN TESTING

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 4
Project No.	2009-666-05	Sample No.	ST8
Lab ID No.	2009-666-05-09		

Visual Description: BROWN SILT

AVERAGE PERMEABILITY = 6.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 6.3E-09 m/sec @ 20°C

PERMEABILITY vs. TIME



Tested By: TMS Date: 9/4/2009 Checked By: MM Date: 9-8-09

DCN: CT-22C DATE:12-21-98 REVISION: 0 \\Server\SQDrive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-09 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 4
Project No.	2009-666-05	Sample No.	ST8
Lab ID No.	2009-666-05-09		

Specific Gravity	2.70	Assumed
Sample Condition		Undisturbed

Visual Description: BROWN SILT

MOISTURE CONTENT:	BEFORE TEST	AFTER TEST
Tare Number	803	807
Wt. of Tare & WS (gm.)	506.52	362.39
Wt. of Tare & DS (gm.)	451.98	312.13
Wt. of Tare (gm.)	103.79	104.78
Wt. of Water (gm.)	54.54	50.26
Wt. of DS (gm.)	348.19	207.35
Moisture Content (%)	**15.7**	**24.2**

SPECIMEN:	BEFORE TEST	AFTER TEST
Wt. of Tube & WS (gm.)	641.60	NA
Wt. of Tube (gm.)	0.00	NA
Wt. of WS (calc.) (gm.)	641.60	689.17
Length 1 (in.)	3.275	3.157
Length 2 (in.)	3.246	3.254
Length 3 (in.)	3.266	3.170
Top Diameter (in.)	2.827	2.869
Middle Diameter (in.)	2.810	2.860
Bottom Diameter (in.)	2.798	2.814
Average Length (in.)	3.26	3.19
Average Area (in.^{2})	6.21	6.37
Sample Volume (cm^3)	331.93	333.32
Unit Wet Wt. (gm./ cm^3)	1.933	2.068
Unit Wet Wt. (pcf)	120.7	129.1
Unit Dry Wt. (pcf)	104.3	103.9
Unit Dry Wt. (gm./ cm^3)	1.671	1.664
Void Ratio, e	0.616	0.622
Porosity, n	0.381	0.384
Pore Volume (cm^3)	126.5	127.9
Total Wt. Of Sample After Test		649.15

Tested By: TMS Date: 9/4/2009 Checked By: MPS Date: 9-8-09

DCN: CT-22C DATE:12-21 [illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-09 PERMOM.xls]Sheet1

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FLEXIBLE WALL PERMEABILITY TEST

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INTEGRITY IN TESTING

PERMOMETER METHOD

ASTM D 5084-03
(SOP-S22C)

Client	JOYCE ENGINEERING, INC.	Boring No.	TEST PAD 2
Client Project	WHITE OAK MSW LF PH III	Depth (ft.)	LIFT 4
Project No.	2009-666-05	Sample No.	ST8
Lab ID No.	2009-666-05-09		

Test Pressures		Final Sample Dimensions	
Cell Pressure(psi)	75.0	Sample Length (cm), L	8.11
Back Pressure(psi)	50.0	Sample Area (cm^2), A	41.09
Eff. Cons. Pressure(psi)	25.0	Pipette Area (cm^2), a_p	0.03142
Response (%)	95	Annulus Area (cm^2), a_a	0.76712
		Equilibrium Level (cm), R_{eq}	1.7

AVERAGE PERMEABILITY = 6.3E-07 cm/sec @ 20°C
AVERAGE PERMEABILITY = 6.3E-09 m/sec @ 20°C

DATE (mm/dd/yy)	TIME (hr)	TIME (min)	ELAPSED TIME t (min)	PIPETTE READI NG R_p (cm)	INCREMENT GRADIENT i (cm/cm)	FLOW CONDITION (0 flow) (1 stop)	TEMP. (°C)	INCREMENTAL PERMEABILITY @ 20°C (cm/sec)
9/4/2009	12	14.85	0	9.5	12.6	0	24.2	NA
9/4/2009	12	14.98	0	9.4	12.4	0	24.2	7.1E-07
9/4/2009	12	15.13	0	9.3	12.2	0	24.2	6.2E-07
9/4/2009	12	15.38	1	9.1	11.9	0	24.2	7.6E-07
9/4/2009	12	15.62	1	9.0	11.8	0	24.2	4.1E-07
9/4/2009	12	15.93	1	8.8	11.4	0	24.2	6.4E-07
9/4/2009	12	16.10	1	8.7	11.3	0	24.2	6.0E-07
9/4/2009	12	16.27	1	8.6	11.1	0	24.2	6.1E-07
9/4/2009	12	16.43	2	8.5	10.9	0	24.2	6.5E-07

Tested By: TMS Date: 9/4/2009 Checked By: MMS Date: 9-8-09

DCN: CT-22C DATE:12-21-[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-05-09 PERMOM.xls]Sheet1

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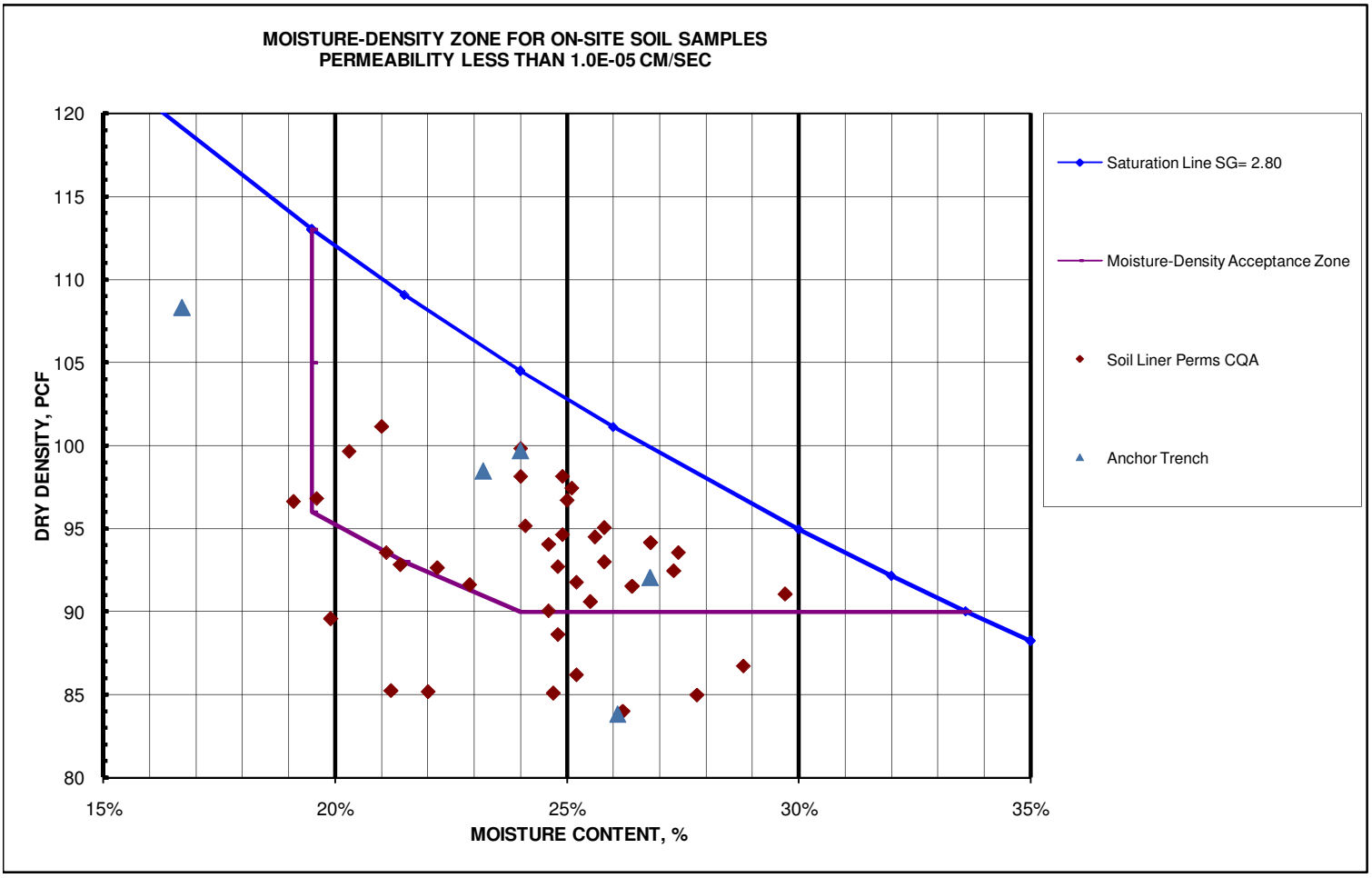
MOISTURE-DENSITY ZONE FOR ON-SITE SOIL SAMPLES
PERMEABILITY LESS THAN 1.0E-05 CM/SEC
DRY DENSITY, PCF
120
115
110
105
100
95
90
85
80
15%
20%
25%
30%
35%
MOISTURE CONTENT, %
Saturation Line SG= 2.80
Moisture-Density Acceptance Zone
Soil Liner Perms CQA
Anchor Trench

		SOIL LINER Construction started on September 11, 2009												
Lab ID	Tube	ACRE	LIFT	WD	MC	DD	K cm/sec	LL	PL	PI	USCS	Gravel	Sand	Silt/Clay
No.	No.	Ref.		pcf	%	pcf						%	%	%
666-06-01	ST-9	A1	L1	119.9	20.3%	99.7	1.7E-07	45	31	14	ML	5.15	33.21	61.64
666-06-02	ST-10	A1	L2	122.4	21.0%	101.2	4.5E-07	47	34	13	ML	2.93	41.66	55.41
666-07-05	ST-15	A1	L3	118.1	24.1%	95.2	5.7E-07	40	35	5	ML	3.49	47.20	49.31
666-07-01	ST-11	A2	L1	115.8	19.6%	96.8	1.4E-06	43	35	8	ML	3.54	46.65	49.81
666-07-03	ST-13	A2	L2	118.1	29.7%	91.1	1.7E-07	49	38	11	ML	1.01	36.45	62.54
666-07-06	ST-16	A2	L3	118.7	25.6%	94.5	3.4E-07	46	34	12	ML	0.92	47.58	51.50
666-08-01	ST-18	A3	L1	121.9	25.1%	97.4	3.4E-07	50	41	9	MH	3.37	41.10	55.53
666-08-02	ST-19	A3	L2	120.9	25.0%	96.7	1.8E-07	48	35	13	ML	4.78	39.32	55.90
666-09-01	ST-20	A3	L3	123.8	24.0%	99.8	3.0E-07	45	37	8	ML	5.46	43.97	50.57
666-10-06	ST-32	A4	L1	112.2	24.6%	90.0	4.2E-06	48	38	10	ML	0.58	34.32	65.10
666-09-07	ST-33	A4	L2	113.2	22.2%	92.6	7.2E-06	47	39	8	ML	0.08	40.02	59.90
666-12-03	ST-34	A4	L3	117.2	24.6%	94.1	4.7E-06	45	39	6	ML	0.27	41.94	57.79
666-09-05	ST-24	A5	L1	119.2	27.4%	93.6	4.3E-07	45	35	10	ML	0.53	36.36	63.11
666-09-10	ST-29	A5	L2	110.6	24.8%	88.6	2.7E-06	48	42	6	ML	1.03	35.81	63.16
666-10-05	ST-30	A5	L3	113.3	21.1%	93.6	9.5E-06	44	39	5	ML	0.24	38.41	61.35
666-09-02	ST-21	A6	L1	121.7	24.0%	98.1	1.8E-07	55	33	22	MH	0.45	37.06	62.49
666-09-03	ST-22	A6	L2	112.7	21.4%	92.8	2.4E-05	37	32	5	ML	3.38	42.02	54.60
666-09-03	ST-22B	A6	L2B	115.1	19.1%	96.6	3.9E-05	37	32	5	ML	3.38	42.02	54.60
666-10-03	ST-22A	A6	L2R	115.7	24.8%	92.7	2.3E-06	49	41	8	ML	0.45	38.94	60.61
666-09-04	ST-23	A6	L3	111.7	28.8%	86.72	5.7E-06	45	38	7	ML	0.50	38.85	60.65
666-11-01	ST-23A	A6	L3R	108.6	27.8%	85.0	2.8E-06	45	38	7	ML	0.15	36.03	63.82
666-09-06	ST-25	A7	L1	115.7	26.4%	91.5	1.4E-06	47	39	8	ML	2.16	43.03	54.81
666-09-08	ST-27	A7	L2	103.9	22.0%	85.2	1.5E-05	47	43	4	ML	0.22	38.28	61.50
666-10-04	ST-27A	A7	L2	119.4	26.8%	94.2	1.3E-06	44	38	6	ML	0.79	53.63	45.58
666-12-04	ST-35	A7	L3	106.1	24.7%	85.1	3.2E-05	47	39	8	ML	3.87	40.50	55.63
666-14-01	ST-35A	A7	L3R	107.4	19.9%	89.6	5.6E-06	49	41	8	ML	6.3	34.36	59.34
666-09-07	ST-26	A8	L1	117.7	27.3%	92.5	1.4E-06	43	34	9	ML	1.65	36.33	62.02
666-09-09	ST-28	A8	L2	103.3	21.2%	85.2	8.8E-05	45	40	5	ML	0.56	44.67	54.77
666-12-02	ST-28A	A8	L2R	117.0	25.8%	93.0	4.9E-06	47	37	10	ML	1.58	36.19	62.23
666-12-01	ST-31	A8	L3	106.0	26.2%	84.0	3.7E-06	47	39	8	ML	0.13	41.27	58.60
666-07-02	ST-12	A9A	L1	119.6	25.8%	95.1	8.0E-07	47	36	11	ML	5.26	44.17	50.57
666-07-04	ST-14	A9A	L2	113.7	25.5%	90.6	2.1E-06	46	36	10	ML	3.12	44.41	52.47
666-07-07	ST-17	A9A	L3	122.6	24.9%	98.2	1.1E-07	49	33	16	ML	1.67	39.61	58.72
666-13-01	ST-36	A9B	L1	114.9	25.2%	91.8	3.3E-05	46	36	10	ML	0.17	43.19	56.64
666-13-01	ST-36A	A9BR	L1	112.6	22.9%	91.6	8.0E-06	50	36	14	MH	4.21	43.69	52.10
666-13-02	ST-37	A9B	L2	107.9	25.2%	86.2	9.9E-06	51	43	8	MH	0.53	43.87	55.60
666-13-03	ST-38	A9B	L3	118.2	24.9%	94.6	2.8E-06	51	43	8	MH	0.99	38.1	60.91
PERIMETER ANCHOR TRENCH														
666-10-01	ST-1	PH1 CCH3		121.3	23.2%	98.5	5.3E-07	45	33	12	ML	0.39	42.53	57.08
666-10-02	ST-2	PH2		105.7	26.1%	83.8	1.0E-04	37	35	2	ML	0	46.81	53.19
666-10-02	ST-2R	PH2 B		116.7	26.8%	92.0	9.3E-05	37	35	2	ML	0	46.81	53.19
666-13-04	ST-3	PH1		126.4	16.7%	108.3	4.0E-07	49	31	18	ML	5.78	57.89	36.33
666-13-05	ST-4	PH1		123.6	24.0%	99.7	1.0E-05	43	32	11	ML	8.22	68.68	23.10

Appendix I C – Stone Layer

Llewellyn & Associates, Inc. dba

Construction Materials Laboratory

2204 Atchley Street
Knoxville, Tn. 37920
865-572-6031/-573-6122

P. O. Box 5186
Johnson City, Tn. 37603
423-926-0762/926-3860

Project: White Oak Landfill
Client: Harrison Construction Company
Report To: Mr. Don Mason, Harrison Construction Co. (2), Lab (1)
Lab Number: K-092710, K-092713, K-092714

Permeability of Granular Soils ASTM D 2434 (Constant Head)

Date: 12/23/2009
Type of Sample: Remolded Source: Waynesville Quarry
Received From: Harrison Construction Company
Date Received: 12/22/2009

Test Data

Description of Material: Size # 57 Crushed Granite

Maximum Particle Size:	3/4"
Percentage of Oversize Material Not Used:	8.4
Relative Maximum Dry Density, PCF:	103.8
Relative Minimum Dry Density, PCF:	96.6
Dry Unit Weight of Test Specimen, PCF:	99.2
Test Specimen Remolded To, %:	95.6
Test Specimen Moisture Content, %:	1.0
Temperature of Water, Degrees Celsius:	19.3

Coefficient Of Permeability, k 1.62E+00

Llewellyn & Associates, Inc. dba

Construction Materials Laboratory

2204 Atchley Street
Knoxville, Tennessee 37920
865-572-6031/573-6122

P.O. Box 5186
Johnson City, Tn. 37602
423-326-0762/326-3860

Project: White Oak Landfill

Client: Harrison Construction Company

Report to: Mr. Don Mason, Harrison Construction Co. (2), Lab (1)

Lab Number: K-092712

Aggregate Gradation and Quality Summary

Date Delivered: 12/22/2009
Sampled by: Client
Date Tested: 12/23/2009

Size and Type of Aggregate: #57 Crushed Granite

Producer: Harrison Construction Company, Waynesville Quarry

Aggregate Gradation ASTM C 136, C 117

Total Weight, Pounds 9.31

Sieve Size	Cumulative Weight Retained	Cumulative Percent Retained	Cumulative Percent Passing	NCDOT Size #57 Specifications
1 1/2"	0	0	100	100
1"	0.00	0	100	95-100
3/4"	0.78	8.4	91.6	–
1/2"	4.80	51.6	48.4	25-60
3/8'	7.28	78.2	21.8	–
#4	8.60	92.4	7.6	0 - 10
#8	8.84	95.0	5.0	0 - 5
#200	9.16	98.7	1.3	5.0*

* Job specifications.

McGill ASSOCIATES

COPY

25th anniversary 1984-2009

October 30, 2009

Mr. Christopher R. Haverstrom, P.E.
Thalle Construction Company, Inc.
900 NC 86 North
Hillsborough, North Carolina 27278

RECEIVED NOV 02 2009

RE: Shop Drawings Submittal
2400-003 B (10/28/09)
MSW Phase 3
White Oak MSW Landfill
Haywood County, North Carolina

Dear Mr. Haverstrom:

Please find attached a copy of the shop drawing that was submitted to us for review:

Submittal #		
• **2400-003 B (10/28/09)**	**#57 Stone Drainage Layer**	**APPROVED**

Please feel free to contact me, Jeff Bishop, or Dave Pasko if you wish to discuss this submittal.

Sincerely,
McGILL ASSOCIATES, P.A.

WILLIAM H. SPERRY, P.E.
Project Manager

Enclosures

cc: Mr. Stephen King, Haywood County, 2 copies
Mr. Evan Andrews, P.E., Joyce Engineering, 1 copy
Mr. Roy Alexander, McGill Associates, 2 copies

P:\2007\07518\Construction Administration\Letters\ch30Oct09-shop2400-003 B - 10-28-09.DOC

qc/qa Data
Producer/NCDOT Samples, Calendar Year 2009
10/23/2009

All Stone/Sand Samples

	(four digit NCDOT source number)		(plant location)	(two digit)		(qc or qa)			(tons represented by sample - lot size)						(p or f)		
Quarry Name	Quarry No.	producer	County	County No.	Size Mat.	sample type	date	sample no.	1.5"	1"	1/2"	#4	#8	#200	pass/fail	who sampled	who ran
WAYNESVILLE	1001	HARRISON	HAYWOOD	5.942	CA57	QC	10/14/2009	QC-39	100	100	58.9	3.8	2.5	<1.0	PASS	4937	4937
WAYNESVILLE	1001	HARRISON	HAYWOOD	5.942	CA57	QC	10/6/2009	QC-38	100	100	55.2	8.7	4.1	<1.0	PASS	4937	4937
WAYNESVILLE	1001	HARRISON	HAYWOOD	5.942	CA57	QC	9/21/2009	QC-36	100	100	53.2	6	3.4	<1.0	PASS	4937	4937
WAYNESVILLE	1001	HARRISON	HAYWOOD	5.942	CA57	QC	9/16/2009	QC-35	100	100	48.6	6.2	2.5	<1.0	PASS	4937	4937
WAYNESVILLE	1001	HARRISON	HAYWOOD	5.942	CA57	QC	9/9/2009	QC-34	100	100	49.6	6.1	3.3	<1.0	PASS	4937	4937

Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

McGILL ASSOCIATES, P.A.
Consulting Engineers
Asheville, North Carolina

☒ Approved ☐ Revise and Resubmit

☐ Approved As Noted ☐ Not Approved

Name

Title Proj. Mgr. Date 10/30/09

Review is for General Arrangement only and does not release the contractor from the responsibility of quantities, dimension, performance or other requirements of the contract documents.

Llewellyn & Associates, Inc. dba
Construction Materials Laboratory

2204 Atchley Street
Knoxville, Tennessee 37920

P. O. Box 9449
(865) 573-6031 - 573 6122

Branch
P. O. Box 5186 T. K. S.
Johnson City, Tennessee 37601
(423) 926-0762

October 29, 2009

Mr. Nathan Killingsworth
Harrison Construction Company
4817 Rutledge Pike
Knoxville, Tennessee 37914
859-546-3173

RE: **Test Results**
Calcium Carbonate Content
Size No. 57 Coarse Aggregate
Waynesville, Dillsboro and Franklin Quarries
Project: White Oak Landfill

Dear Mr. Killingsworth,
Testing of the size #57 aggregates from the Waynesville, Dillsboro and Franklin Quarries has been completed. The test results indicate a Calcium Carbonate content of less that one percent (1%) by weight. The testing procedures utilized were ASTM C 1271 and ASTM D 3042 performed by our subcontractor Bowser-Morner in Dayton, Ohio. Please find attached the test report with the results for each quarry.

Respectfully submitted,
Construction Materials Laboratory

Johnny R. Quillen

Johnny R. Quillen C.E.T.
Laboratory Manager
Knoxville Office

Enclosures:
Test Reports

BOWSER-MORNER, INC.

Delivery Address: 4518 Taylorsville Road • Dayton, Ohio 45424 Mailing Address: P. O. Box 51 • Dayton, Ohio 45401

AASHTO/ISO 17025 Accredited

LABORATORY REPORT

Report To: Construction Materials Laboratory
Attn: Johnny Quillen
P.O. Box 9449
Knoxville, TN 37940-0449

Report Date: October 28, 2009
Job No.: 149087
Report No.: 003779
No. of Pages: 1

Report On: Laboratory Analysis of Three Samples of No. 57 Crushed Granite Aggregate Dillsboro, Franklin, and Waynesville Quarries

On October 20, 2009, three samples of No. 57 crushed aggregate were submitted for laboratory determination of percent calcium carbonate. Testing was performed in accordance with the following procedures:

ASTM C 1271, "Test Method for X-Ray Spectrometric Analysis of Lime and Limestone" (X-Ray Floresecnce, XRF)

ASTM D 3042, "Test Method for Insoluble Residue in Carbonate Aggregates"

Results are as follows:

Source	Calcium (Ca), %	Calcium Oxide (CaO), %	Insoluble Residue, %	Acid Soluble, % (Carbonate Material)
Dillsboro Quarry	2.91	4.07	99.6	< 0.4
Franklin Quarry	1.84	2.57	99.5	< 0.5
Waynesville Quarry	1.75	2.45	99.6	< 0.4

The measured elemental and oxide forms of calcium are bound up in the feldspar portion of the granite matrix. Only a trace amount of effervescence was observed upon exposure to a 1:1 hydrochloric acid digestion (ASTM D 3042), indicating a lack of carbonate material. Based upon the above results it is the opinion of this laboratory that all three materials contain little if any "calcium carbonate, $CaCO_3$".

Should you have any questions, or if we may be of further service, please contact me at (937) 236-8805, extension 235.

Respectfully submitted,

BOWSER-MORNER, INC.

James W. Fletcher, Vice President
Director of Laboratory Services
Construction Services Division

JWF/jwf
003779
1-Client
1-File

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WHITE OAK LANDFILL - PHASE 3 CONSTRUCTION
HAYWOOD COUNTY, NORTH CAROLINA

CONSTRUCTION TESTING #57 STONE

Sample ID	% Passing #8 Sieve	Perm k cm/sec	CY	Lab ID
S1	3	1.5E+01	**1,500**	666-13-06
S2	6		3,000	666-13-07
S2A	3		3,000	666-16-01
S2B	2		3,000	666-16-02
S3	5		4,500	497-01-02
S4	3	2.0E+01	**6,000**	497-02-01
S5	2		7,500	666-17-01
S6	5		9,000	666-17-02
S7	2		10,500	666-17-03
S8	2	2.7E+01	**12,000**	497-03-01
S9	4		13,500	666-17-04
S10	3		15,000	666-17-05
S11	4		16,500	666-18-01
S12	2	1.80E+01	**18,000**	034-01-01
S13	3		19,500	666-18-02
S14	2		21,000	666-19-01
S15	3		22,500	666-19-02
S16	2	2.10E+01	**24,000**	034-02-02
S17	2		25,500	666-20-01
S18	2		27,000	666-20-02
S19	3		28,500	666-21-01
S20	1	2.00E+01	**30,000**	034-03-01

Table 1005-1 NCDOT

Aggregate Gradation - Percentage of total by weight passing each sieve

STD Size	1.5"	1"	3/4"	1/2"	3/8"	#4	#8	#200
#57	100	95-100		25-60		0-10	0-5	0-0.6

Minimum permeability of 1.0E-02 cm/sec aggregate drainage material

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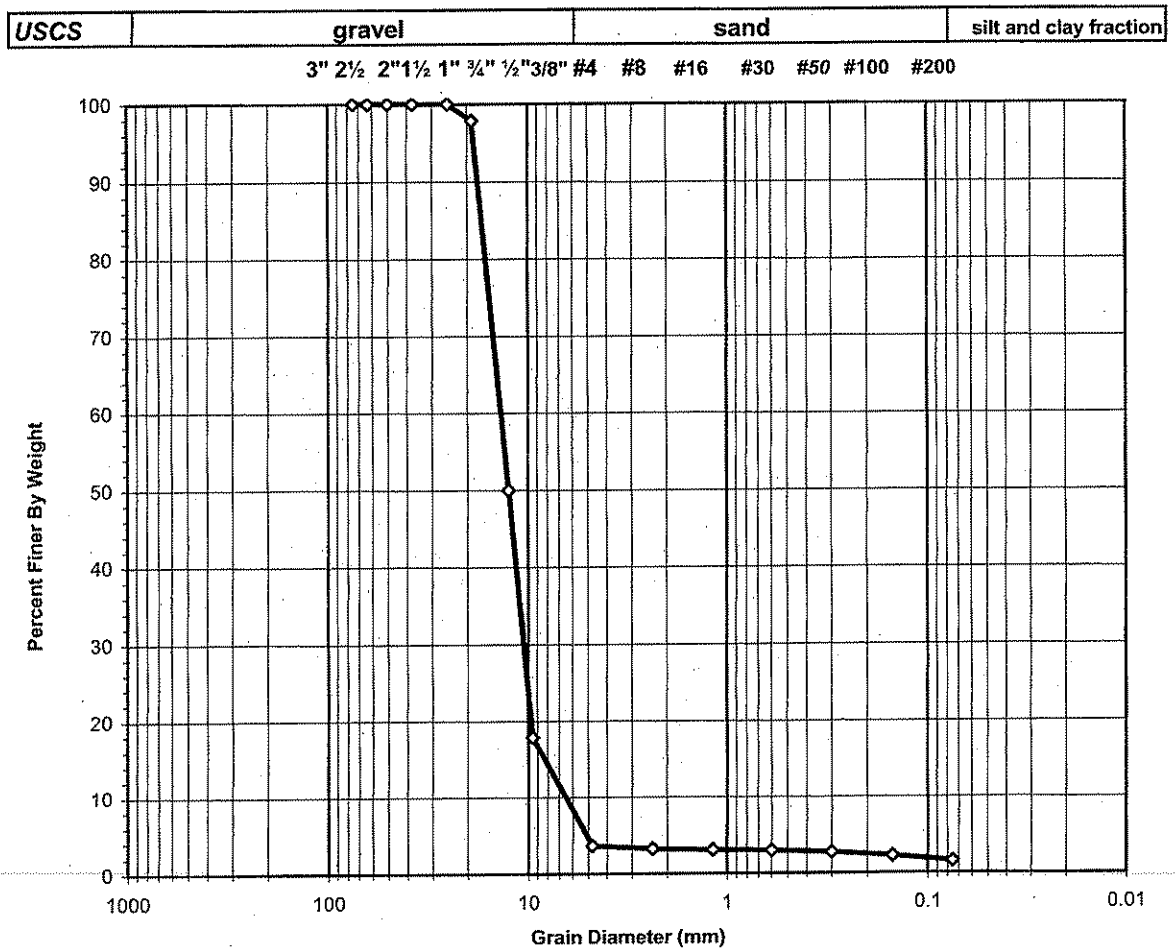
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S1
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	1500YDS3
Project No.	2009-666-13	Sample No.	NA
Lab ID	2009-666-13-06		

Color **GRAY**



USCS Symbol: ***gp, ASSUMED***

Fineness Modulus: ***6.66***

D60 =	13.65		
D30 =	10.54	CC =	1.26
D10 =	6.47	CU =	2.11

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By MM Date 12-3-09

DCN: CT-S42A DATE 08/25/09 REVISION 0 /Me\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-06 C136pan.xls]Sheet1

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S1
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	1500YDS3
Project No.	2009-666-13	Sample No.	NA
Lab ID	2009-666-13-06		
		Color	**GRAY**

Tare No.	B-39	Wt. of Dry Specimen (gm)	7656.40
Wt. Tare + DS.(Pre-Wash)	8206.80	Wt. of +#200 Specimen(gm)	7532.72
Wt.Tare + Dry,Washed specimen	8124.70	Wt. of -#200 Specimen(gm)	111.57
Wt Tare	550.40		
Wt. Dry,Washed specimen	7574.30		

Total Wt. Retained After Sieving 7562.19

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	163.40	2	2	98
1/2"	12.50	3667.80	48	50	50
3/8"	9.50	2456.10	32	82	18
#4	4.75	1088.80	14	96	4
#8	2.36	28.97	0	97	3
#16	1.18	12.36	0	97	3
#30	0.60	10.46	0	97	3
#50	0.30	17.00	0	97	3
#100	0.15	38.65	1	98	2
#200	0.075	49.18	0.6	98.4	1.6
Pan	-	29.47	0	99	-

Tested By SD Date 12/3/2009 Checked By MM Date 12-3-09

DCN: CT-S42A DATE 08/25/09 REVISION 0 \\Raleigh\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-06 C136pan.xls]Sheet1

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RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-68 (SOP-S35) Modified

Client	JOYCE ENGINEERING, INC.	Boring No.	#57 COVER
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	1500 CY
Project No.	2009-497-01	Sample No.	S1
Lab ID	2009-497-01-01	Visual Description	BROWN AND GRAY CRUSHED STONE

Unit Weight

Wt. of Wet Material (gm)	13825
Average Length (in)	11.8
Permeameter Diameter (in)	7.5
Sample Volume (cc)	8513.7
Unit Dry Weight (gm/cc)	1.62
Unit Dry Weight (pcf)	100.8

Water Content

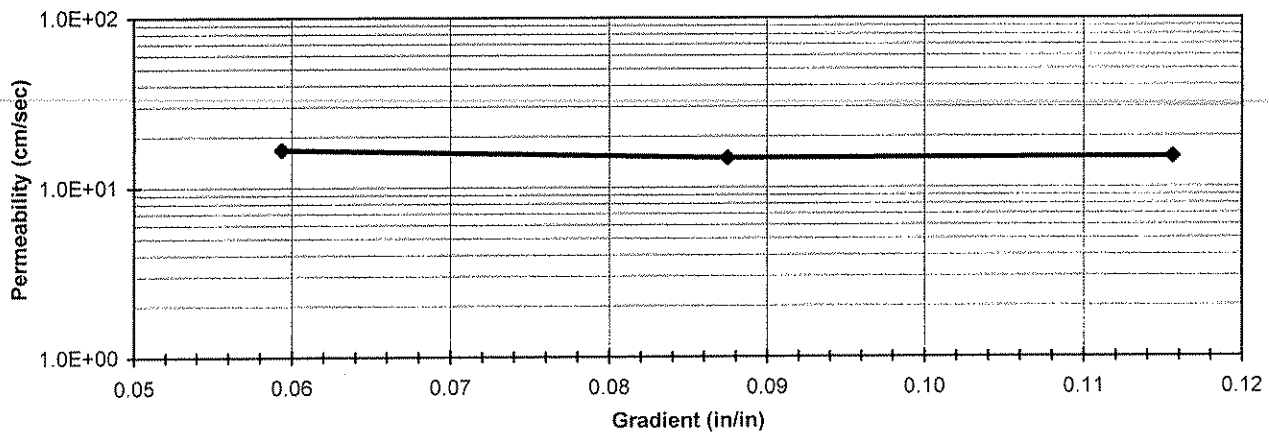
Tare Number	615
Wt. of Tare & Wet Mat.(gm)	322.60
Wt. of Tare & Dry Mat.(gm)	321.43
Wt. of Tare (gm)	84.42
Wt. Water (gm)	1.17
Wt. of Dry Material (gm)	237.01

	Test 1	Test 2	Test 3
Piezometer Spacing (in)	***8***	***8***	***8***
Temperature (° C)	*21.8*	*22.4*	*20.6*
Temp. Correction Factor	*0.9578*	*0.9443*	*0.9855*

Water Content (%) ***0.5*** *(Measured)*

Load (psf) ***NA***

Test No.	Replicate No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collection Tube (divisions)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	1	0.48	0.06	49.2	10	14441	1.7E+01	
1	2	0.48	0.06	48.7	10	14441	1.7E+01	**1.7E+01**
1	3	0.48	0.06	48.7	10	14441	1.7E+01	
2	1	0.70	0.09	36.8	10	14441	1.5E+01	
2	2	0.70	0.09	36.6	10	14441	1.5E+01	**1.5E+01**
2	3	0.70	0.09	36.6	10	14441	1.5E+01	
3	1	0.93	0.12	28.8	10	14441	1.5E+01	
3	2	0.93	0.12	28.3	10	14441	1.5E+01	**1.5E+01**
3	3	0.93	0.12	28.5	10	14441	1.5E+01	



Tested By DB Date 12/9/09 Checked By AB Date 12-10-09

 DCN: CT-S35 DATE: 12/30/03 REVISION: 6 *\\DAVE\excel\PROJECTS 2009\[2009-497-01-01PERM.XLS]Sheet1*

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CARBONATE CONTENT

ASTM D 3042-03 (SOP S-55)

Client	JOYCE ENGINEERING	Boring No.	#57 COVER
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	1500 CY
Project No.	2009-497-01	Sample No.	S-1
Lab ID	2009-497-01-01		

Visual Description GRAY AND BROWN STONE

Washed and Dried Specimen (+ #200 Material)

Tare No.	687
Wgt. Tare (gm)	97.38
Weight of Washed, Dry Specimen and Tare Before Acid Wash (gm)	908.07
Weight of Washed, Dry Specimen and Tare After Acid Wash (gm)	907.30
Weight of dry Specimen before acid wash (gm)	810.69
Weight of dry Specimen after acid wash (gm)	809.92

Carbonate Content 0.1%

Note: *Sampling for this test is done in accordance with Sampling Section of Test Method ASTM C 136 and D 3042 Sections 6.1.1 and 6.1.2*

Tested By KBL Date 12/9/09 Checked By KB Date 12-10-09

DCN: CT-S47 DATE :6/6/01 REVISION: 1 C:\MSOFFICE\Excel\PrintQ\[W503.XLS]Sheet1

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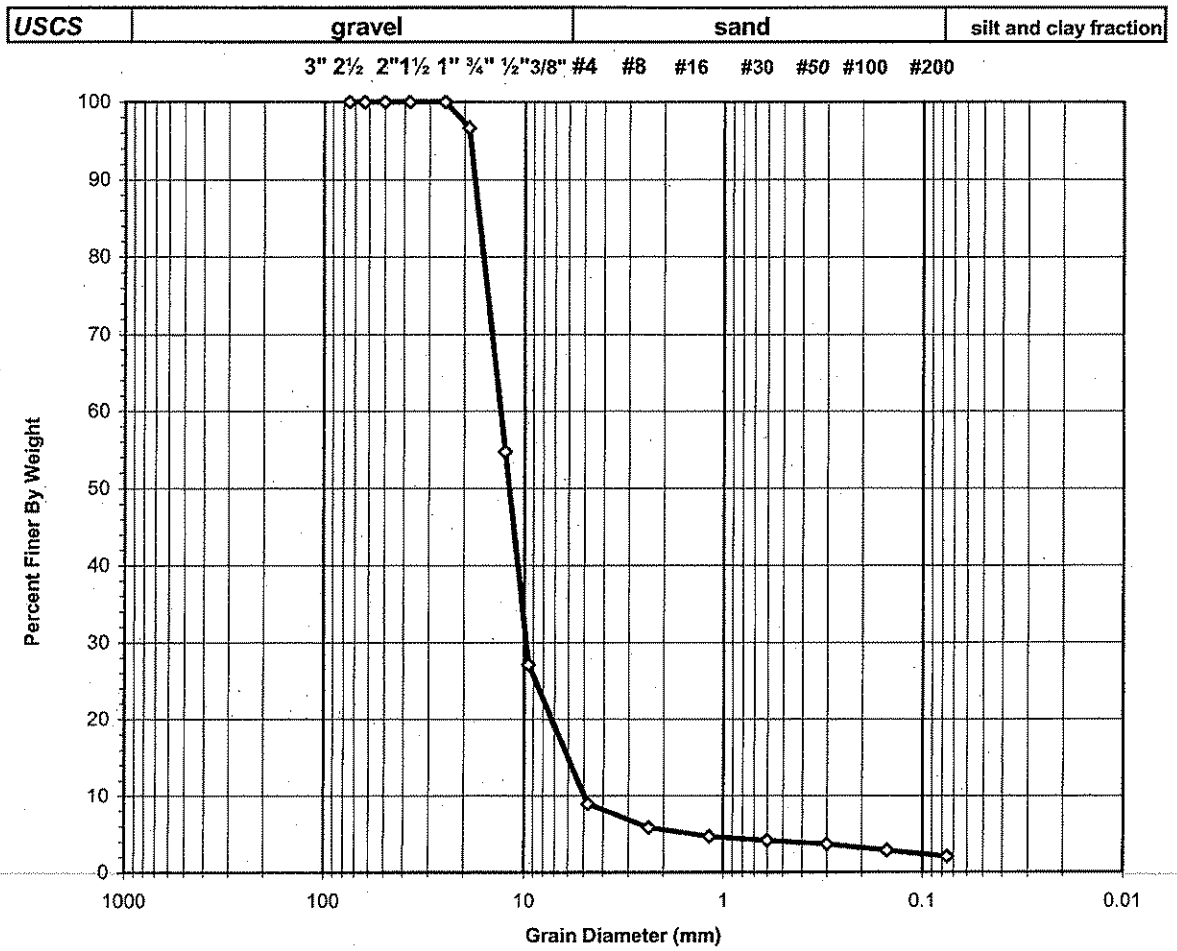
INTEGRITY IN TESTING

WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S2
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	3000YDS3
Project No.	2009-666-13	Sample No.	NA
Lab ID	2009-666-13-07		
		Color	**GRAY**



USCS Symbol:	***gp, ASSUMED***	D60 =	13.18		
		D30 =	9.78	CC =	1.47
Fineness Modulus:	***6.46***	D10 =	4.94	CU =	2.67

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By MB Date 12-3-09

DCN: CT-S42A DATE 08/25/09 REVISION 0 *Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-07 C136pan.xls]Sheet1*

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S2
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	3000YDS3
Project No.	2009-666-13	Sample No.	NA
Lab ID	2009-666-13-07		
		Color	**GRAY**

Tare No.	A-21	Wt. of Dry Specimen (gm)	7697.40
Wt. Tare + DS.(Pre-Wash)	8183.70	Wt. of +#200 Specimen(gm)	7538.82
Wt.Tare + Dry,Washed specimen	8058.20	Wt. of -#200 Specimen(gm)	150.08
Wt Tare	486.30		
Wt. Dry,Washed specimen	7571.90		
		Total Wt. Retained After Sieving	7563.40

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1
Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	257.30	3	3	97
1/2"	12.50	3228.50	42	45	55
3/8"	9.50	2125.20	28	73	27
#4	4.75	1397.50	18	91	9
#8	2.36	241.45	3	94	6
#16	1.18	89.35	1	95	5
#30	0.60	38.24	0	96	4
#50	0.30	37.32	0	96	4
#100	0.15	59.99	1	97	3
#200	0.075	63.97	0.8	97.9	2.1
Pan	-	24.58	0	98	-

Tested By SD Date 12/3/2009 Checked By [illegible] Date 12-3-09

DCN: CT-S42A DATE 08/25/09 REVISION 0 File:\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-13-07 C136pan.xls]Sheet1

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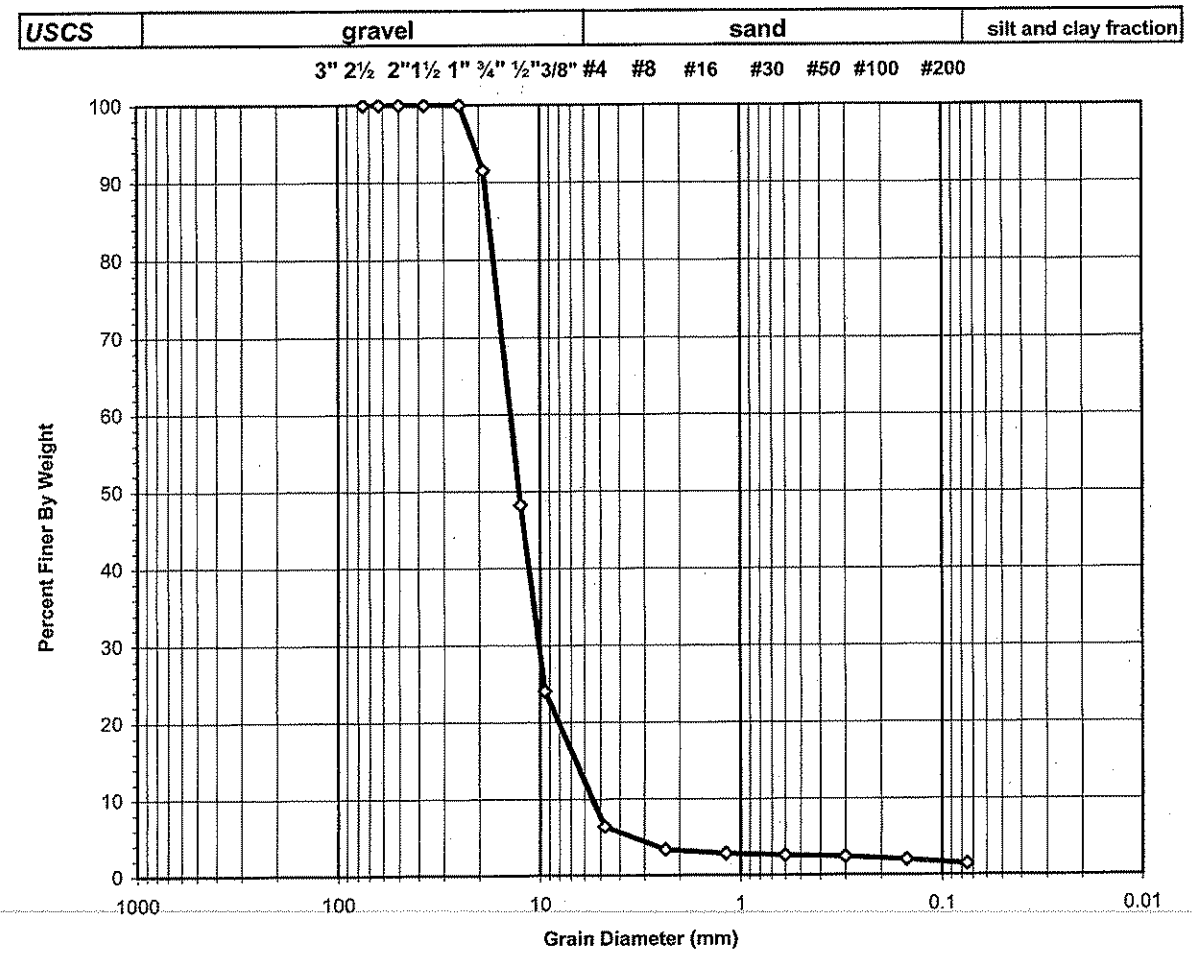
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S2A
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	3000YDS3
Project No.	2009-666-16	Sample No.	NA
Lab ID	2009-666-16-01		
		Color	**GRAY**



USCS Symbol:	***gp, ASSUMED***	D60 =	14.01		
		D30 =	10.16	CC =	1.35
Fineness Modulus:	***6.65***	D10 =	5.46	CU =	2.56

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By MMS Date 12-16-09

DCN: CT-S42A DATE 08/20/05 REVISION 1 *J:\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-16-01 C136pan.xls]Sheet1*

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S2A
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	3000YDS3
Project No.	2009-666-16	Sample No.	NA
Lab ID	2009-666-16-01		
		Color	**GRAY**

Tare No.	A21	Wt. of Dry Specimen (gm)	7191.80
Wt. Tare + DS.(Pre-Wash)	7677.80	Wt. of +#200 Specimen(gm)	7087.23
Wt.Tare + Dry,Washed specimen	7596.10	Wt. of -#200 Specimen(gm)	95.72
Wt Tare	486.00		
Wt. Dry,Washed specimen	7110.10		

Total Wt. Retained After Sieving 7101.25

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	609.20	8	8	92
1/2"	12.50	3113.00	43	52	48
3/8"	9.50	1735.70	24	76	24
#4	4.75	1271.10	18	94	6
#8	2.36	222.32	3	97	3
#16	1.18	38.00	1	97	3
#30	0.60	15.56	0	97	3
#50	0.30	15.70	0	98	2
#100	0.15	28.57	0	98	2
#200	0.075	38.08	0.5	98.5	1.5
Pan	-	14.02	0	99	-

Tested By SD Date 12/16/2009 Checked By [illegible] Date 12-16-09

DCN: CT-S42A DATE 08/26/09 REVISION 1 D:\Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-16-01 C136pan.xls]Sheet1

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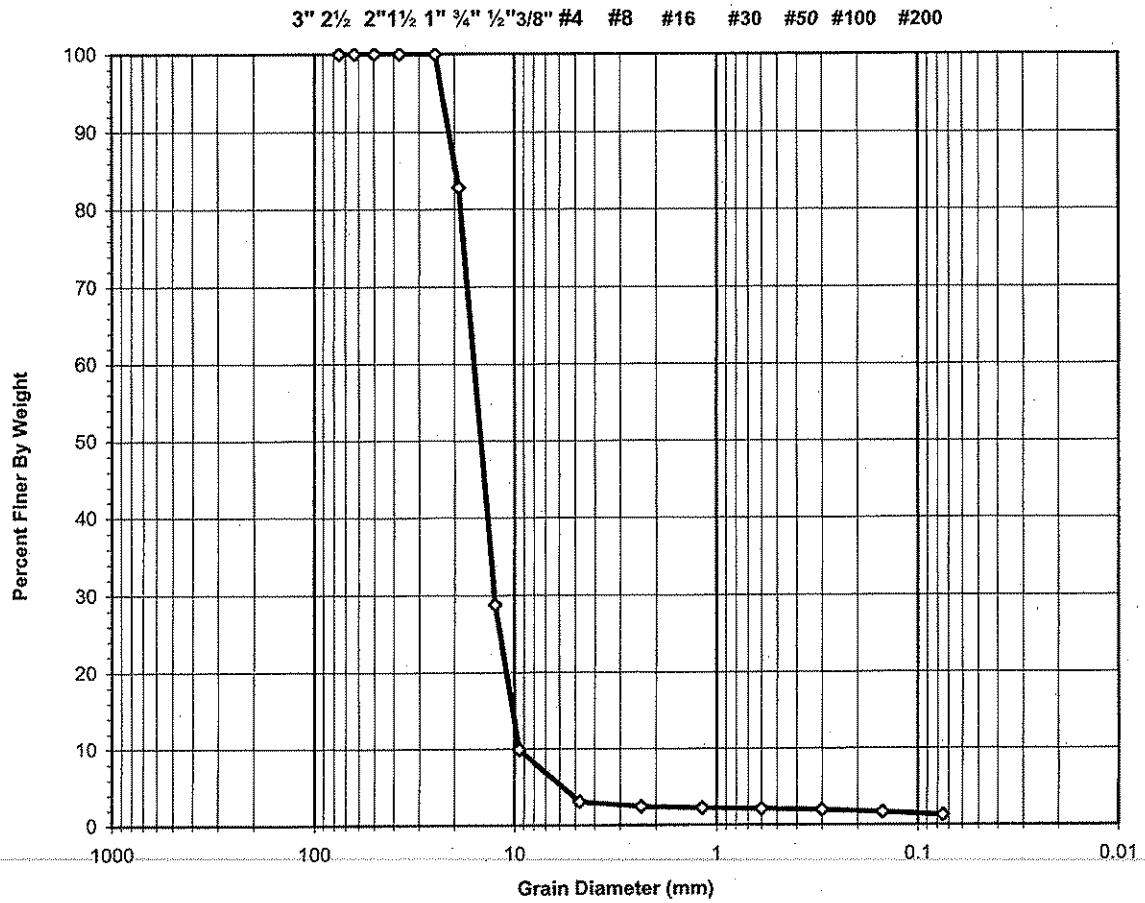
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S2B
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	3000YDS3
Project No.	2009-666-16	Sample No.	NA
Lab ID	2009-666-16-02		
		Color	**GRAY**

USCS	gravel	sand	silt and clay fraction



USCS Symbol:	***gp, ASSUMED***	D60 =	15.92		
		D30 =	12.62	CC =	1.05
Fineness Modulus:	***6.94***	D10 =	9.51	CU =	1.67

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By MMS Date 12-16-09

DCN: CT-S42A DATE 08/2[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-16-02 C136pan.xls]Sheet1

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	S2B
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	3000YDS3
Project No.	2009-666-16	Sample No.	NA
Lab ID	2009-666-16-02		
		Color	**GRAY**

Tare No.	T3	Wt. of Dry Specimen (gm)	5417.40
Wt. Tare + DS.(Pre-Wash)	5600.30	Wt. of +#200 Specimen(gm)	5349.23
Wt.Tare + Dry,Washed specimen	5548.80	Wt. of -#200 Specimen(gm)	61.25
Wt Tare	182.90		
Wt. Dry,Washed specimen	5365.90		
		Total Wt. Retained After Sieving	5358.98

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	930.80	17	17	83
1/2"	12.50	2927.00	54	71	29
3/8"	9.50	1020.80	19	90	10
#4	4.75	372.30	7	97	3
#8	2.36	34.89	1	98	2
#16	1.18	10.50	0	98	2
#30	0.60	7.24	0	98	2
#50	0.30	8.10	0	98	2
#100	0.15	15.36	0	98	2
#200	0.075	22.24	0.4	98.7	1.3
Pan	-	9.75	0	99	-

Tested By SD Date 12/16/2009 Checked By MDS Date 12-16-09

DCN: CT-S42A DATE 08/25/2008 REVISION 0 *Drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-16-02 C136pan.xls]Sheet1*

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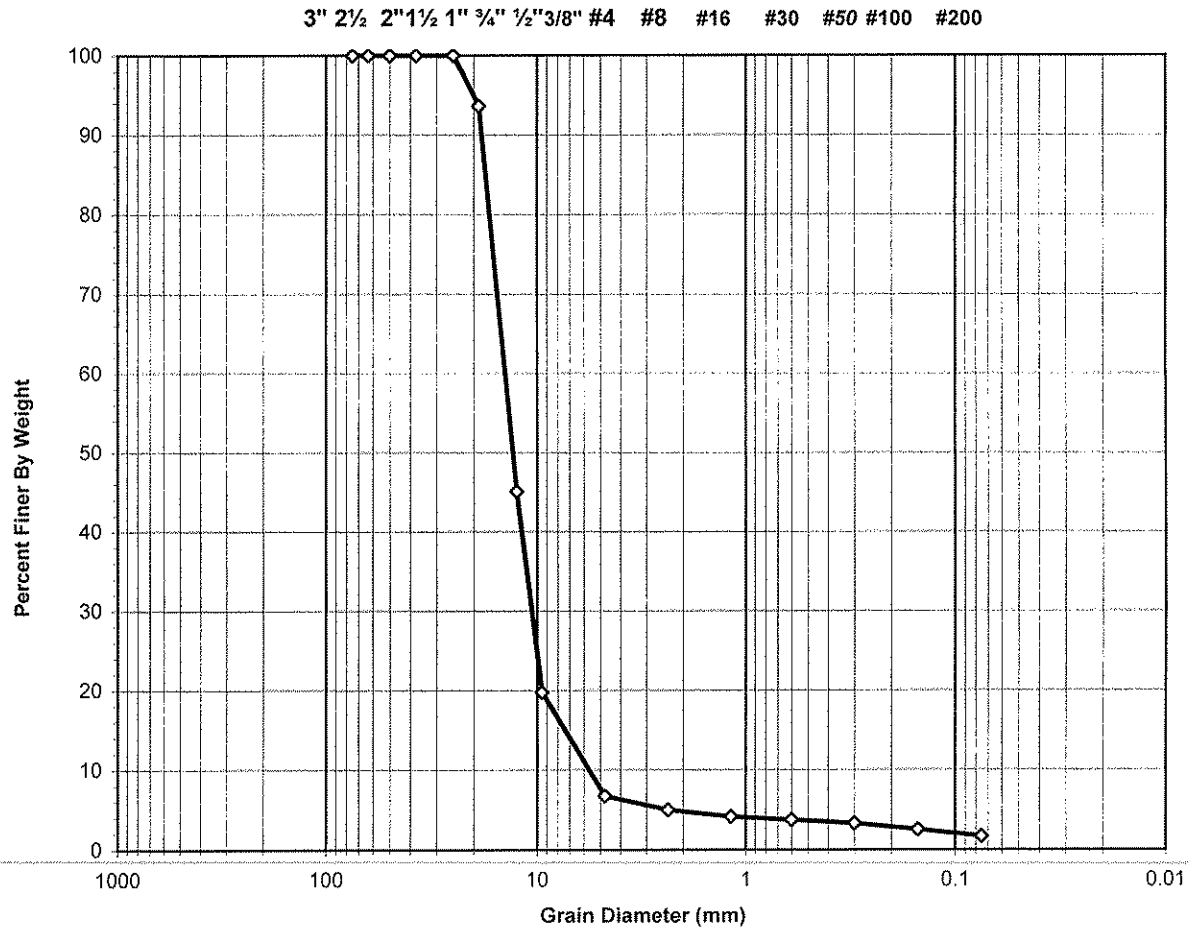
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING	Boring No.	#57 COVER
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	4500 CY
Project No.	2009-497-01	Sample No.	S-3
Lab ID	2009-497-01-02		

Color **BROWN AND GRAY**

USCS	gravel	sand	silt and clay fraction



USCS Symbol: ***GP***

Fineness Modulus: ***6.61***

D60 =	14.21		
D30 =	10.62	CC =	1.40
D10 =	5.65	CU =	2.52

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By BK Date 12/11/09 Checked By KB Date 12-11-09

DCN: CT-S42A DATE 08/26/09 REVISION: 11
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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING	Boring No.	#57 COVER
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	4500 CY
Project No.	2009-497-01	Sample No.	S-3
Lab ID	2009-497-01-02		
		Color	**BROWN AND GRAY**

Tare No.	Z	Wt. of Dry Specimen (gm)	4823.00
Wt. Tare + DS.(Pre-Wash)	5869.00	Wt. of +#200 Specimen(gm)	4741.19
Wt.Tare + Dry,Washed specimen	5810.00	Wt. of -#200 Specimen(gm)	73.63
Wt Tare	1046.00		
Wt. Dry,Washed specimen	4764.00		

Total Wt. Retained After Sieving 4755.82

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	307.00	6	6	94
1/2"	12.50	2341.00	49	55	45
3/8"	9.50	1223.00	25	80	20
#4	4.75	626.00	13	93	7
#8	2.36	84.18	2	95	5
#16	1.18	41.91	1	96	4
#30	0.60	19.27	0	96	4
#50	0.30	20.83	0	97	3
#100	0.15	37.09	1	97	3
#200	0.075	40.91	0.8	98.3	1.7
Pan	-	14.63	0	99	-

Tested By BK Date 12/11/09 Checked By KR Date 12-11-09

DCN: CT-S42A DATE 08/26/09 REVISION: 11
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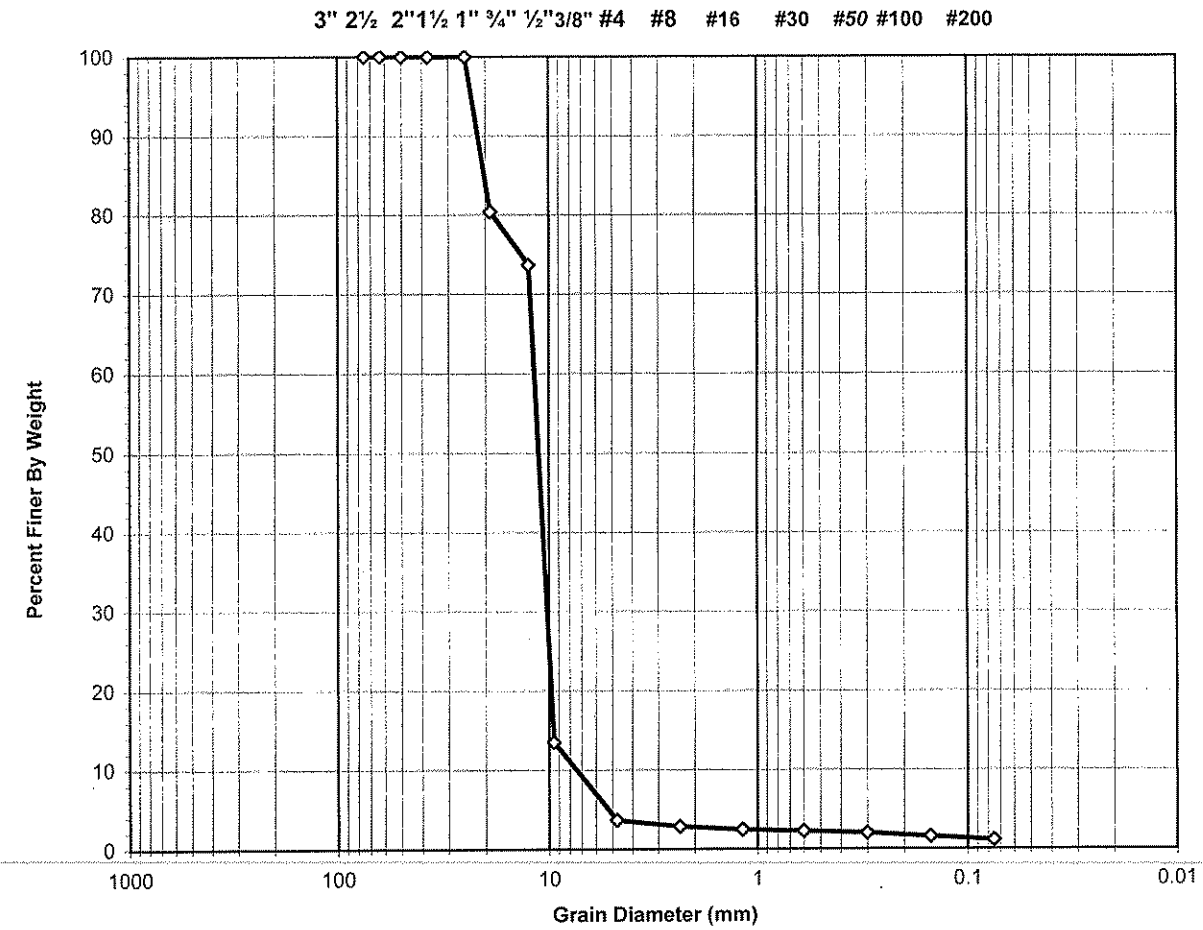
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING	Boring No.	#57
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2009-497-02	Sample No.	S-4
Lab ID	2009-497-02-01		

Color **GRAY**

USCS	gravel	sand	silt and clay fraction



USCS Symbol: ***GP***

Fineness Modulus: ***6.91***

D60 =	11.74		
D30 =	10.24	CC =	1.21
D10 =	7.41	CU =	1.59

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By BK Date 12/15/09 Checked By KB Date 12-15-09

DCN: CT-S42A DATE 08/26/09 REVISION: 11

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING	Boring No.	#57
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2009-497-02	Sample No.	S-4
Lab ID	2009-497-02-01		
		Color	**GRAY**

Tare No.	A+	Wt. of Dry Specimen (gm)	5725.00
Wt. Tare + DS.(Pre-Wash)	6723.00	Wt. of +#200 Specimen(gm)	5660.97
Wt.Tare + Dry,Washed specimen	6678.00	Wt. of -#200 Specimen(gm)	57.43
Wt Tare	998.00		
Wt. Dry,Washed specimen	5680.00		

Total Wt. Retained After Sieving 5673.40

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	1120.00	20	20	80
1/2"	12.50	386.00	7	26	74
3/8"	9.50	3444.00	60	86	14
#4	4.75	564.00	10	96	4
#8	2.36	46.61	1	97	3
#16	1.18	23.94	0	98	2
#30	0.60	11.71	0	98	2
#50	0.30	14.20	0	98	2
#100	0.15	23.42	0	98	2
#200	0.075	27.09	0.5	98.9	1.1
Pan	-	12.43	0	99	-

Tested By BK Date 12/15/09 Checked By KB Date 12-15-09

DCN: CT-S42A DATE 08/26/09 REVISION: 11

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RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-68 (SOP-S35) Modified

Client	JOYCE ENGINEERING, INC.	Boring No.	#57
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2009-497-02	Sample No.	S-4
Lab ID	2009-497-02-01	Visual Description	GRAY STONE

Unit Weight

Wt. of Wet Material (gm)	13912
Average Length (in)	11.6
Permeameter Diameter (in)	7.5
Sample Volume (cc)	8426.9
Unit Dry Weight (gm/cc)	1.63
Unit Dry Weight (pcf)	101.8

Water Content

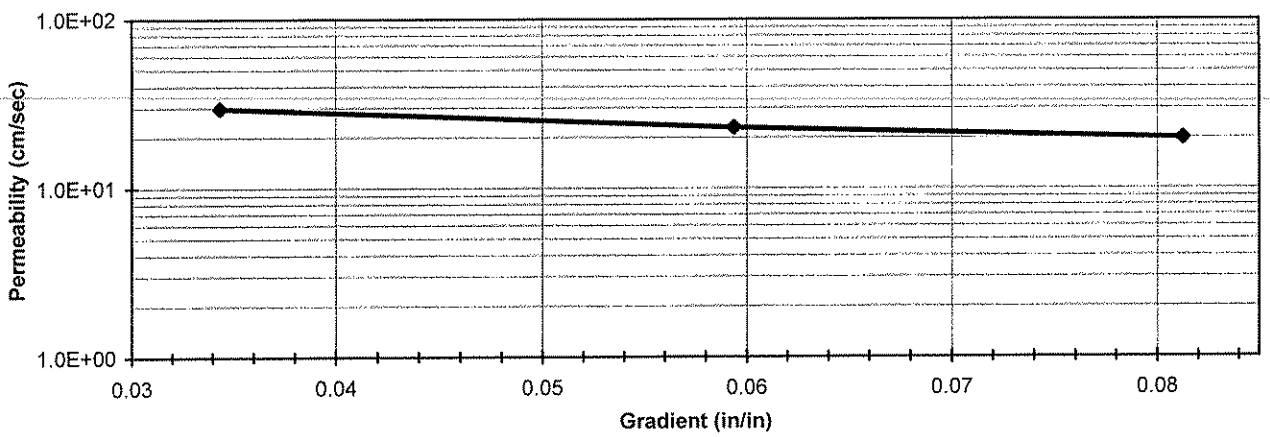
Tare Number	544
Wt. of Tare & Wet Mat.(gm)	414.40
Wt. of Tare & Dry Mat.(gm)	410.60
Wt. of Tare (gm)	84.50
Wt. Water (gm)	3.80
Wt. of Dry Material (gm)	326.10

	Test 1	Test 2	Test 3
Piezometer Spacing (in)	***8***	***8***	***8***
Temperature (° C)	*26.8*	*26.6*	*26.6*
Temp. Correction Factor	*0.8538*	*0.8576*	*0.8576*

Water Content (%) ***1.2***
(Measured)

Load (psf) ***NA***

Test No.	Replicate No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collection Tube (divisions)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	1	0.27	0.03	42.5	10	14441	3.0E+01	
1	2	0.27	0.03	42.4	10	14441	3.0E+01	**3.0E+01**
1	3	0.27	0.03	42.6	10	14441	3.0E+01	
2	1	0.48	0.06	32.2	10	14441	2.3E+01	
2	2	0.48	0.06	32.0	10	14441	2.3E+01	**2.3E+01**
2	3	0.48	0.06	32.1	10	14441	2.3E+01	
3	1	0.65	0.08	27.0	10	14441	2.0E+01	
3	2	0.65	0.08	26.9	10	14441	2.0E+01	**2.0E+01**
3	3	0.65	0.08	26.9	10	14441	2.0E+01	



Tested By PC Date 12/11/09 Checked By KB Date 12-14-09

 DCN: CT-S35 DATE: 12/30/03 REVISION: 6 *\\Geoserver\data drive\PATS SOIL\[2009-497-02-01.XLS]Sheet1*

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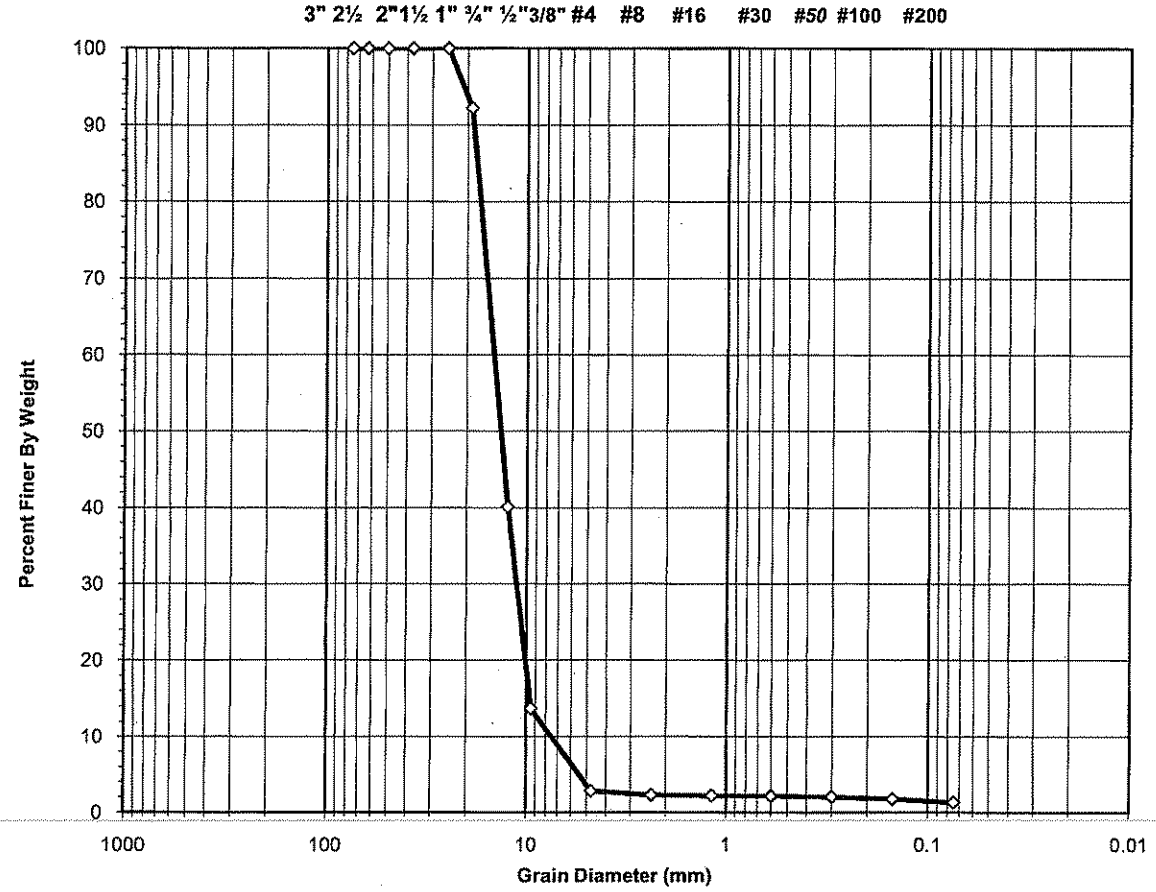
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	7500 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S5
Lab ID	2009-666-17-01		
		Color	**GRAY**

USCS	gravel	sand	silt and clay fraction



USCS Symbol:	***gp, ASSUMED***	D60 =	14.67		
		D30 =	11.25	CC =	1.15
Fineness Modulus:	***6.81***	D10 =	7.51	CU =	1.95

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/09 REVISION 0 drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-17-01 C136pan.xls]Sheet1

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ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	7500 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S5
Lab ID	2009-666-17-01		
		Color	**GRAY**

Tare No.	A-21	Wt. of Dry Specimen (gm)	5119.50
Wt. Tare + DS.(Pre-Wash)	5605.80	Wt. of +#200 Specimen(gm)	5052.48
Wt.Tare + Dry,Washed specimen	5572.00	Wt. of -#200 Specimen(gm)	53.41
Wt Tare	486.30		
Wt. Dry,Washed specimen	5085.70		

Total Wt. Retained After Sieving 5072.09

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.3

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	399.70	8	8	92
1/2"	12.50	2666.50	52	60	40
3/8"	9.50	1351.80	26	86	14
#4	4.75	558.40	11	97	3
#8	2.36	26.14	1	98	2
#16	1.18	5.37	0	98	2
#30	0.60	2.77	0	98	2
#50	0.30	5.65	0	98	2
#100	0.15	14.03	0	98	2
#200	0.075	22.12	0.4	98.7	1.3
Pan	-	19.61	0	99	-

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

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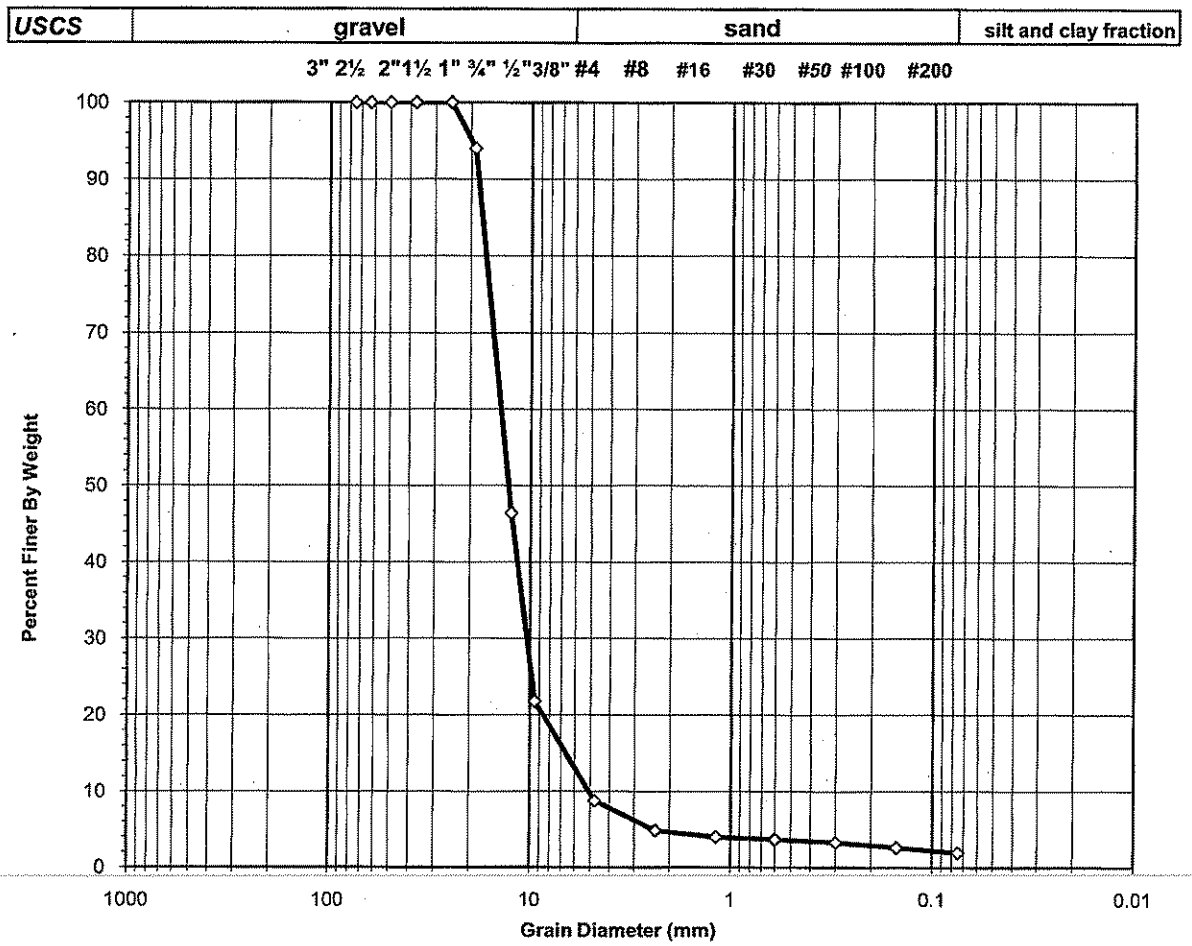
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	9000 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S6
Lab ID	2009-666-17-02		

Color **GRAY**



USCS Symbol: ***gp, ASSUMED***

Fineness Modulus: ***6.57***

D60 =	14.09		
D30 =	10.41	CC =	1.52
D10 =	5.08	CU =	2.77

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/09 REVISION 1 *drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-17-02 C136pan.xls]Sheet1*

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ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	9000 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S6
Lab ID	2009-666-17-02		
		Color	**GRAY**

Tare No.	B-39	Wt. of Dry Specimen (gm)	6120.50
Wt. Tare + DS.(Pre-Wash)	6670.60	Wt. of +#200 Specimen(gm)	6002.08
Wt.Tare + Dry,Washed specimen	6613.40	Wt. of -#200 Specimen(gm)	94.11
Wt Tare	550.10		
Wt. Dry,Washed specimen	6063.30		

Total Wt. Retained After Sieving 6038.99

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.4

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	367.90	6	6	94
1/2"	12.50	2911.80	48	54	46
3/8"	9.50	1509.00	25	78	22
#4	4.75	796.40	13	91	9
#8	2.36	239.55	4	95	5
#16	1.18	51.76	1	96	4
#30	0.60	21.27	0	96	4
#50	0.30	24.07	0	97	3
#100	0.15	38.12	1	97	3
#200	0.075	42.21	0.7	98.1	1.9
Pan	-	36.91	1	99	-

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

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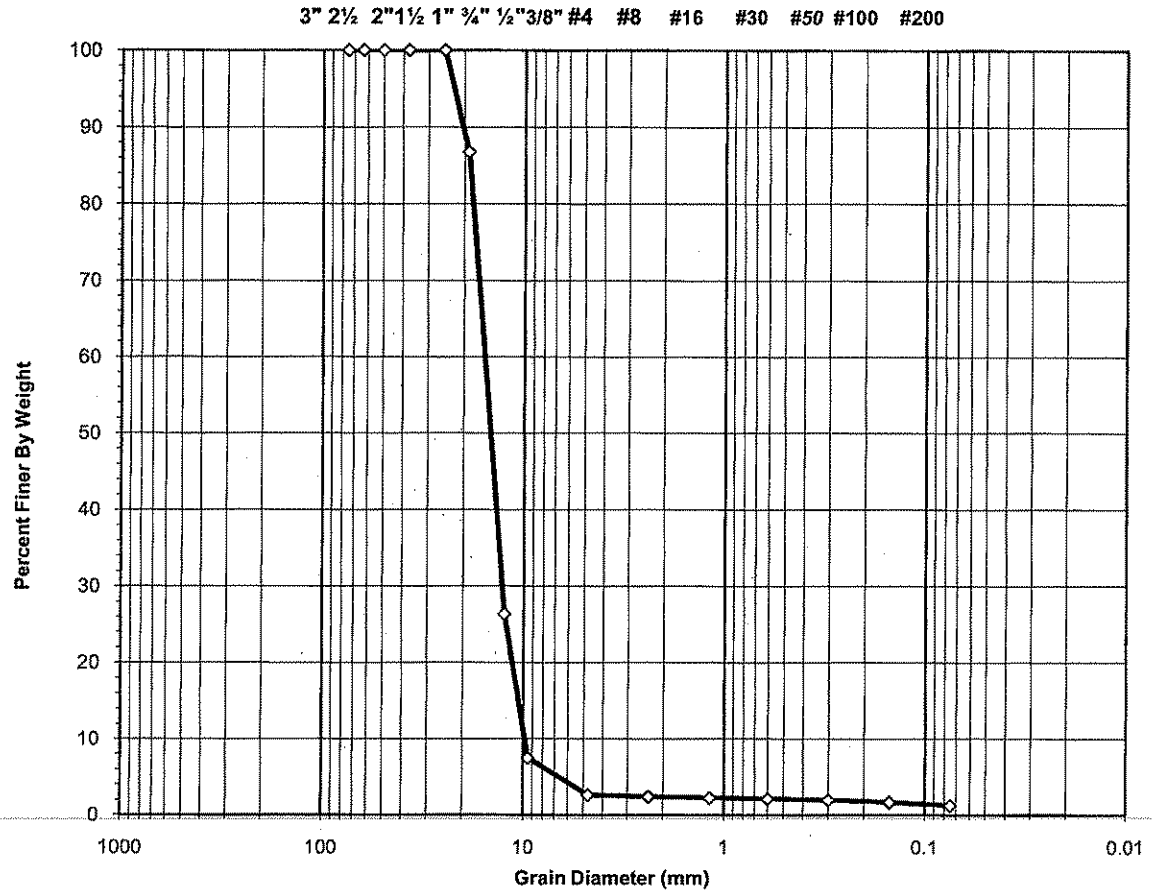
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	10500 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S7
Lab ID	2009-666-17-03		
		Color	**GRAY**

USCS	gravel	sand	silt and clay fraction



USCS Symbol:	***gp, ASSUMED***	D60 =	15.78		
		D30 =	12.82	CC =	1.06
Fineness Modulus:	***6.93***	D10 =	9.86	CU =	1.60

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/09 REVISION 1 *drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-17-03 C136pan.xls]Sheet1*

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ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	10500 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S7
Lab ID	2009-666-17-03		
		Color	**GRAY**

Tare No.	986	Wt. of Dry Specimen (gm)	5784.90
Wt. Tare + DS.(Pre-Wash)	6457.70	Wt. of +#200 Specimen(gm)	5715.45
Wt.Tare + Dry,Washed specimen	6424.90	Wt. of -#200 Specimen(gm)	57.68
Wt Tare	672.80		
Wt. Dry,Washed specimen	5752.10		
		Total Wt. Retained After Sieving	5740.33

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2
Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	765.20	13	13	87
1/2"	12.50	3496.00	60	74	26
3/8"	9.50	1093.90	19	93	7
#4	4.75	280.80	5	97	3
#8	2.36	13.34	0	98	2
#16	1.18	8.26	0	98	2
#30	0.60	5.96	0	98	2
#50	0.30	9.36	0	98	2
#100	0.15	18.29	0	98	2
#200	0.075	24.34	0.4	98.8	1.2
Pan	-	24.88	0	99	-

Tested By DAW Date 12.29.09 Checked By JEB Date 12.30.09

DCN: CT-S42A DATE 08/26/08 REVISION: 1 drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\2009-666-17-03 C136pan.xls]Sheet1

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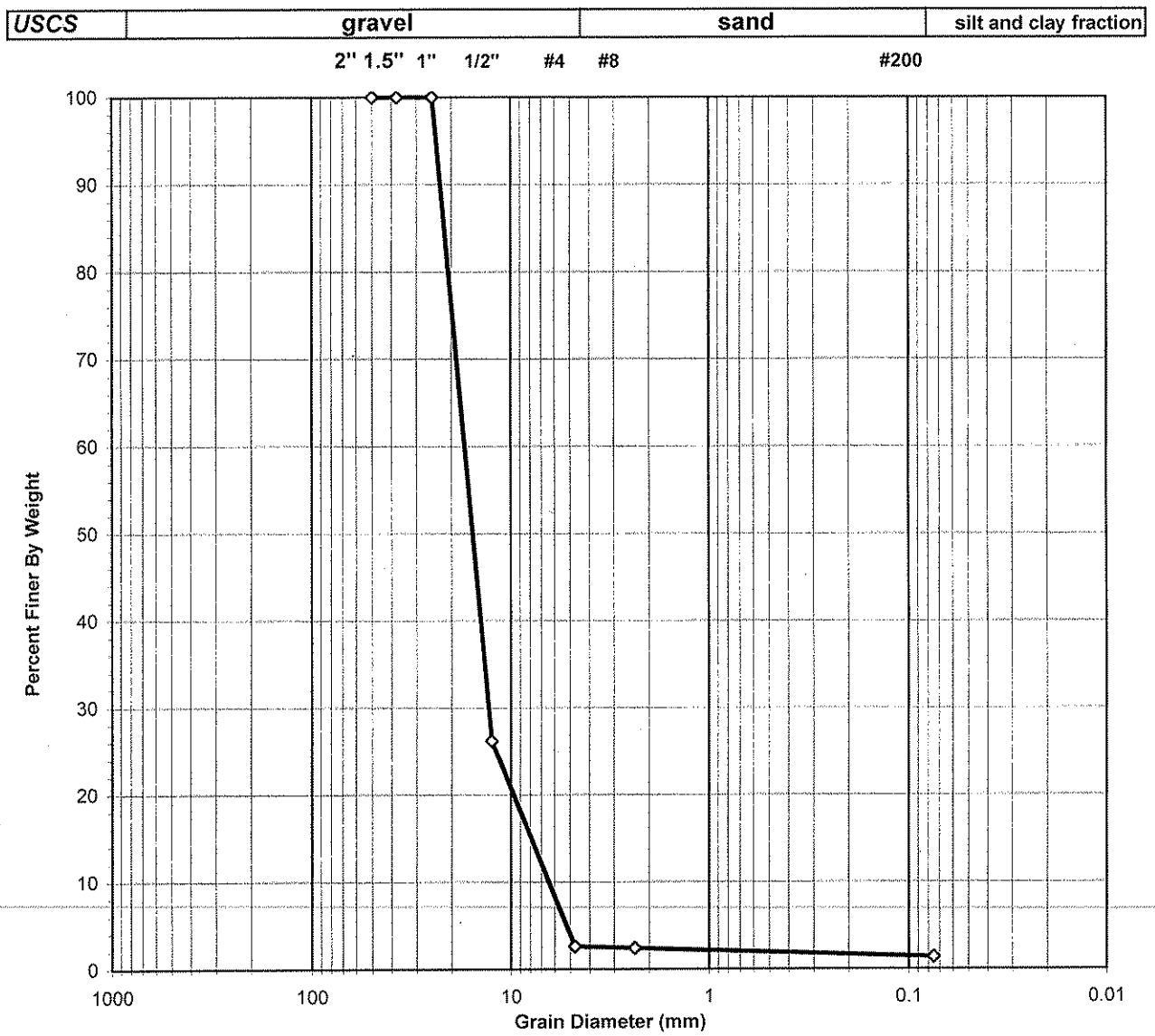
INTEGRITY IN TESTING

WASH SIEVE ANALYSIS
AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	#57 STONE
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2009-497-03	Sample No.	S-8
Lab ID	2009-497-03-01		
		Color	GRAY



USCS Symbol ***GP***

USCS Classification ***POORLY GRADED GRAVEL***

Tested By MF Date 12/29/09 Checked By KB Date 12-30-09

 DCN: CT-S42I DATE 2/14/03 REVISION: 2 C:\MSOFFICE\Excel\PrintQ\[W727.XLS]Sheet1

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS

AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	#57 STONE
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2009-497-03	Sample No.	S-8
Lab ID	2009-497-03-01		
		Color	**GRAY**

Tare No.	X	Wt. of Dry Specimen (gm)	10161.00
Wt. Tare + DS.(Pre-Wash)	11157.00	Wt. of +#200 Specimen(gm)	10062.00
Wt.Tare + Dry,Washed specimen	11058.00	Wt. of -#200 Specimen(gm)	99.00
Wt Tare	996.00		
Wt. Dry,Washed specimen	10062.00		
		Total Wt. Retained After Sieving	10050.11

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Wt.of Material Retained (gm.)	Percent Retained	Accumulated Percent Retained	Percent Finer
2"	50	0.00	0	0	100
1 1/2"	37.5	0.00	0	0	100
1"	25	0.00	0	0	100
1/2"	12.5	7499.00	74	74	26
#4	4.75	2396.00	24	97	3
#8	2.36	17.83	0	98	2
#200	0.075	107.49	1	99	1
Pan	-	29.79	0	99 -	-

Tested By MF Date 12/29/09 Checked By KB Date 12-30-09

DCN: CT-S42I DATE 2/14/03 REVISION: 2

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INTEGRITY IN TESTING

RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-68 (SOP-S35) Modified

Client	JOYCE ENGINEERING	Boring No.	#57 STONE
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2009-497-03	Sample No.	S-8
Lab ID	2009-497-03-01	Visual Description	GRAY STONE

Unit Weight

Wt. of Wet Material (gm)	13923
Average Length (in)	11.6
Permeameter Diameter (in)	7.5
Sample Volume (cc)	8426.9
Unit Dry Weight (gm/cc)	1.65
Unit Dry Weight (pcf)	102.8

Water Content

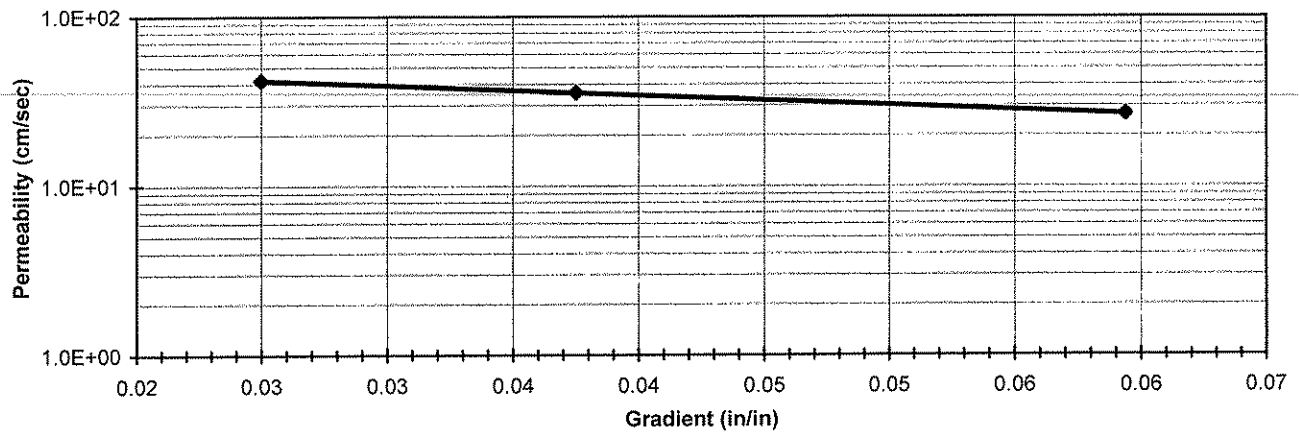
Tare Number	876
Wt. of Tare & Wet Mat.(gm)	523.80
Wt. of Tare & Dry Mat.(gm)	522.50
Wt. of Tare (gm)	109.92
Wt. Water (gm)	1.30
Wt. of Dry Material (gm)	412.58

	Test 1	Test 2	Test 3
Piezometer Spacing (in)	***8***	***8***	***8***
Temperature (° C)	*20.2*	*20.7*	*20.7*
Temp. Correction Factor	*0.9950*	*0.9831*	*0.9831*

Water Content (%) ***0.3***
(Measured)

Load (psf) ***NA***

Test No.	Replicate No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collection Tube (divisions)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	1	0.20	0.02	48.2	10	14441	4.2E+01	
1	2	0.20	0.02	48.1	10	14441	4.2E+01	**4.2E+01**
1	3	0.20	0.02	48.2	10	14441	4.2E+01	
2	1	0.30	0.04	37.4	10	14441	3.5E+01	
2	2	0.30	0.04	37.5	10	14441	3.5E+01	**3.5E+01**
2	3	0.30	0.04	37.6	10	14441	3.5E+01	
3	1	0.48	0.06	31.5	10	14441	2.7E+01	
3	2	0.48	0.06	31.4	10	14441	2.7E+01	**2.7E+01**
3	3	0.48	0.06	31.6	10	14441	2.7E+01	



Tested By PC Date 12/29/09 Checked By KB Date 12-30-09

 DCN: CT-S35 DATE: 12/30/03 REVISION: 6 *\\Geoserver\data drive\PATS SOIL\[2009-497-03-01.XLS]Sheet1*

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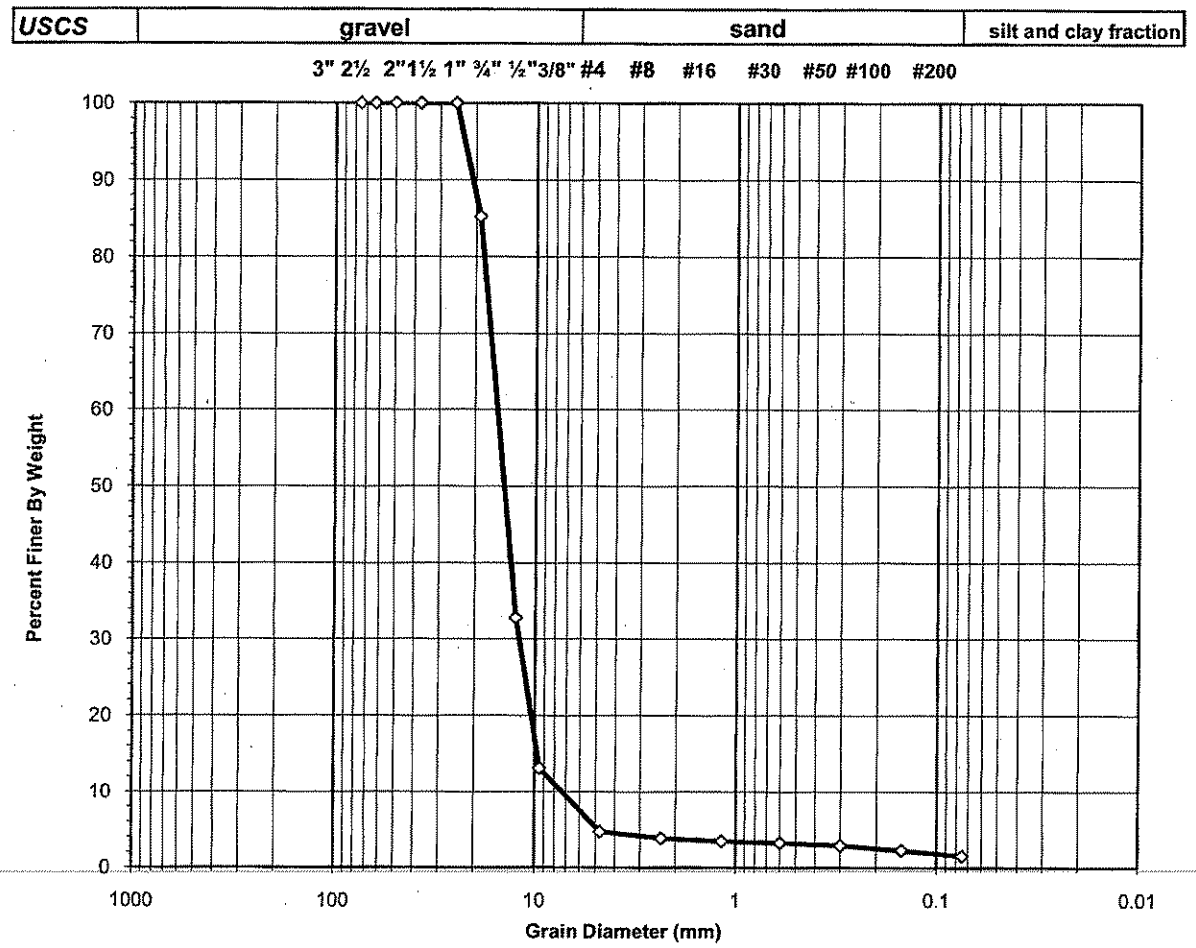
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	13500 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S9
Lab ID	2009-666-17-04		

Color **GRAY**



USCS Symbol: ***gp, ASSUMED***

Fineness Modulus: ***6.82***

D60 =	15.53		
D30 =	12.03	CC =	1.27
D10 =	7.35	CU =	2.11

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/09 REVISION: drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-17-04 C136pan.xls]Sheet1

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	13500 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S9
Lab ID	2009-666-17-04		
		Color	**GRAY**

Tare No.	T-4	Wt. of Dry Specimen (gm)	6130.90
Wt. Tare + DS.(Pre-Wash)	6315.30	Wt. of +#200 Specimen(gm)	6037.73
Wt.Tare + Dry,Washed specimen	6261.50	Wt. of -#200 Specimen(gm)	82.62
Wt Tare	184.40		
Wt. Dry,Washed specimen	6077.10		
		Total Wt. Retained After Sieving	6066.55

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	905.20	15	15	85
1/2"	12.50	3216.60	52	67	33
3/8"	9.50	1204.60	20	87	13
#4	4.75	515.90	8	95	5
#8	2.36	54.65	1	96	4
#16	1.18	22.50	0	97	3
#30	0.60	14.45	0	97	3
#50	0.30	20.92	0	97	3
#100	0.15	38.69	1	98	2
#200	0.075	44.22	0.7	98.5	1.5
Pan	-	28.82	0	99	-

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/09 REVISION 1 *drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-17-04 C136pan.xls]Sheet1*

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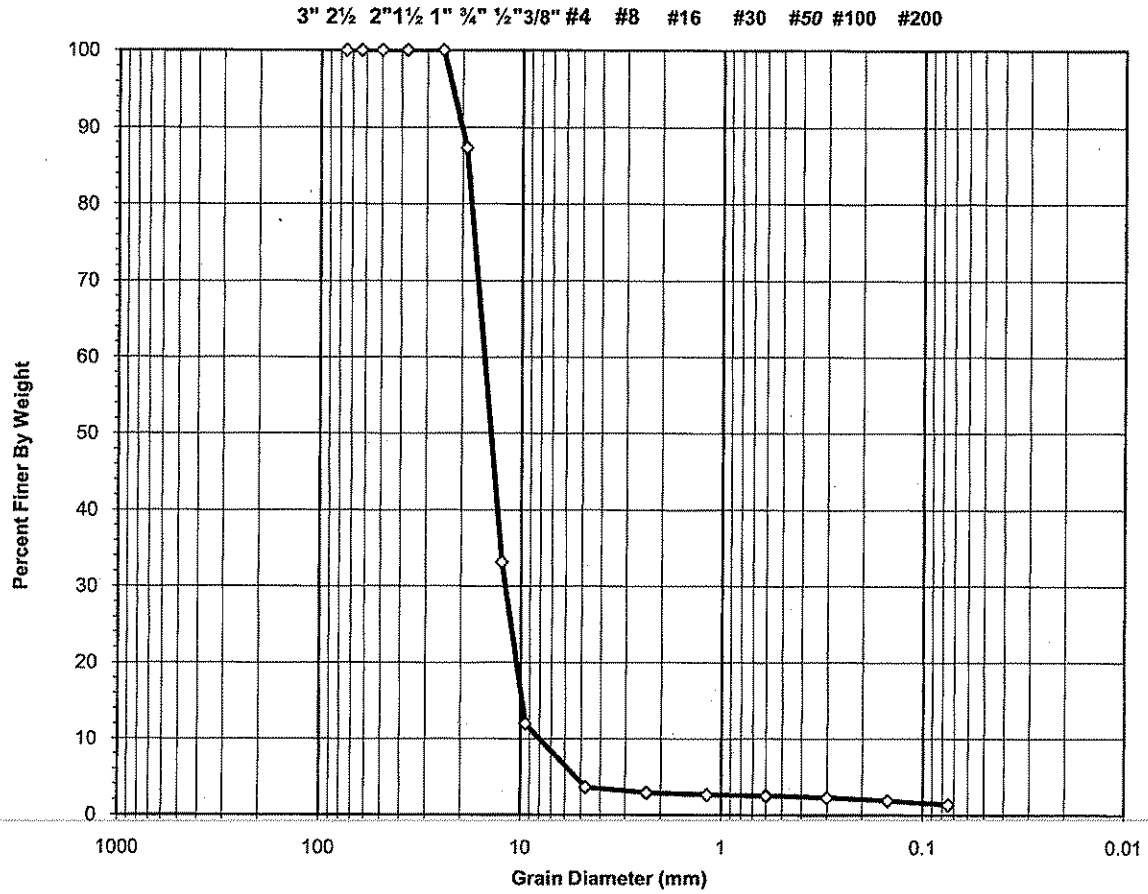
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	15000 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S10
Lab ID	2009-666-17-05		
		Color	**GRAY**

USCS	gravel	sand	silt and clay fraction



USCS Symbol:	***gp, ASSUMED***	D60 =	15.38		
		D30 =	12.00	CC =	1.16
Fineness Modulus:	***6.85***	D10 =	8.08	CU =	1.90

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/08 REVISION 1 drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\\2009-666-17-05 C136pan.xls]Sheet1

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ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	15000 yd³
Client Reference	WHITE OAK MSW LF PHS III	Depth(ft.)	NA
Project No.	2009-666-17	Sample No.	S10
Lab ID	2009-666-17-05		
		Color	**GRAY**

Tare No.	T-3	Wt. of Dry Specimen (gm)	6314.60
Wt. Tare + DS.(Pre-Wash)	6496.60	Wt. of +#200 Specimen(gm)	6232.68
Wt.Tare + Dry,Washed specimen	6455.30	Wt. of -#200 Specimen(gm)	69.21
Wt Tare	182.00		
Wt. Dry,Washed specimen	6273.30		
		Total Wt. Retained After Sieving	6260.59

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2
Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	802.10	13	13	87
1/2"	12.50	3419.60	54	67	33
3/8"	9.50	1337.90	21	88	12
#4	4.75	529.60	8	96	4
#8	2.36	45.45	1	97	3
#16	1.18	16.00	0	97	3
#30	0.60	9.61	0	98	2
#50	0.30	13.19	0	98	2
#100	0.15	25.66	0	98	2
#200	0.075	33.57	0.5	98.7	1.3
Pan	-	27.91	0	99	-

Tested By DAW Date 12.29.09 Checked By JRB Date 12.30.09

DCN: CT-S42A DATE 08/26/09 REVISION 1 drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-17-05 C136pan.xls]Sheet1

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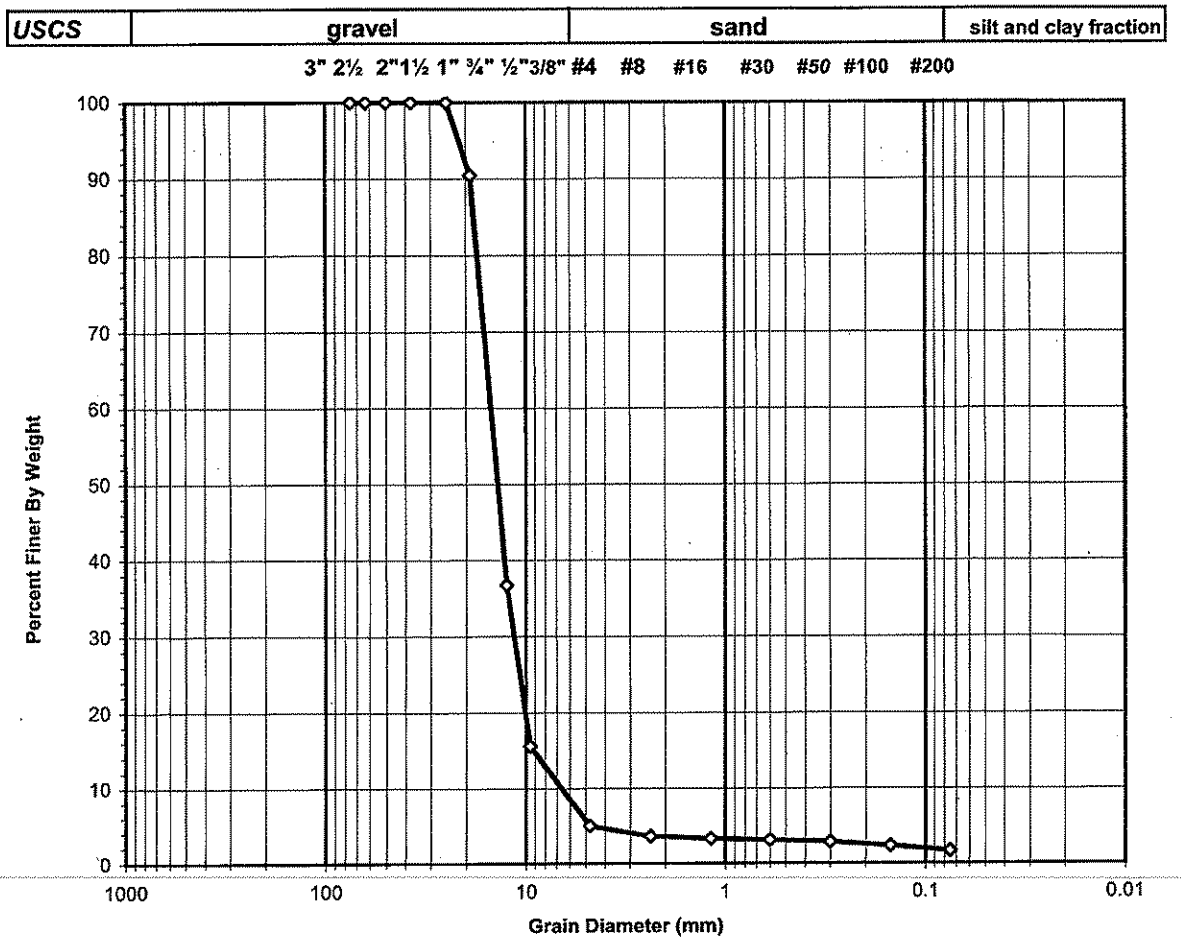
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-18	Sample No.	S#11
Lab ID	2009-666-18-01		
		Color	**GRAY**



USCS Symbol:	***gp, ASSUMED***	D60 =	14.99		
		D30 =	11.46	CC =	1.33
Fineness Modulus:	***6.74***	D10 =	6.59	CU =	2.27

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 1/13/2010 Checked By MPS Date 1-14-10

DCN: CT-S42A DATE 08/26/09 REVISION 0 \\Server\Data\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-18-01 C136pan.xls]Sheet1

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-18	Sample No.	S#11
Lab ID	2009-666-18-01		
		Color	**GRAY**

Tare No.	A-21	Wt. of Dry Specimen (gm)	6229.80
Wt. Tare + DS.(Pre-Wash)	6715.80	Wt. of +#200 Specimen(gm)	6128.29
Wt.Tare + Dry,Washed specimen	6647.40	Wt. of -#200 Specimen(gm)	94.49
Wt Tare	486.00		
Wt. Dry,Washed specimen	6161.40		

Total Wt. Retained After Sieving 6154.38

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	595.00	9.6	10	90
1/2"	12.50	3347.80	53.7	63	37
3/8"	9.50	1317.00	21.1	84	16
#4	4.75	658.90	10.6	95	5
#8	2.36	87.64	1.4	96	4
#16	1.18	20.76	0.3	97	3
#30	0.60	10.78	0.2	97	3
#50	0.30	15.45	0.2	97	3
#100	0.15	33.05	0.5	98	2
#200	0.075	41.91	0.7	98.4	1.6
Pan	-	26.09	0.4	99	-

Tested By DAW Date 1/13/2010 Checked By MPS Date 1-14-10

DCN: CT-S42A DATE 08/26/09 [illegible] \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-18-01 C136pan.xls]Sheet1

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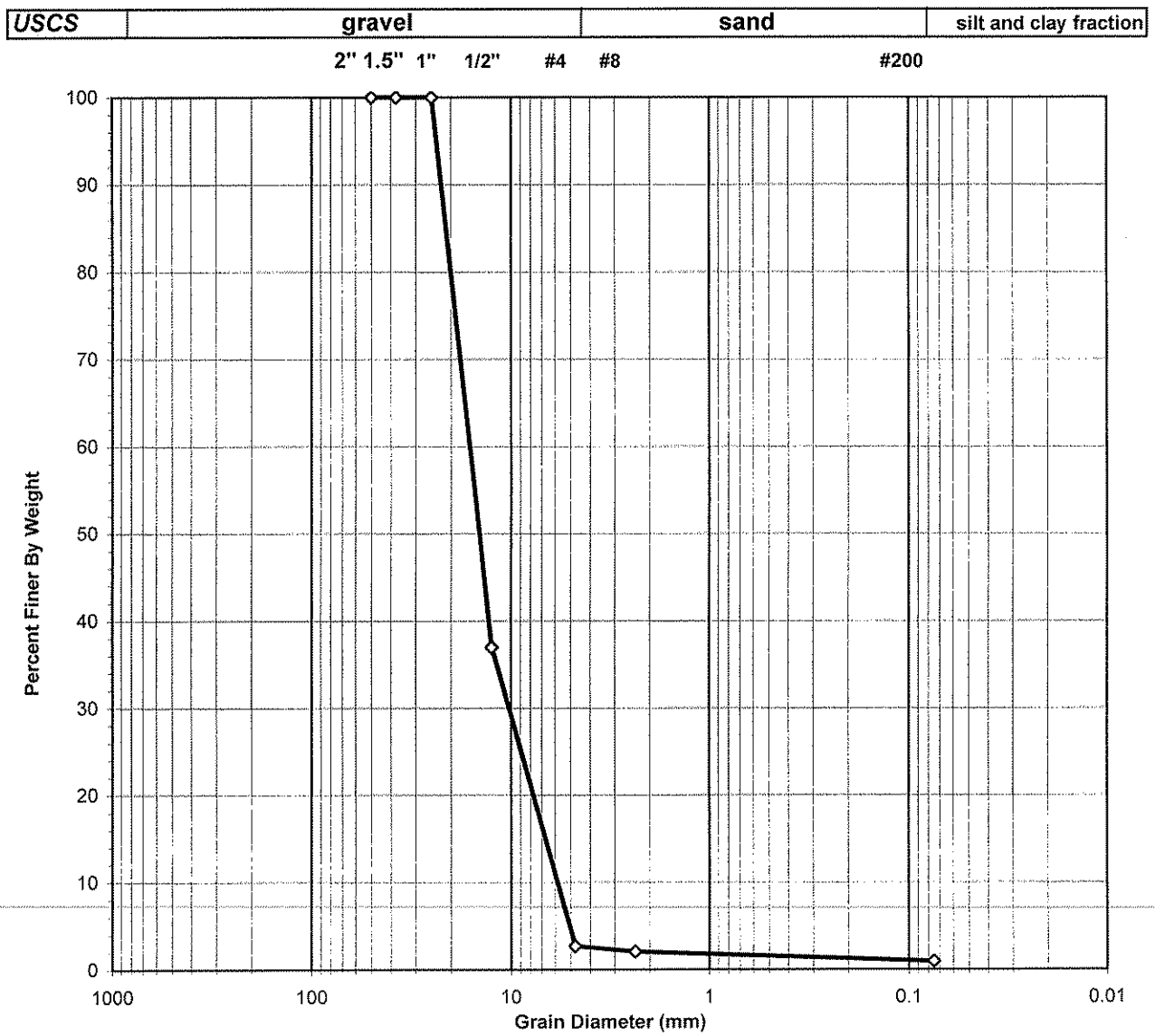
WASH SIEVE ANALYSIS
AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	#57 STONE
Client Reference	WHITE OAK LANDFILL PHASE 3	Depth(ft.)	18,000 CY
Project No.	2010-034-01	Sample No.	S-12
Lab ID	2010-034-01-01		
		Color	GRAY



USCS Symbol ***GP***

USCS Classification ***POORLY GRADED GRAVEL***

Tested By PC Date 1/25/10 Checked By KB Date 1-25-10

 DCN: CT-S42I DATE 2/14/03 REVISION: 2 C:\MSOFFICE\Excel\PrintQ\[X17.XLS]Sheet1

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WASH SIEVE ANALYSIS

AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	#57 STONE
Client Reference	WHITE OAK LANDFILL PHASE 3	Depth(ft.)	18,000 CY
Project No.	2010-034-01	Sample No.	S-12
Lab ID	2010-034-01-01		
		Color	**GRAY**

Tare No.	P	Wt. of Dry Specimen (gm)	10106.00
Wt. Tare + DS.(Pre-Wash)	11104.00	Wt. of +#200 Specimen(gm)	10042.00
Wt.Tare + Dry,Washed specimen	11040.00	Wt. of -#200 Specimen(gm)	64.00
Wt Tare	998.00		
Wt. Dry,Washed specimen	10042.00		

Total Wt. Retained After Sieving 10031.22

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Wt.of Material Retained (gm.)	Percent Retained	Accumulated Percent Retained	Percent Finer
2"	50	0.00	0	0	100
1 1/2"	37.5	0.00	0	0	100
1"	25	0.00	0	0	100
1/2"	12.5	6371.00	63	63	37
#4	4.75	3459.00	34	97	3
#8	2.36	62.85	1	98	2
#200	0.075	116.69	1	99	1
Pan	-	21.68	0	99 -	-

Tested By PC Date 1/25/10 Checked By KB Date 1-25-10

DCN: CT-S42I DATE 2/14/03 REVISION: 2

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RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-68 (SOP-S35) Modified

Client	JOYCE ENGINEERING, INC.	Boring No.	#57 STONE
Client Reference	WHITE OAK LANDFILL PHASE 3	Depth(ft.)	18,000 CY
Project No.	2010-034-01	Sample No.	S-12
Lab ID	2010-034-01-01	Visual Description	DARK GRAY STONE

Unit Weight

Wt. of Wet Material (gm)	13805
Average Length (in)	11.6
Permeameter Diameter (in)	7.5
Sample Volume (cc)	8426.9
Unit Dry Weight (gm/cc)	1.63
Unit Dry Weight (pcf)	101.9

Water Content

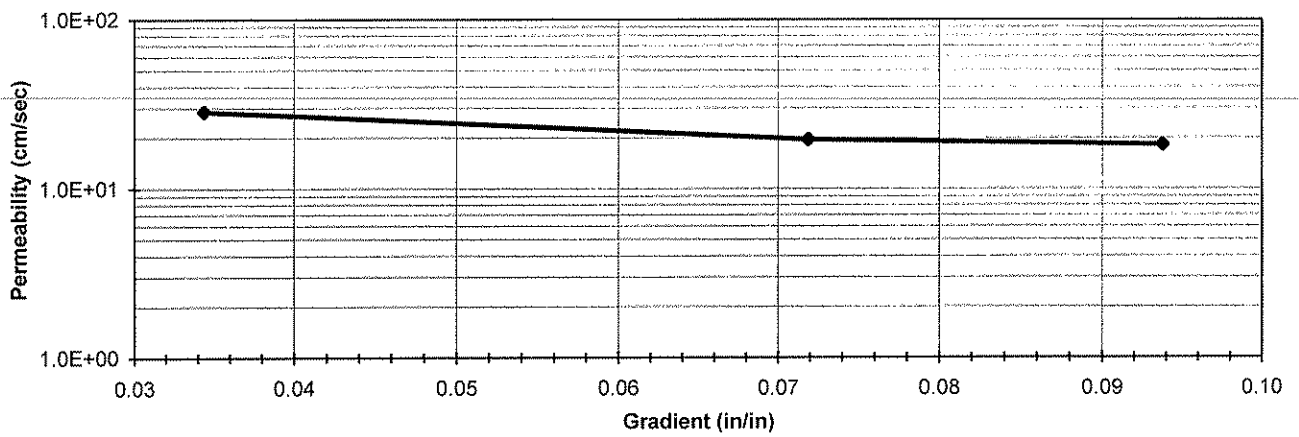
Tare Number	731
Wt. of Tare & Wet Mat.(gm)	527.80
Wt. of Tare & Dry Mat.(gm)	526.50
Wt. of Tare (gm)	84.34
Wt. Water (gm)	1.30
Wt. of Dry Material (gm)	442.16

	Test 1	Test 2	Test 3
Piezometer Spacing (in)	***8***	***8***	***8***
Temperature (° C)	*24.1*	*24.0*	*24.0*
Temp. Correction Factor	*0.9076*	*0.9097*	*0.9097*

Water Content (%) ***0.3***
(Measured)

Load (psf) ***NA***

Test No.	Replicate No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collection Tube (divisions)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	1	0.27	0.03	46.9	10	14441	2.9E+01	
1	2	0.27	0.03	46.6	10	14441	2.9E+01	**2.9E+01**
1	3	0.27	0.03	47.0	10	14441	2.8E+01	
2	1	0.58	0.07	32.4	10	14441	2.0E+01	
2	2	0.58	0.07	32.8	10	14441	2.0E+01	**2.0E+01**
2	3	0.58	0.07	33.1	10	14441	1.9E+01	
3	1	0.75	0.09	27.0	10	14441	1.8E+01	
3	2	0.75	0.09	27.0	10	14441	1.8E+01	**1.8E+01**
3	3	0.75	0.09	26.9	10	14441	1.8E+01	



Tested By PC Date 1/25/10 Checked By KB Date 1-25-10

 DCN: CT-S35 DATE: 12/30/03 REVISION: 6 *\\Geoserver\data drive\PATS SOIL\[2010-034-01-01.XLS]Sheet1*

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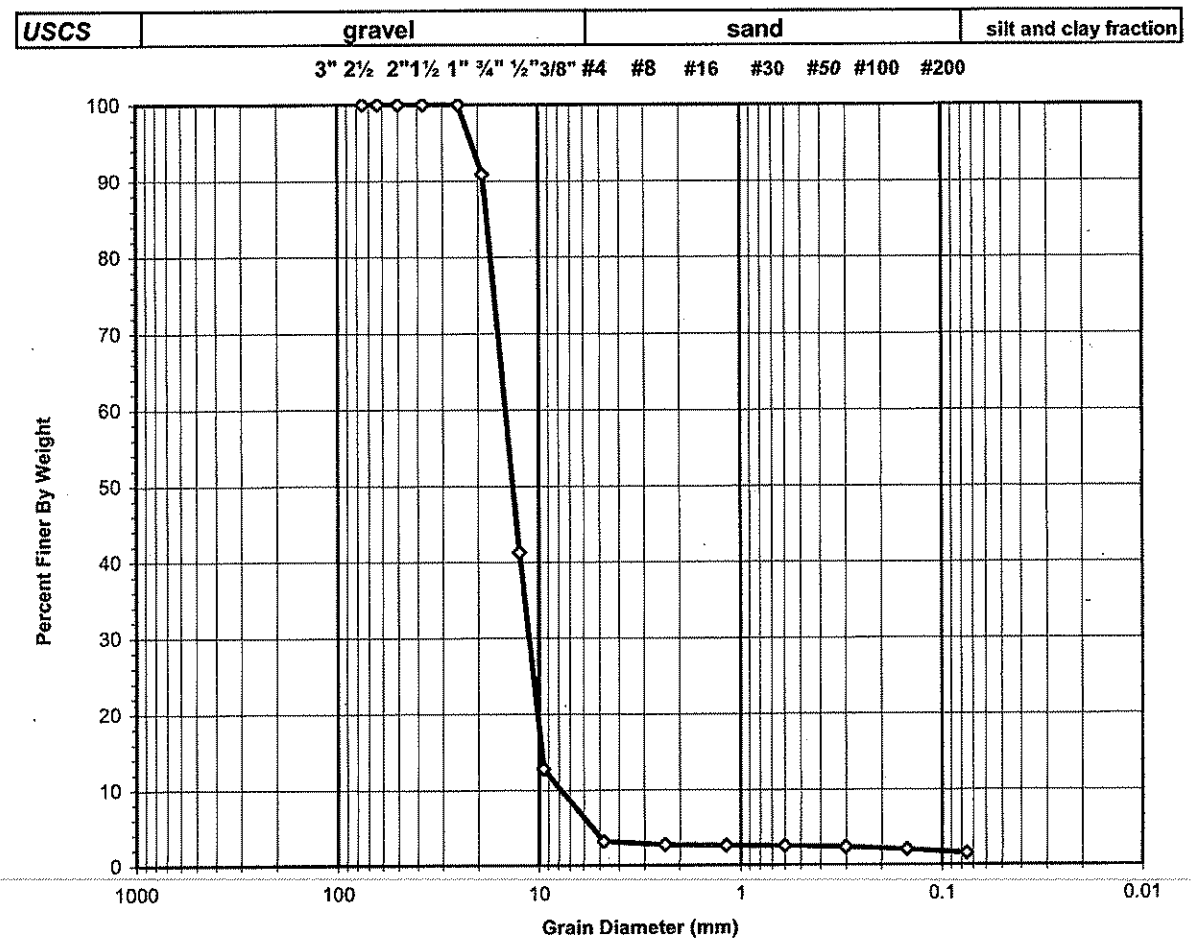
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-18	Sample No.	S#13
Lab ID	2009-666-18-02		
		Color	**GRAY**



USCS Symbol: ***gp, ASSUMED***

Fineness Modulus: ***6.81***

D60 =	14.64		
D30 =	11.22	CC =	1.11
D10 =	7.77	CU =	1.88

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By DAW Date 1/13/2010 Checked By GEM Date 1-26-10

DCN: CT-S42A DATE 08/26/05 REVISION 0 *Archive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-18-02 C136pan.xls]Sheet1*

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-18	Sample No.	S#13
Lab ID	2009-666-18-02		
		Color	**GRAY**

Tare No.	B-39	Wt. of Dry Specimen (gm)	6575.90
Wt. Tare + DS.(Pre-Wash)	7126.10	Wt. of +#200 Specimen(gm)	6476.08
Wt.Tare + Dry,Washed specimen	7063.00	Wt. of -#200 Specimen(gm)	87.59
Wt Tare	550.20		
Wt. Dry,Washed specimen	6512.80		

Total Wt. Retained After Sieving 6500.57

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	600.40	9	9	91
1/2"	12.50	3263.30	50	59	41
3/8"	9.50	1871.20	28	87	13
#4	4.75	633.30	10	97	3
#8	2.36	30.01	0	97	3
#16	1.18	8.20	0	97	3
#30	0.60	5.49	0	98	2
#50	0.30	9.69	0	98	2
#100	0.15	21.86	0	98	2
#200	0.075	32.63	0.5	98.5	1.5
Pan	-	24.49	0	99	-

Tested By DAW Date 1/13/2010 Checked By GEM Date 1-26-10

DCN: CT-S42A DATE 08/26/0[illegible] [illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-18-02 C136pan.xls]Sheet1

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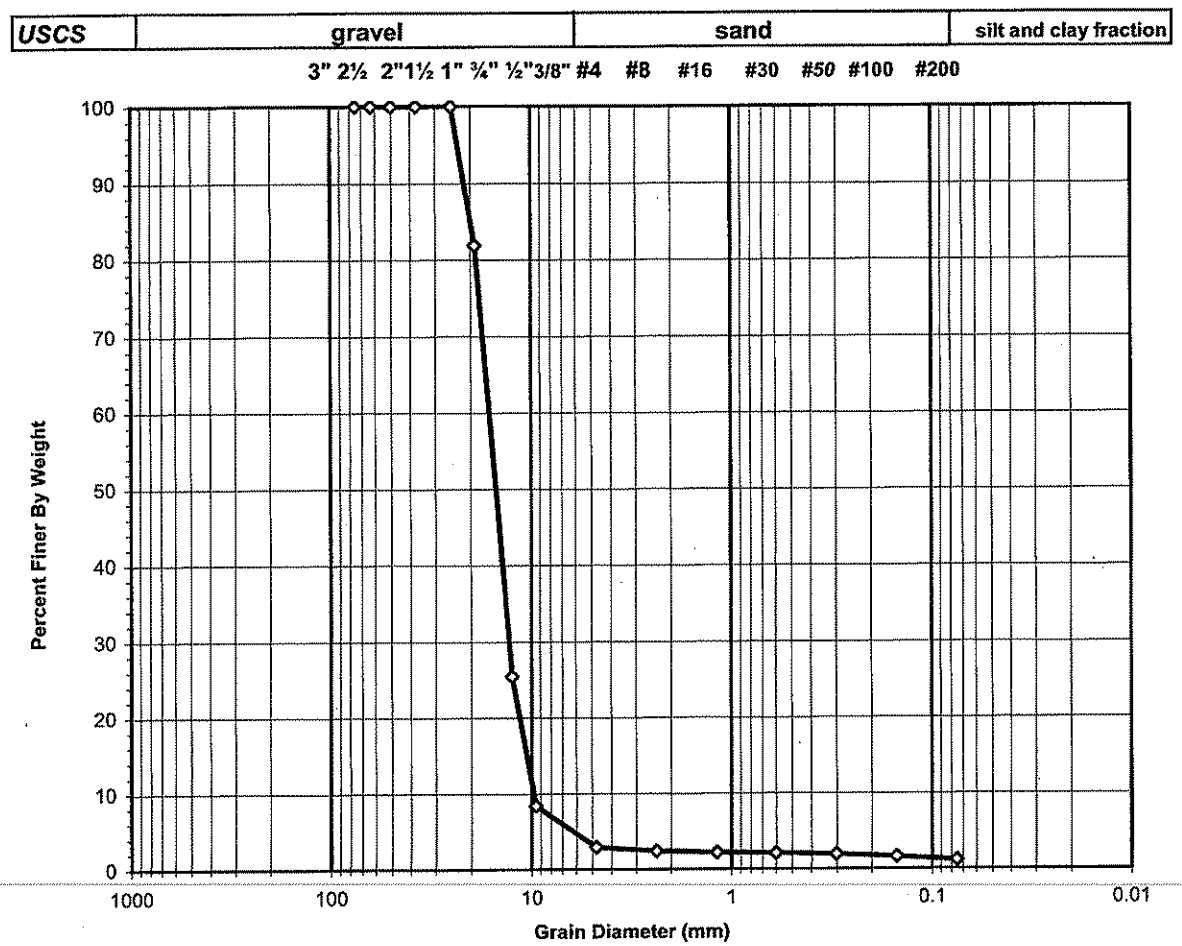
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	21,000 yd³
Project No.	2009-666-19	Sample No.	S#14
Lab ID	2009-666-19-01		
		Color	**GRAY**



USCS Symbol: ***gp, ASSUMED***

Fineness Modulus: ***6.97***

D60 =	16.15		
D30 =	12.93	CC =	1.06
D10 =	9.75	CU =	1.66

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By GEM Date 1-22-10

DCN: CT-S42A DATE 08/26/09 REVISION 1/16 \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-19-01 C136pan.xls]Sheet1

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	21,000 yd³
Project No.	2009-666-19	Sample No.	S#14
Lab ID	2009-666-19-01		
		Color	**GRAY**

Tare No.	B-39	Wt. of Dry Specimen (gm)	5476.80
Wt. Tare + DS.(Pre-Wash)	6027.10	Wt. of +#200 Specimen(gm)	5414.33
Wt.Tare + Dry,Washed specimen	5983.30	Wt. of -#200 Specimen(gm)	57.47
Wt Tare	550.30		
Wt. Dry,Washed specimen	5433.00		

Total Wt. Retained After Sieving 5428.00

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	991.00	18.1	18	82
1/2"	12.50	3092.80	56.5	75	25
3/8"	9.50	933.10	17.0	92	8
#4	4.75	301.00	5.5	97	3
#8	2.36	27.73	0.5	98	2
#16	1.18	11.00	0.2	98	2
#30	0.60	6.43	0.1	98	2
#50	0.30	8.97	0.2	98	2
#100	0.15	18.08	0.3	98	2
#200	0.075	24.22	0.4	98.9	1.1
Pan	-	13.67	0.2	99	-

Tested By SD Date 1/22/2010 Checked By GEM Date 1-22-10

DCN: CT-S42A DATE 08/26/09 [illegible] *[illegible]\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-19-01 C136pan.xls]Sheet1*

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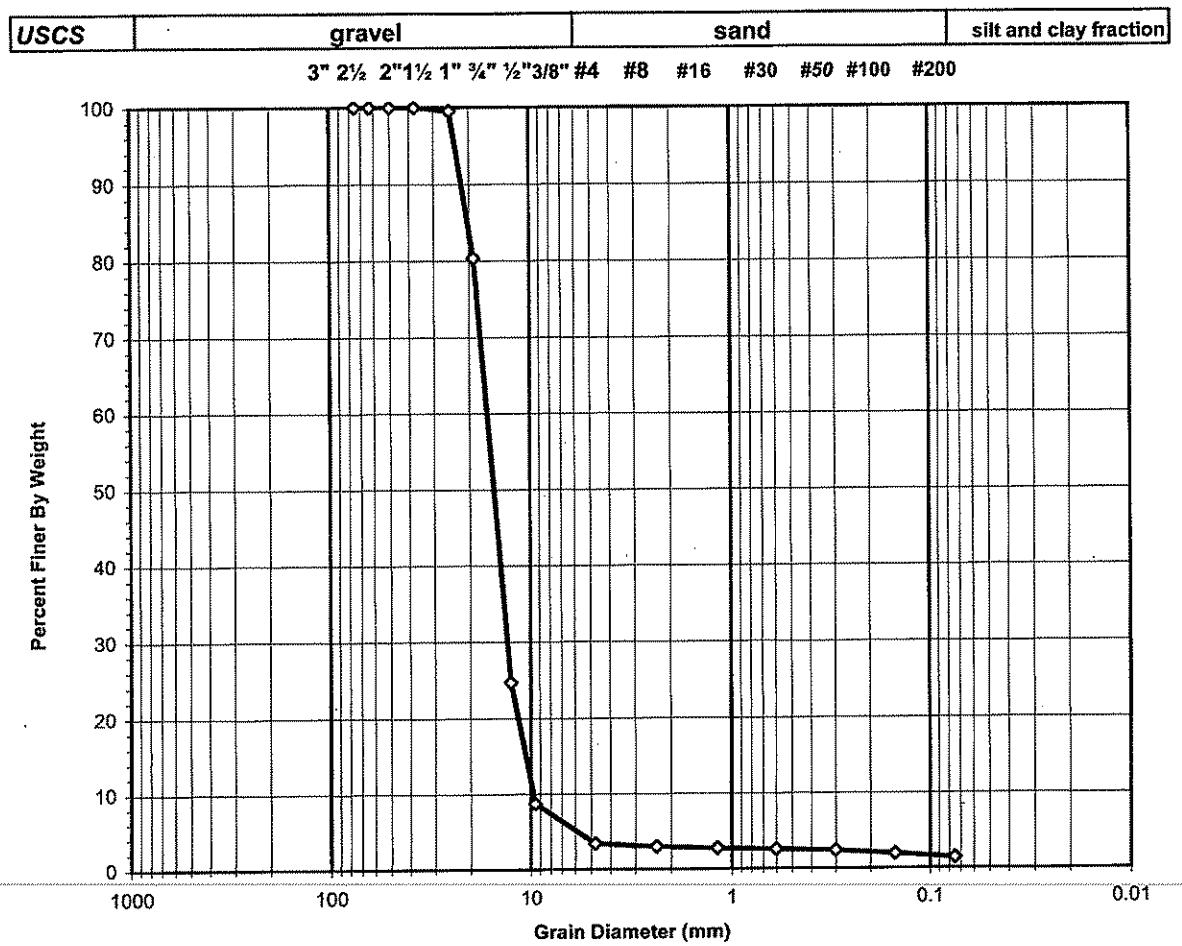
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	22,500 yd³
Project No.	2009-666-19	Sample No.	S#15
Lab ID	2009-666-19-02		
		Color	**GRAY**



USCS Symbol:	***gp, ASSUMED***	D60 =	16.30		
		D30 =	13.01	CC =	1.07
Fineness Modulus:	***6.95***	D10 =	9.71	CU =	1.68

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By sd Date 8/26/2009 Checked By GTM Date 1-22-10

DCN: CT-S42A DATE 08/26/09 REVISION 1.0 \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-19-02 C136pan.xls]Sheet1

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	22,500 yd³
Project No.	2009-666-19	Sample No.	S#15
Lab ID	2009-666-19-02		
		Color	**GRAY**

Tare No.	A-21	Wt. of Dry Specimen (gm)	5599.70
Wt. Tare + DS.(Pre-Wash)	6085.90	Wt. of +#200 Specimen(gm)	5523.80
Wt.Tare + Dry,Washed specimen	6032.60	Wt. of -#200 Specimen(gm)	70.40
Wt Tare	486.20		
Wt. Dry,Washed specimen	5546.40		

Total Wt. Retained After Sieving 5540.90

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	26.30	0	0	100
3/4"	19.00	1073.80	19.2	20	80
1/2"	12.50	3118.40	55.7	75	25
3/8"	9.50	893.70	16.0	91	9
#4	4.75	298.40	5.3	97	3
#8	2.36	24.89	0.4	97	3
#16	1.18	12.37	0.2	97	3
#30	0.60	8.82	0.2	97	3
#50	0.30	12.87	0.2	98	2
#100	0.15	24.27	0.4	98	2
#200	0.075	29.98	0.5	98.6	1.4
Pan	-	17.10	0.3	99	-

Tested By sd Date 1/22/2010 Checked By GEM Date 1-22-10

DCN: CT-S42A DATE 08/26/09 REVISION No. \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-19-02 C136pan.xlsjSheet1

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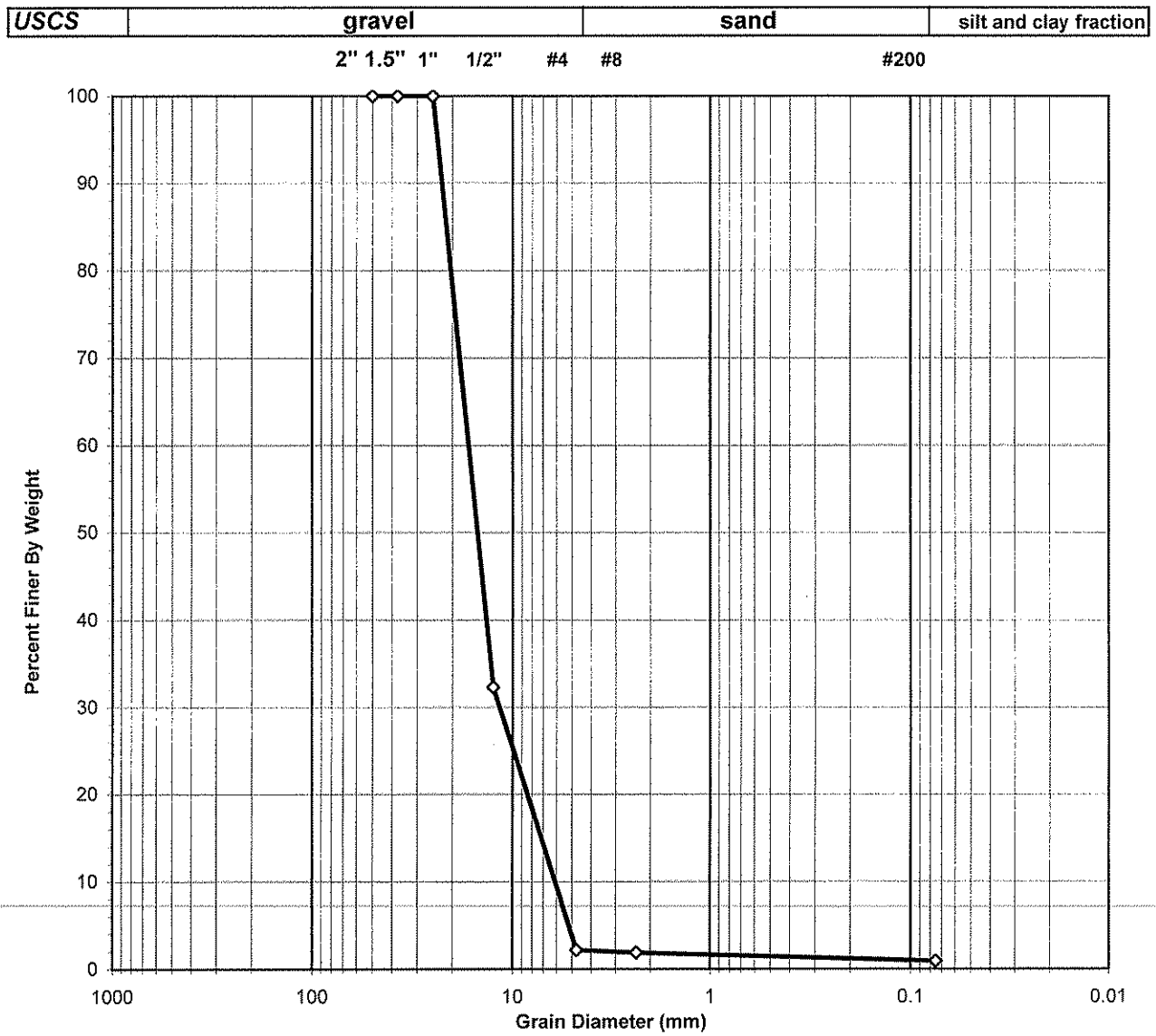
WASH SIEVE ANALYSIS
AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	AASHTO 57
Client Reference	White Oak Landfill Phase 3	Depth(ft.)	NA
Project No.	2010-034-02	Sample No.	S-16
Lab ID	2010-034-02-01		
		Color	GRAY



USCS Symbol ***GP***

USCS Classification ***POORLY GRADED GRAVEL***

Tested By MF Date 2/2/10 Checked By KB Date 2-5-10

 DCN: CT-S42I DATE 2/14/03 REVISION: 2 C:\MSOFFICE\Excel\PrintQ\[X191.XLS]Sheet1

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WASH SIEVE ANALYSIS
AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	AASHTO 57
Client Reference	White Oak Landfill Phase 3	Depth(ft.)	NA
Project No.	2010-034-02	Sample No.	S-16
Lab ID	2010-034-02-01		
		Color	**GRAY**

Tare No.	P	Wt. of Dry Specimen (gm)	10134.00
Wt. Tare + DS.(Pre-Wash)	11132.00	Wt. of +#200 Specimen(gm)	10074.00
Wt.Tare + Dry,Washed specimen	11072.00	Wt. of -#200 Specimen(gm)	60.00
Wt Tare	998.00		
Wt. Dry,Washed specimen	10074.00		

Total Wt. Retained After Sieving 10067.07

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1
Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Wt.of Material Retained (gm.)	Percent Retained	Accumulated Percent Retained	Percent Finer
2"	50	0.00	0	0	100
1 1/2"	37.5	0.00	0	0	100
1"	25	0.00	0	0	100
1/2"	12.5	6858.00	68	68	32
#4	4.75	3053.00	30	98	2
#8	2.36	30.10	0	98	2
#200	0.075	98.51	1	99	1
Pan	-	27.46	0	99 -	-

Tested By MF Date 2/2/10 Checked By MB Date 2-5-10

 DCN: CT-S42I DATE 2/14/03 REVISION: 2 C:\MSOFFICE\Excel\PrintQ\[X191.XLS]Sheet1

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RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-68 (SOP-S35) Modified

Client	JOYCE ENGINEERING	Boring No.	AASHTO 57
Client Reference	WHITE OAK LF PHASE 3	Depth(ft.)	NA
Project No.	2010-034-02	Sample No.	S-16
Lab ID	2010-034-02-01	Visual Description	GRAY STONE

Unit Weight

Wt. of Wet Material (gm)	14274
Average Length (in)	11.6
Permeameter Diameter (in)	7.5
Sample Volume (cc)	8426.9
Unit Dry Weight (gm/cc)	1.69
Unit Dry Weight (pcf)	105.2

Water Content

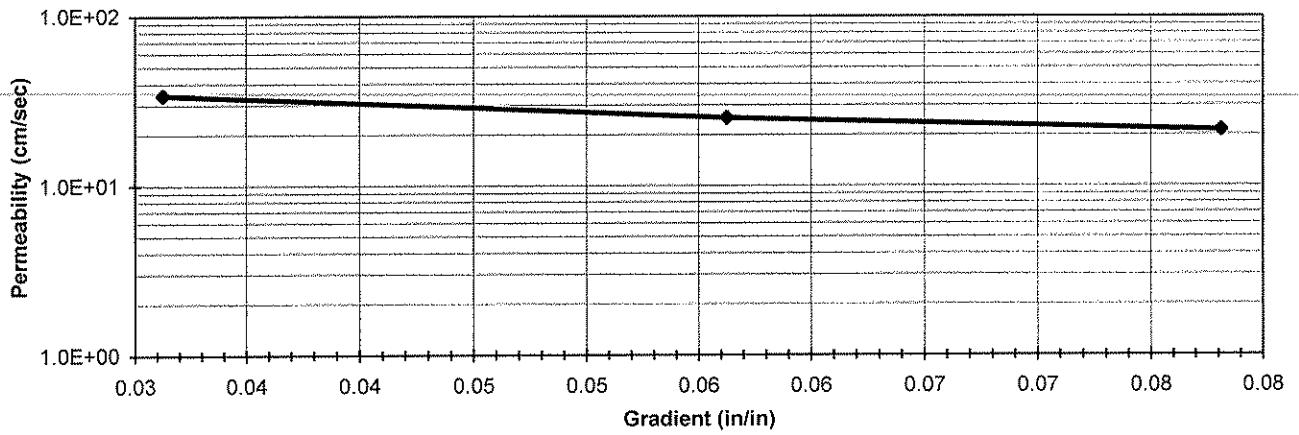
Tare Number	1723
Wt. of Tare & Wet Mat.(gm)	461.30
Wt. of Tare & Dry Mat.(gm)	459.40
Wt. of Tare (gm)	83.22
Wt. Water (gm)	1.90
Wt. of Dry Material (gm)	376.18

	Test 1	Test 2	Test 3
Piezometer Spacing (in)	***8***	***8***	***8***
Temperature (° C)	*21.3*	*21.8*	*22.2*
Temp. Correction Factor	*0.9692*	*0.9578*	*0.9487*

Water Content (%) ***0.5*** *(Measured)*

Load (psf) ***NA***

Test No.	Replicate No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collection Tube (divisions)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	1	0.25	0.03	46.0	10	14441	3.4E+01	
1	2	0.25	0.03	46.0	10	14441	3.4E+01	**3.4E+01**
1	3	0.25	0.03	46.0	10	14441	3.4E+01	
2	1	0.45	0.06	34.3	10	14441	2.5E+01	
2	2	0.45	0.06	34.3	10	14441	2.5E+01	**2.5E+01**
2	3	0.45	0.06	34.5	10	14441	2.5E+01	
3	1	0.63	0.08	28.9	10	14441	2.1E+01	
3	2	0.63	0.08	28.9	10	14441	2.1E+01	**2.1E+01**
3	3	0.63	0.08	28.8	10	14441	2.1E+01	



Tested By PC Date 2/3/10 Checked By KB Date 2-5-10

 DCN: CT-S35 DATE: 12/30/03 REVISION: 6 *\\Geoserver\data drive\PATS SOIL\[2010-034-02-01.XLS]Sheet1*

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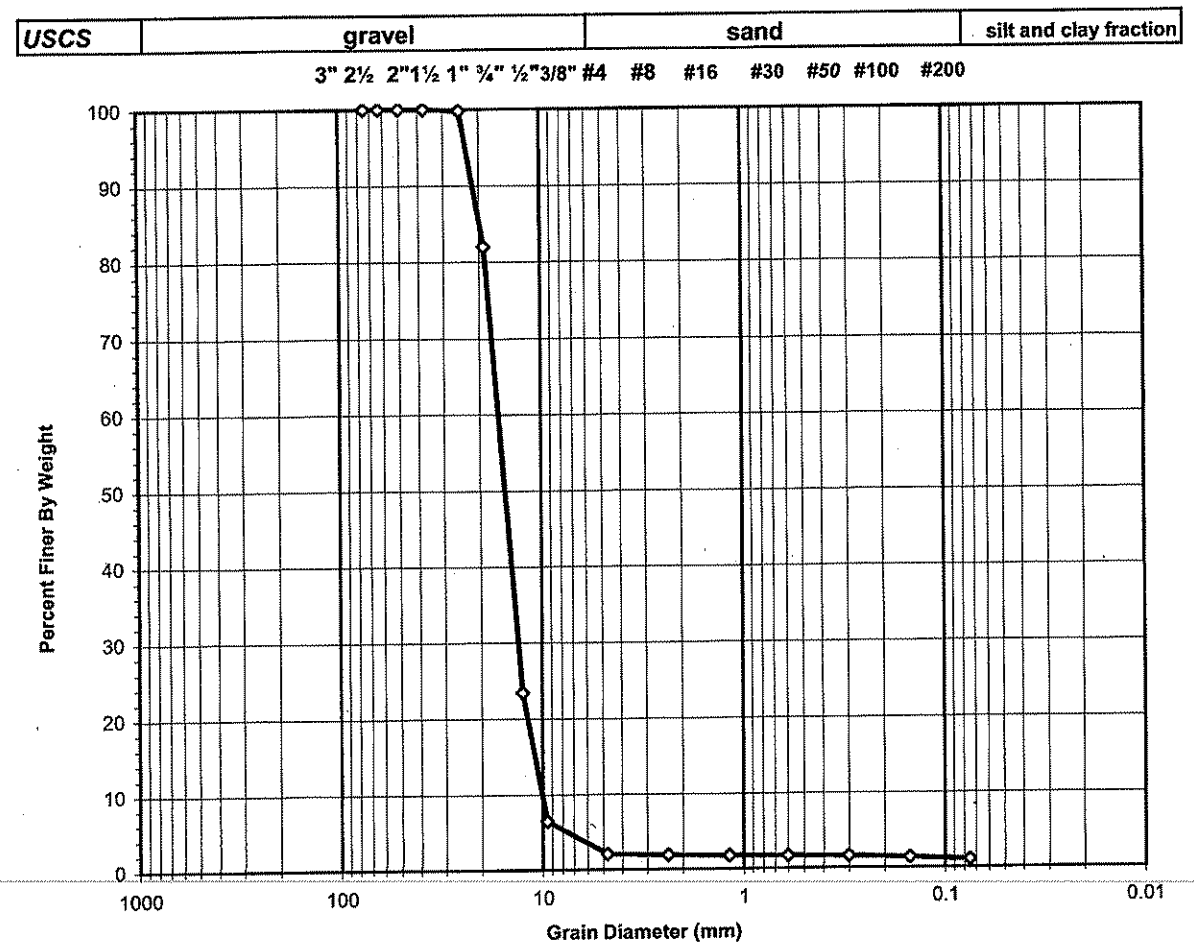
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-20	Sample No.	SAMPLE 17
Lab ID	2009-666-20-01		
		Color	**GRAY**



USCS Symbol:	***gp, ASSUMED***	D60 =	16.24		
		D30 =	13.10	CC =	1.05
Fineness Modulus:	***7.01***	D10 =	10.07	CU =	1.61

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By GAM Date 2-8-10

DCN: CT-S42A DATE 08/26/09 REVISION 0 *\\Server\Active\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-20-01 C136pan.xls]Sheet1*

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ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-20	Sample No.	SAMPLE 17
Lab ID	2009-666-20-01		
		Color	**GRAY**

Tare No.	A-21	Wt. of Dry Specimen (gm)	10475.70
Wt. Tare + DS.(Pre-Wash)	10961.60	Wt. of +#200 Specimen(gm)	10368.39
Wt.Tare + Dry,Washed specimen	10889.20	Wt. of -#200 Specimen(gm)	91.15
Wt Tare	485.90		
Wt. Dry,Washed specimen	10403.30		

Total Wt. Retained After Sieving 10387.14

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	22.70	0	0	100
3/4"	19.00	1865.60	18	18	82
1/2"	12.50	6133.90	59	77	23
3/8"	9.50	1780.90	17	94	6
#4	4.75	457.20	4	98	2
#8	2.36	19.69	0	98	2
#16	1.18	12.56	0	98	2
#30	0.60	8.41	0	98	2
#50	0.30	10.82	0	98	2
#100	0.15	22.71	0	99	1
#200	0.075	33.90	0.3	99.0	1.0
Pan	-	18.75	0	99	-

Tested By SD Date 2/8/2010 Checked By GEM Date 2-8-10

DCN: CT-S42A DATE 08/26/09 [illegible] *ive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-20-01 C136pan.xls]Sheet1*

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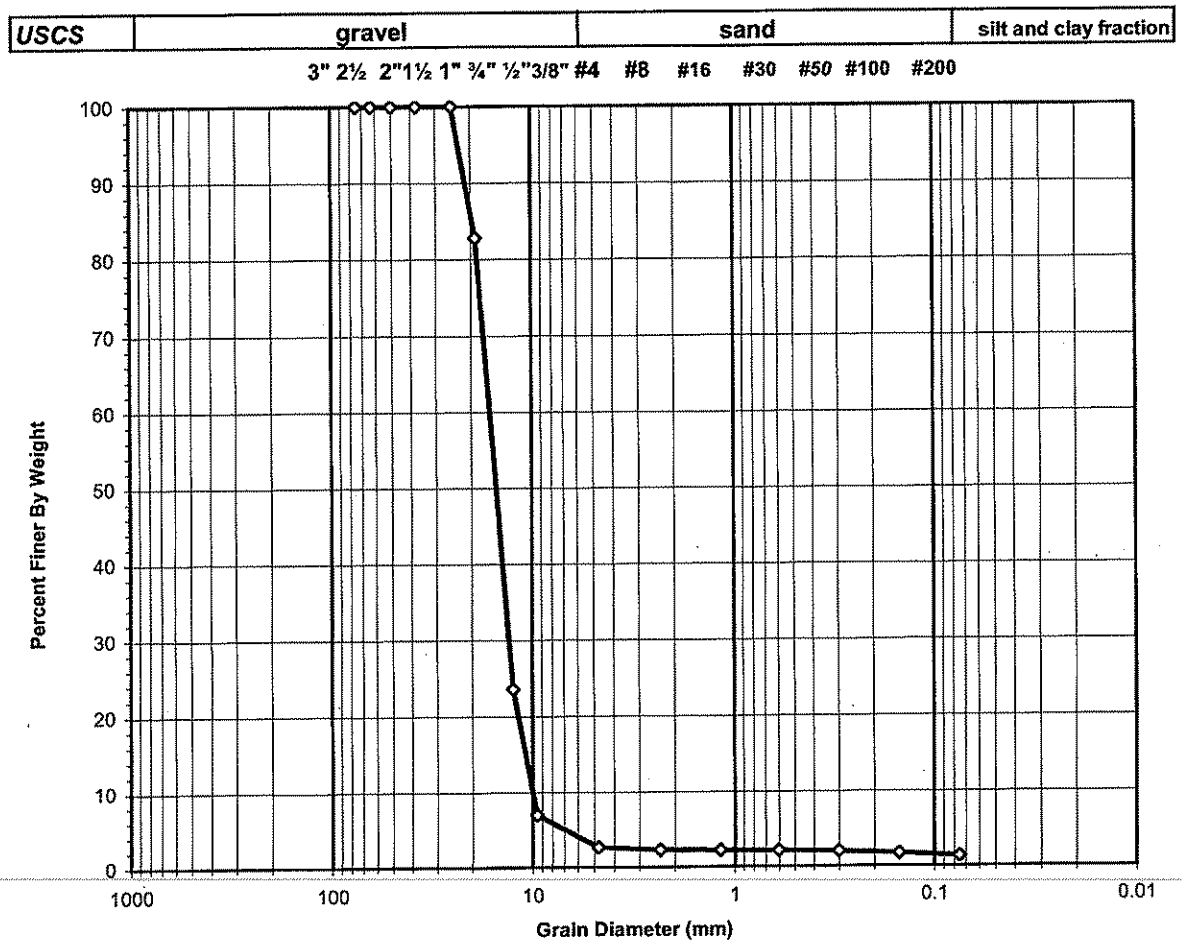
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-20	Sample No.	SAMPLE 18
Lab ID	2009-666-20-02		
		Color	**GRAY**



USCS Symbol: ***gp, ASSUMED***

Fineness Modulus: ***6.97***

D60 =	16.17		
D30 =	13.08	CC =	1.06
D10 =	9.99	CU =	1.62

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 8/26/2009 Checked By GEM Date 2-8-10

DCN: CT-S42A DATE 08/26/09 REVISION 0 *drive\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-20-02 C136pan.xls]Sheet1*

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WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-20	Sample No.	SAMPLE 18
Lab ID	2009-666-20-02		
		Color	**GRAY**

Tare No.	B-39	Wt. of Dry Specimen (gm)	4976.18
Wt. Tare + DS.(Pre-Wash)	5526.30	Wt. of +#200 Specimen(gm)	4912.35
Wt.Tare + Dry,Washed specimen	5481.20	Wt. of -#200 Specimen(gm)	55.50
Wt Tare	550.12		
Wt. Dry,Washed specimen	4931.08		

Total Wt. Retained After Sieving 4922.75

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.2

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	0.00	0	0	100
3/4"	19.00	855.10	17	17	83
1/2"	12.50	2950.20	59	76	24
3/8"	9.50	825.40	17	93	7
#4	4.75	214.60	4	97	3
#8	2.36	18.35	0	98	2
#16	1.18	4.76	0	98	2
#30	0.60	3.80	0	98	2
#50	0.30	6.31	0	98	2
#100	0.15	14.02	0	98	2
#200	0.075	19.81	0.4	98.7	1.3
Pan	-	10.40	0	99	-

Tested By SD Date 2/8/2010 Checked By GEM Date 2-8-10

DCN: CT-S42A DATE 08/26/05 REV/ISSUE 01 *I:\Active\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-20-02 C136pan.xls]Sheet1*

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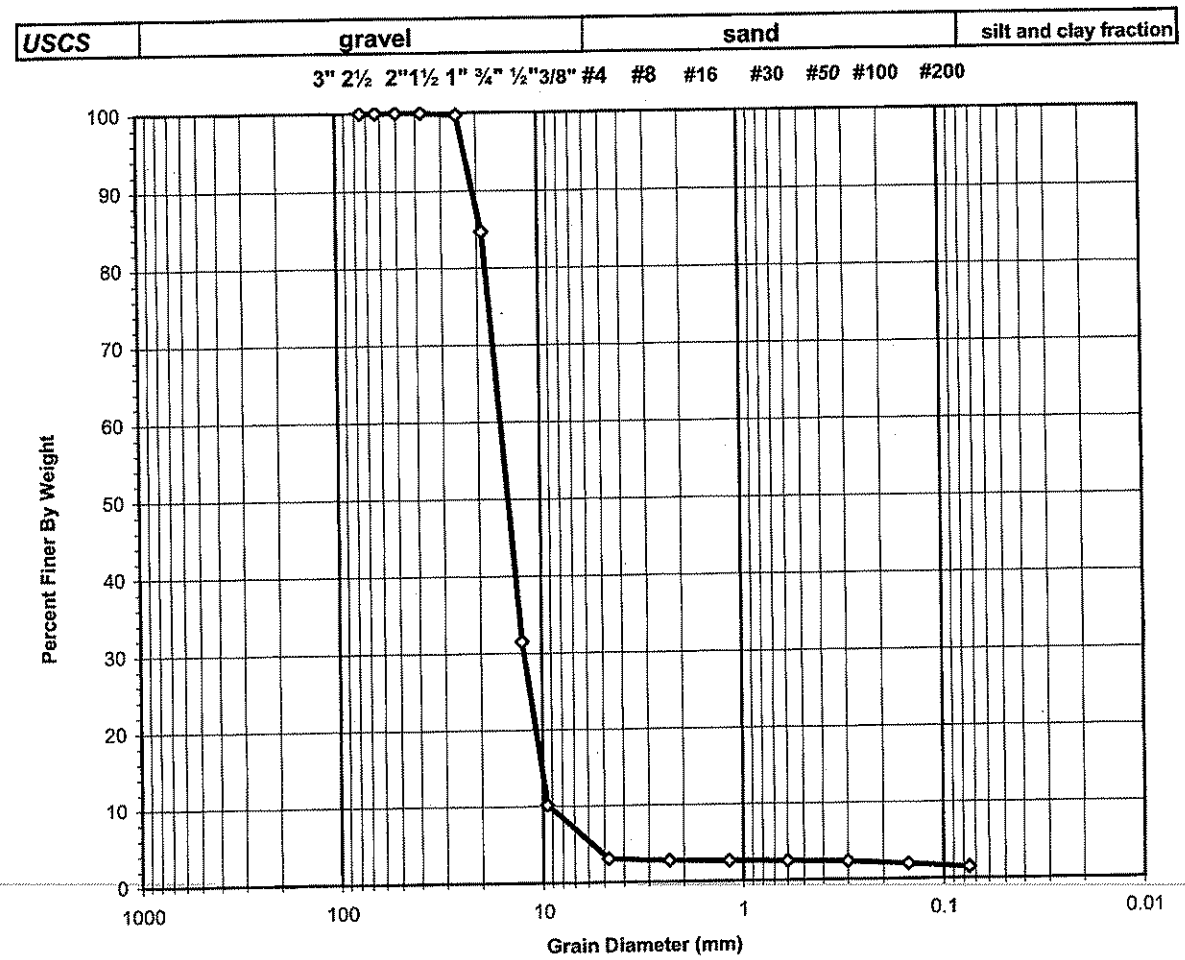
WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-21	Sample No.	SAMPLE 19
Lab ID	2009-666-21-01		
		Color	**GRAY**



USCS Symbol:	***gp, ASSUMED***	D60 =	15.64		
		D30 =	12.26	CC =	1.03
Fineness Modulus:	***6.90***	D10 =	9.34	CU =	1.67

USCS Classification: ***POORLY GRADED GRAVEL***

Tested By SD Date 2/8/2010 Checked By [illegible] Date 2-18-10

DCN: CT-S42A DATE 08/25/09 REVISION 14 \2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-20-01 C136pan.xls]Sheet1

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INTEGRITY IN TESTING

WASH SIEVE ANALYSIS OF AGGREGATES
ASTM C117-04 / C136-06

Client	JOYCE ENGINEERING, INC.	Boring No.	NA
Client Reference	WHITE OAK MSW LF PH III	Depth(ft.)	NA
Project No.	2009-666-21	Sample No.	SAMPLE 19
Lab ID	2009-666-21-01		
		Color	**GRAY**

Tare No.	A-21	Wt. of Dry Specimen (gm)	12594.26
Wt. Tare + DS.(Pre-Wash)	13079.86	Wt. of +#200 Specimen(gm)	12410.59
Wt.Tare + Dry,Washed specimen	12945.60	Wt. of -#200 Specimen(gm)	165.16
Wt Tare	485.60		
Wt. Dry,Washed specimen	12460.00		

Total Wt. Retained After Sieving 12441.49

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Weight Retained (gm.)	Percent Retained	Accumulated Percent Retained	**Percent Finer**
3"	75	0.00	0	0	100
2 1/2"	63	0.00	0	0	100
2"	50	0.00	0	0	100
1 1/2"	37.50	0.00	0	0	100
1"	25.00	36.20	0	0	100
3/4"	19.00	1885.40	15	15	85
1/2"	12.50	6702.80	53	68	32
3/8"	9.50	2689.00	21	90	10
#4	4.75	892.00	7	97	3
#8	2.36	42.59	0	97	3
#16	1.18	16.55	0	97	3
#30	0.60	13.44	0	97	3
#50	0.30	21.42	0	98	2
#100	0.15	46.55	0	98	2
#200	0.075	64.64	0.5	98.5	1.5
Pan	-	30.90	0	99	-

Tested By SD Date 2/8/2010 Checked By [illegible] Date 2-18-10

DCN: CT-S42A DATE 08/26/09 REVISION 1 \\e\2009 PROJECTS\2009-666 JOYCE WHITE OAK\[2009-666-20-01 C136pan.xls]Sheet1

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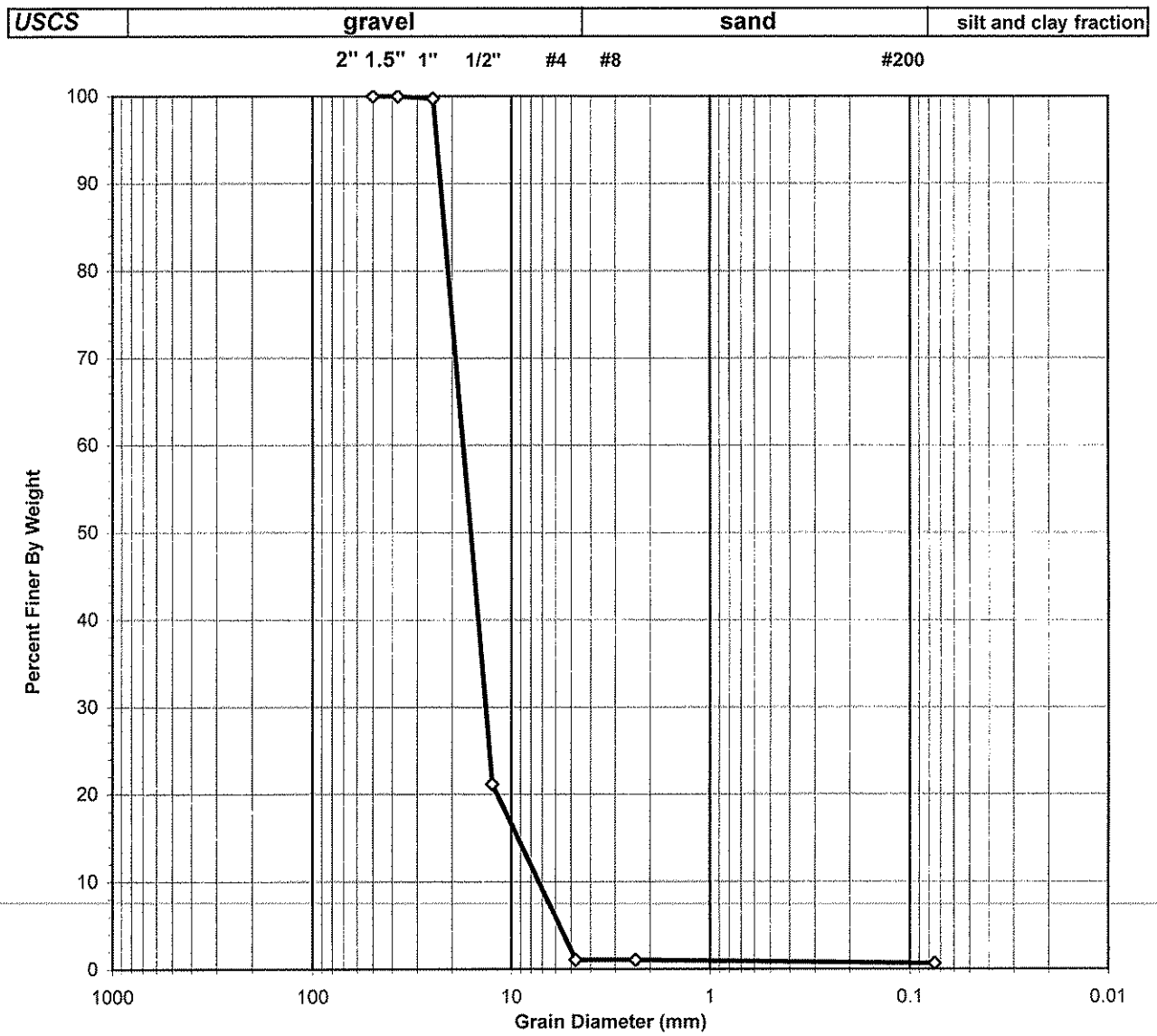
WASH SIEVE ANALYSIS
AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	AASHTO #57
Client Reference	WHITE OAK LANDFILL PHASE 3	Depth(ft.)	NA
Project No.	2010-034-03	Sample No.	S-20
Lab ID	2010-034-03-01		
		Color	GRAY



USCS Symbol ***GP***

USCS Classification ***POORLY GRADED GRAVEL***

Tested By MF Date 4/1/10 Checked By KB Date 4-1-10

 DCN: CT-S42I DATE 2/14/03 REVISION: 2 C:\MSOFFICE\Excel\PrintQ\[X965.XLS]Sheet1

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WASH SIEVE ANALYSIS
AASHTO # 57 (ASTM C136-06)

Client	JOYCE ENGINEERING	Boring No.	AASHTO #57
Client Reference	WHITE OAK LANDFILL PHASE 3	Depth(ft.)	NA
Project No.	2010-034-03	Sample No.	S-20
Lab ID	2010-034-03-01		
		Color	**GRAY**

Tare No.	X	Wt. of Dry Specimen (gm)	10327.00
Wt. Tare + DS.(Pre-Wash)	11320.00	Wt. of +#200 Specimen(gm)	10292.00
Wt.Tare + Dry,Washed specimen	11285.00	Wt. of -#200 Specimen(gm)	35.00
Wt Tare	993.00		
Wt. Dry,Washed specimen	10292.00		

Total Wt. Retained After Sieving 10286.39

% Difference Wt. Dry,Washed specimen vs Total Wt. Retained After Sieving 0.1

Note: % Difference must not be more than 0.3

Sieve	Sieve Opening (mm)	Wt.of Material Retained (gm.)	Percent Retained	Accumulated Percent Retained		Percent Finer
2"	50	0.00	0	0		100
1 1/2"	37.5	0.00	0	0		100
1"	25	25.93	0	0		100
1/2"	12.5	8113.00	79	79		21
#4	4.75	2077.00	20	99		1
#8	2.36	2.78	0	99		1
#200	0.075	41.13	0	99		1
Pan	-	26.55	0	100	-	-

Tested By MF Date 4/1/10 Checked By KB Date 4-1-10

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RIGID WALL CONSTANT HEAD PERMEABILITY

ASTM D 2434-68 (SOP-S35) Modified

Client	JOYCE ENGINEERING, INC.	Boring No.	AASHTO #57
Client Reference	WHITE OAK LANDFILL PHASE 3	Depth(ft.)	NA
Project No.	2010-034-03	Sample No.	S-20
Lab ID	2010-034-03-01	Visual Description	GRAY STONE

Unit Weight

Wt. of Wet Material (gm)	13557
Average Length (in)	11.6
Permeameter Diameter (in)	7.5
Sample Volume (cc)	8426.9
Unit Dry Weight (gm/cc)	1.60
Unit Dry Weight (pcf)	100.0

Water Content

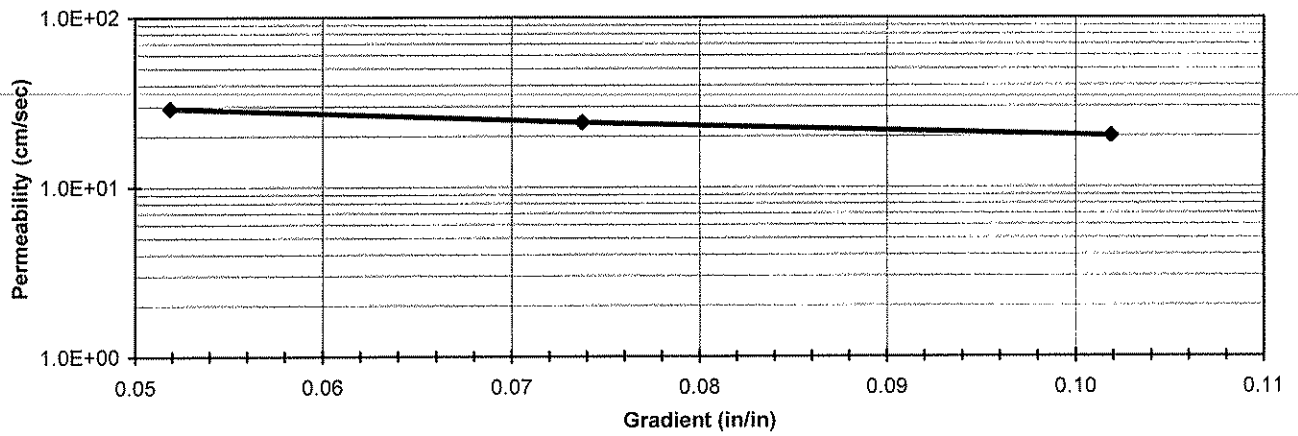
Tare Number	565
Wt. of Tare & Wet Mat.(gm)	420.80
Wt. of Tare & Dry Mat.(gm)	419.40
Wt. of Tare (gm)	82.71
Wt. Water (gm)	1.40
Wt. of Dry Material (gm)	336.69

	Test 1	Test 2	Test 3
Piezometer Spacing (in)	***8***	***8***	***8***
Temperature (° C)	*21.2*	*22.0*	*22.5*
Temp. Correction Factor	*0.9715*	*0.9532*	*0.9421*

Water Content (%) ***0.4***
(Measured)

Load (psf) ***NA***

Test No.	Replicate No.	Head (in)	Gradient (in/in)	Elapsed Time (sec)	Collection Tube (divisions)	Collected Volume (cc)	Permeability 20° C (cm/s)	Average Permeability (cm/s)
1	1	0.38	0.05	36.1	10	14441	2.9E+01	
1	2	0.38	0.05	36.3	10	14441	2.9E+01	**2.9E+01**
1	3	0.38	0.05	36.1	10	14441	2.9E+01	
2	1	0.55	0.07	29.1	10	14441	2.4E+01	
2	2	0.55	0.07	29.2	10	14441	2.4E+01	**2.4E+01**
2	3	0.55	0.07	29.2	10	14441	2.4E+01	
3	1	0.77	0.10	24.5	10	14441	2.0E+01	
3	2	0.77	0.10	24.5	10	14441	2.0E+01	**2.0E+01**
3	3	0.77	0.10	24.7	10	14441	2.0E+01	



Tested By PC Date 4/1/10 Checked By KB Date 4-1-10

 DCN: CT-S35 DATE: 12/30/03 REVISION: 6 *\\Geoserver\data drive\PATS SOIL\[2010-034-03-01.XLS]Sheet1*

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Appendix II

Appendix II – Geosynthetic Clay Liner

Appendix II A – Manufacturer Certifications

Date: 10/20/2009
Purchase Order: P7005
ORDER NUMBERS: 025559501, 025559502, 025559503, 025559504, 025559505

Kennedy Garber
Hallaton

Sparks, MD 21152
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559501, 025559502, 025559503, 025559504, 025559505
PREPARED FOR: Hallaton

CONTENTS:

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

PRODUCT CERTIFICATIONS

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559501, 025559502, 025559503, 025559504, 025559505
PREPARED FOR: Hallaton

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5.0E-9 cm/s Max
ASTM D 5887	GCL Index Flux	Weekly	1.0E-8 m3/m2/s Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using
ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 025559501

GCL								Geotextiles				Clay
CV-BENTOMAT ST								N/W-WHITE			WOVEN	CV-CG 50
Order	**GCL Lot #**	**GCL Roll #**	**Length**	**Width**	**weight**	**sq ft**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
025559505	200942CV	9136	150	15	2614	2250	9134	200941CV	00003945	00003945	2020351536	929877B
025559501	200942CV	9142	150	15	2626	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559501	200942CV	9143	150	15	2624	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559505	200942CV	9148	150	15	2618	2250	9134	200941CV	00004001	00003999	2020398989	929879A
025559505	200942CV	9151	150	15	2628	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559501	200942CV	9156	150	15	2642	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559505	200942CV	9166	150	15	2638	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559502	200942CV	9167	150	15	2630	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559502	200942CV	9191	150	15	2626	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559502	200942CV	9193	150	15	2664	2250	9193	200942CV	00004138	00004138	2020332136	929879B
025559502	200942CV	9209	150	15	2636	2250	9208	200942CV	00004098	00004090	WEA011909-7	929879B
025559505	200942CV	9210	150	15	2636	2250	9208	200942CV	00004098	00004090	WEA011909-7	929879B
025559505	200942CV	9211	150	15	2640	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
025559502	200942CV	9212	150	15	2652	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
025559502	200942CV	9213	150	15	2644	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
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025559502	200942CV	9219	150	15	2644	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B
025559501	200942CV	9221	150	15	2667	2250	9208	200942CV	00004135	00004128	WEA011621-19	929879B
025559502	200942CV	9225	150	15	2650	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559502	200942CV	9227	150	15	2642	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
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025559501	200942CV	9239	150	15	2654	2250	9237	200942CV	00004096	00004090	WEA011909-4	929880A
025559502	200942CV	9242	150	15	2728	2250	9242	200942CV	00004096	00004090	WEA011909-4	929880A
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025559502	200942CV	9252	150	15	2730	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559502	200942CV	9256	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
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025559501	200942CV	9258	150	15	2658	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
025559501	200942CV	9260	150	15	2642	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
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025559501	200942CV	9279	150	15	2644	2250	9266	200938CV	00003629	00003629	WEA011909-5	929880A
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025559501	200942CV	9284	150	15	2646	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559502	200942CV	9285	150	15	2646	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
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025559505	200942CV	9288	150	15	2642	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
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025559504	200942CV	9314	150	15	2584	2250	9310	200938CV	00003596	00003589	WEA011621-21	929880B
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025559504	200942CV	9323	150	15	2590	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B
025559503	200942CV	9324	150	15	2582	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B
025559503	200942CV	9326	150	15	2586	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
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025559503	200942CV	9329	150	15	2588	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9330	150	15	2574	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9331	150	15	2572	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9332	150	15	2570	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9333	150	15	2584	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9334	150	15	2578	2250	9327	200941CV	00004000	00003999	WEA011909-8	929880B
025559504	200942CV	9335	150	15	2578	2250	9327	200941CV	00003922	00003918	WEA011909-8	929880B
025559504	200942CV	9336	150	15	2584	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9337	150	15	2568	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9338	150	15	2580	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9339	150	15	2580	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9340	150	15	2590	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
					Total sq ft:	**189000**	Total Number of Rolls Certified: **84**					

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 025559501 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
		ASTM Test Method:	D 5993	D 6768	D 6496
		Required Value:	0.75 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
CV-BENTOMAT ST	200942CV	9134	0.82	61.2	6.5
CV-BENTOMAT ST	200942CV	9149	0.86	61.2	6.5
CV-BENTOMAT ST	200942CV	9164	0.80	61.2	6.2
CV-BENTOMAT ST	200942CV	9178	0.87	61.2	5.7
CV-BENTOMAT ST	200942CV	9193	0.85	61.2	4.3
CV-BENTOMAT ST	200942CV	9208	0.84	61.2	4.4
CV-BENTOMAT ST	200942CV	9222	0.85	86.1	7.5
CV-BENTOMAT ST	200942CV	9237	0.83	86.1	6.1
CV-BENTOMAT ST	200942CV	9242	0.85	86.1	5.0
CV-BENTOMAT ST	200942CV	9252	0.87	86.1	4.7
CV-BENTOMAT ST	200942CV	9266	0.87	86.1	4.4
CV-BENTOMAT ST	200942CV	9281	0.89	86.1	10.4
CV-BENTOMAT ST	200942CV	9296	0.86	86.1	10.6
CV-BENTOMAT ST	200942CV	9310	0.83	52.4	8.3
CV-BENTOMAT ST	200942CV	9327	0.84	52.4	8.6

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 025559501

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
929878A	9.60	31.00	16.40
929877B	10.40	26.00	15.60
929879A	9.80	29.00	17.00
929879B	9.50	31.00	15.60
929880A	10.30	31.00	16.80
929880B	10.10	30.00	16.40

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 025559501 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 82TEX	2020332136	3.5	218.5
PPX 82TEX	2020351536	3.4	206.4
PPX 82TEX	2020363400	3.5	175.9
PPX 82TEX	2020398989	3.5	200.5
MTX 1213	WEA011621-19	3.4	156.6
MTX 1213	WEA011621-20	3.4	156.6
MTX 1213	WEA011621-21	3.4	156.6
MTX 1213	WEA011909-1	3.6	162.2
MTX 1213	WEA011909-4	3.6	162.2
MTX 1213	WEA011909-5	3.5	155.3
MTX 1213	WEA011909-7	3.5	155.3
MTX 1213	WEA011909-8	3.5	155.3

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
CV-NON-WOVEN	00003589	6.5	48.7
CV-NON-WOVEN	00003629	6.9	49.6
CV-NON-WOVEN	00003764	6.8	45.8
CV-NON-WOVEN	00003804	6.8	45.1
CV-NON-WOVEN	00003854	7.0	55.2
CV-NON-WOVEN	00003918	6.7	47.3
CV-NON-WOVEN	00003945	6.4	46.4
CV-NON-WOVEN	00003999	6.2	41.9
CV-NON-WOVEN	00004090	6.3	34.5
CV-NON-WOVEN	00004128	6.3	44.6
CV-NON-WOVEN	00004138	6.8	41.0
CV-NON-WOVEN	00004163	6.5	37.6

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

Date: 10/21/2009
Purchase Order: P7005
ORDER NUMBERS: 025559506, 025559510, 025559511, 025559512

Kennedy Garber
Hallaton

Sparks, MD 21152
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559506, 025559510, 025559511, 025559512
PREPARED FOR: Hallaton

CONTENTS:

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

PRODUCT CERTIFICATIONS

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559506, 025559510, 025559511, 025559512
PREPARED FOR: Hallaton

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5.0E-9 cm/s Max
ASTM D 5887	GCL Index Flux	Weekly	1.0E-8 m3/m2/s Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using
ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 025559506

GCL								Geotextiles				Clay
CV-BENTOMAT ST								N/W-WHITE			WOVEN	CV-CG 50
Order	**GCL Lot #**	**GCL Roll #**	**Length**	**Width**	**weight**	**sq ft**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
025559512	200942CV	9146	150	15	2616	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559512	200942CV	9147	150	15	2624	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559510	200942CV	9153	150	15	2632	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559510	200942CV	9155	150	15	2632	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559511	200942CV	9162	150	15	2636	2250	9149	200941CV	00003924	00003918	2020398989	929879A
025559511	200942CV	9168	150	15	2620	2250	9164	200941CV	00003924	00003918	2020363400	929879A
025559510	200942CV	9169	150	15	2650	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9171	150	15	2644	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9172	150	15	2632	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9173	150	15	2642	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9174	150	15	2636	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9175	150	15	2642	2250	9164	200941CV	00003948	00003945	2020363400	929879A
025559511	200942CV	9176	150	15	2648	2250	9164	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9177	150	15	2640	2250	9164	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9179	150	15	2667	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9180	150	15	2630	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9181	150	15	2642	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9182	150	15	2636	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559510	200942CV	9196	150	15	2634	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559510	200942CV	9197	150	15	2640	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559511	200942CV	9198	150	15	2654	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559512	200942CV	9199	150	15	2642	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559511	200942CV	9200	150	15	2651	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559511	200942CV	9201	150	15	2640	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559512	200942CV	9202	150	15	2634	2250	9193	200942CV	00004136	00004128	WEA011909-7	929879B
025559512	200942CV	9203	150	15	2648	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9204	150	15	2634	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9205	150	15	2648	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9206	150	15	2636	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9208	150	15	2672	2250	9208	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9216	150	15	2642	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
025559512	200942CV	9217	150	15	2650	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B
025559512	200942CV	9218	150	15	2644	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B
025559510	200942CV	9220	150	15	2644	2250	9208	200942CV	00004135	00004128	WEA011621-19	929879B
025559510	200942CV	9223	150	15	2654	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559511	200942CV	9224	150	15	2646	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559511	200942CV	9226	150	15	2626	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559510	200942CV	9229	150	15	2642	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559506	200942CV	9241	150	15	2616	2250	9237	200942CV	00004096	00004090	WEA011909-4	929880A
025559506	200942CV	9244	150	15	2646	2250	9242	200942CV	00004096	00004090	WEA011909-4	929880A
025559510	200942CV	9247	150	15	2642	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559510	200942CV	9248	150	15	2652	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559510	200942CV	9249	150	15	2652	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559511	200942CV	9250	150	15	2668	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559511	200942CV	9251	150	15	2668	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559506	200942CV	9253	150	15	2646	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559506	200942CV	9254	150	15	2646	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559506	200942CV	9255	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559506	200942CV	9259	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
025559506	200942CV	9263	150	15	2644	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559506	200942CV	9264	150	15	2650	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559510	200942CV	9266	150	15	2706	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559510	200942CV	9271	150	15	2640	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559510	200942CV	9272	150	15	2620	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559506	200942CV	9274	150	15	2636	2250	9266	200938CV	00003629	00003629	WEA011621-20	929880A
025559511	200942CV	9275	150	15	2624	2250	9266	200938CV	00003629	00003629	WEA011621-20	929880A
025559506	200942CV	9276	150	15	2628	2250	9266	200938CV	00003629	00003629	WEA011909-5	929880A
025559506	200942CV	9282	150	15	2644	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559506	200942CV	9283	150	15	2650	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559510	200942CV	9291	150	15	2640	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559510	200942CV	9295	150	15	2610	2250	9281	200942CV	00004097	00004090	WEA011909-5	929880B
025559510	200942CV	9297	150	15	2600	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559511	200942CV	9299	150	15	2598	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559506	200942CV	9300	150	15	2592	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559506	200942CV	9302	150	15	2600	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559506	200942CV	9303	150	15	2600	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559506	200942CV	9305	150	15	2598	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559506	200942CV	9306	150	15	2610	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
					Total sq ft:	**153000**					Total Number of Rolls Certified: **68**	

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 025559506 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
		ASTM Test Method:	D 5993	D 6768	D 6496
		Required Value:	0.75 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
CV-BENTOMAT ST	200942CV	9134	0.82	61.2	6.5
CV-BENTOMAT ST	200942CV	9149	0.86	61.2	6.5
CV-BENTOMAT ST	200942CV	9164	0.80	61.2	6.2
CV-BENTOMAT ST	200942CV	9178	0.87	61.2	5.7
CV-BENTOMAT ST	200942CV	9193	0.85	61.2	4.3
CV-BENTOMAT ST	200942CV	9208	0.84	61.2	4.4
CV-BENTOMAT ST	200942CV	9222	0.85	86.1	7.5
CV-BENTOMAT ST	200942CV	9237	0.83	86.1	6.1
CV-BENTOMAT ST	200942CV	9242	0.85	86.1	5.0
CV-BENTOMAT ST	200942CV	9252	0.87	86.1	4.7
CV-BENTOMAT ST	200942CV	9266	0.87	86.1	4.4
CV-BENTOMAT ST	200942CV	9281	0.89	86.1	10.4
CV-BENTOMAT ST	200942CV	9296	0.86	86.1	10.6

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 025559506

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
929879A	9.80	29.00	17.00
929879B	9.50	31.00	15.60
929880A	10.30	31.00	16.80
929880B	10.10	30.00	16.40

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 025559506 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 82TEX	2020332136	3.5	218.5
PPX 82TEX	2020363400	3.5	175.9
PPX 82TEX	2020398989	3.5	200.5
MTX 1213	WEA011621-19	3.4	156.6
MTX 1213	WEA011621-20	3.4	156.6
MTX 1213	WEA011909-1	3.6	162.2
MTX 1213	WEA011909-4	3.6	162.2
MTX 1213	WEA011909-5	3.5	155.3
MTX 1213	WEA011909-7	3.5	155.3

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
CV-NON-WOVEN	00003629	6.9	49.6
CV-NON-WOVEN	00003764	6.8	45.8
CV-NON-WOVEN	00003804	6.8	45.1
CV-NON-WOVEN	00003854	7.0	55.2
CV-NON-WOVEN	00003918	6.7	47.3
CV-NON-WOVEN	00003945	6.4	46.4
CV-NON-WOVEN	00003999	6.2	41.9
CV-NON-WOVEN	00004033	6.5	33.4
CV-NON-WOVEN	00004090	6.3	34.5
CV-NON-WOVEN	00004128	6.3	44.6
CV-NON-WOVEN	00004138	6.8	41.0
CV-NON-WOVEN	00004163	6.5	37.6

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

Date: 10/22/2009
Purchase Order: P7005
ORDER NUMBERS: 025559507, 025559508, 025559509

Kennedy Garber
Hallaton

Sparks, MD 21152
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559507, 025559508, 025559509
PREPARED FOR: Hallaton

CONTENTS:

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

PRODUCT CERTIFICATIONS

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559507, 025559508, 025559509
PREPARED FOR: Hallaton

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5.0E-9 cm/s Max
ASTM D 5887	GCL Index Flux	Weekly	1.0E-8 m3/m2/s Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using
ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 025559507

GCL								Geotextiles				Clay
CV-BENTOMAT ST								N/W-WHITE			WOVEN	CV-CG 50
Order	**GCL Lot #**	**GCL Roll #**	**Length**	**Width**	**weight**	**sq ft**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
025559508	200942CV	9134	150	15	2636	2250	9134	200941CV	00003945	00003945	2020351536	929877B
025559509	200942CV	9137	150	15	2632	2250	9134	200941CV	00003945	00003945	2020351536	929879A
025559509	200942CV	9140	150	15	2634	2250	9134	200941CV	00003945	00003945	2020351536	929879A
025559509	200942CV	9144	150	15	2622	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559507	200942CV	9145	150	15	2630	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559507	200942CV	9149	150	15	2638	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9150	150	15	2640	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9152	150	15	2636	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9154	150	15	2648	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9157	150	15	2648	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559507	200942CV	9158	150	15	2644	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559509	200942CV	9160	150	15	2634	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559508	200942CV	9161	150	15	2632	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559509	200942CV	9163	150	15	2636	2250	9149	200941CV	00003924	00003918	2020398989	929879A
025559509	200942CV	9164	150	15	2648	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559508	200942CV	9165	150	15	2626	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559508	200942CV	9170	150	15	2640	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559508	200942CV	9178	150	15	2684	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559507	200942CV	9183	150	15	2642	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559508	200942CV	9184	150	15	2626	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559507	200942CV	9185	150	15	2630	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559508	200942CV	9186	150	15	2640	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559508	200942CV	9187	150	15	2628	2250	9178	200942CV	00004165	00004163	2020363400	929879B
025559508	200942CV	9188	150	15	2636	2250	9178	200942CV	00004165	00004163	2020363400	929879B
025559507	200942CV	9189	150	15	2628	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559507	200942CV	9190	150	15	2638	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559507	200942CV	9192	150	15	2620	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559507	200942CV	9194	150	15	2636	2250	9193	200942CV	00004138	00004138	2020332136	929879B
025559509	200942CV	9195	150	15	2648	2250	9193	200942CV	00004138	00004138	2020332136	929879B
025559508	200942CV	9207	150	15	2656	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559508	200942CV	9215	150	15	2642	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
025559508	200942CV	9222	150	15	2667	2250	9222	200942CV	00004135	00004128	WEA011621-19	929879B
025559508	200942CV	9230	150	15	2644	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559508	200942CV	9231	150	15	2642	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559508	200942CV	9232	150	15	2656	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559508	200942CV	9233	150	15	2652	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559507	200942CV	9234	150	15	2633	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559508	200942CV	9235	150	15	2656	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559509	200942CV	9236	150	15	2650	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559509	200942CV	9237	150	15	2680	2250	9237	200942CV	00004094	00004090	WEA011621-19	929880A
025559509	200942CV	9243	150	15	2646	2250	9242	200942CV	00004096	00004090	WEA011909-4	929880A
025559509	200942CV	9265	150	15	2636	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559509	200942CV	9267	150	15	2640	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559509	200942CV	9268	150	15	2640	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559509	200942CV	9269	150	15	2634	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559509	200942CV	9280	150	15	2646	2250	9266	200940CV	00003772	00003764	WEA011909-5	929880A
025559509	200942CV	9289	150	15	2632	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559509	200942CV	9290	150	15	2638	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
						Total sq ft: **108000**	Total Number of Rolls Certified: **48**					

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 025559507 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
		ASTM Test Method:	D 5993	D 6768	D 6496
		Required Value:	0.75 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
CV-BENTOMAT ST	200942CV	9134	0.82	61.2	6.5
CV-BENTOMAT ST	200942CV	9149	0.86	61.2	6.5
CV-BENTOMAT ST	200942CV	9164	0.80	61.2	6.2
CV-BENTOMAT ST	200942CV	9178	0.87	61.2	5.7
CV-BENTOMAT ST	200942CV	9193	0.85	61.2	4.3
CV-BENTOMAT ST	200942CV	9208	0.84	61.2	4.4
CV-BENTOMAT ST	200942CV	9222	0.85	86.1	7.5
CV-BENTOMAT ST	200942CV	9237	0.83	86.1	6.1
CV-BENTOMAT ST	200942CV	9242	0.85	86.1	5.0
CV-BENTOMAT ST	200942CV	9252	0.87	86.1	4.7
CV-BENTOMAT ST	200942CV	9266	0.87	86.1	4.4
CV-BENTOMAT ST	200942CV	9281	0.89	86.1	10.4

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 025559507

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
929877B	10.40	26.00	15.60
929879A	9.80	29.00	17.00
929879B	9.50	31.00	15.60
929880A	10.30	31.00	16.80
929880B	10.10	30.00	16.40

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 025559507 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 82TEX	2020332136	3.5	218.5
PPX 82TEX	2020351536	3.4	206.4
PPX 82TEX	2020363400	3.5	175.9
PPX 82TEX	2020398989	3.5	200.5
MTX 1213	WEA011621-19	3.4	156.6
MTX 1213	WEA011621-20	3.4	156.6
MTX 1213	WEA011909-4	3.6	162.2
MTX 1213	WEA011909-5	3.5	155.3
MTX 1213	WEA011909-7	3.5	155.3

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
CV-NON-WOVEN	00003629	6.9	49.6
CV-NON-WOVEN	00003764	6.8	45.8
CV-NON-WOVEN	00003804	6.8	45.1
CV-NON-WOVEN	00003854	7.0	55.2
CV-NON-WOVEN	00003918	6.7	47.3
CV-NON-WOVEN	00003945	6.4	46.4
CV-NON-WOVEN	00003999	6.2	41.9
CV-NON-WOVEN	00004033	6.5	33.4
CV-NON-WOVEN	00004090	6.3	34.5
CV-NON-WOVEN	00004128	6.3	44.6
CV-NON-WOVEN	00004138	6.8	41.0
CV-NON-WOVEN	00004163	6.5	37.6

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

CETCO
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY

Please Note: This Recap is thru 3 pm. Other trucks could be loaded.

RECAP SHEETS

TO:
Hallaton
White Oak LF
3898 Fines Creek Road
Waynesville, NC 28785
Kennedy Garber
410.583.7700
kgarber@hallaton.com

FROM: **CETCO**
Cartersville,GA

ATTN: **JUDY**
PHONE: **770 387 7751**
FAX:

CUSTOMER P.O. P7005
ORDER APPROX. 450,000 **sf BMST**
ORDERED 200 **rolls** 50 **bags**

	ORDER #	TRUCK	SHIP DATE	ROLLS	SQ FT	BAGS	COMMENTS
1	25559501	Nationwide	10/19/2009	16	36,000	50	includes 1 pallet of conformance samples
2	25559502	Nationwide	10/19/2009	17	38,250		
3	25559503	Nationwide	10/19/2009	17	38,250		
4	25559504	Nationwide	10/19/2009	17	38,250		
5	25559505	Nationwide	10/19/2009	17	38,250		
6	25559506	Nationwide	10/20/2009	17	38,250		
7	25559511	Nationwide	10/20/2009	17	38,250		
8	25559512	Nationwide	10/20/2009	17	38,250		
9	25559510	Nationwide	10/20/2009	17	38,250		
10	25559509	Nationwide	10/21/2009	17	38,250		
11	25559508	Nationwide	10/21/2009	17	38,250		
12	25559507	Nationwide	10/22/2009	14	31,500		
				Complete			
	TOTALS			200	450,000	50	

ATTENTION: CONSTRUCTION ADMINISTRATION

SUBMITTAL AND ROUTING FORM

(TO BE USED WITH EACH INDIVIDUAL PLAN SUBMITTAL OR SHOP DRAWING)

SUBMITTAL AND APPROVAL (Contractor to Complete)

Project Name: White Oak Landfill MSW Phase 3 — McGill Project #: 7518

Contractor: Thalle Construction Company — Submittal #: 2320-003

Contract for: — Spec Section: 2320

Submittal Title: GCL Bill of Lading

Sheet / item numbers:

Subcontractor: Hallaton — Supplier: Cetco

Date Transmitted: 10/26/2009 — Date Needed:

Change from Contract Documents? Yes **No** — Attached Documentation:

Submittal Complete: **Yes** No

The Contractor must review and approve this submittal for all requirements and conformance to the contract documents prior to submittal to McGill Associates. Submittals forwarded without the Contractor's approval will be returned without review or comment.

Reviewed by: Sarah McKee — Date: 10/26/2009

McGILL ASSOCIATES SUBMITTAL ROUTING (McGill to complete)

Date Received: _____ Logged By: _____ To: _____ Returned By: _____

Review Codes: **1=Approved: 2=Approved as Noted: 3=Revise and Resubmitt: 4=Not Approved**

Reviewed By	Review Code	COMMENTS	Initials	Date

Project Engineers Approval: _____ Date: _____

CETCO

Shippers No : 025559501 Previous Page

Straight Bill of Lading - Original

Loader: RPANK Time In: 10/19/09-15:09:18 Time Out: **10/19/09-15:59:26**

Carrier: BOYD BROS
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/19/2009
Ship Date : 10/16/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7609 Trailer #: 50600/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
36000.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 16 rolls palletized	42189.0000
50.0000 EACH		COMMODITY GRANULAR-50 (10902/024) CLAY-BENTONITE-GROUND CLASS 50 ITEM 48170 / 3295232 3295232 16 rolls palletized 1 Skid Samples	2500.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44689

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per Rosen, Joseph

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559501
ORDER DATE: 9/25/2009
SHIP DATE:. 10/19/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

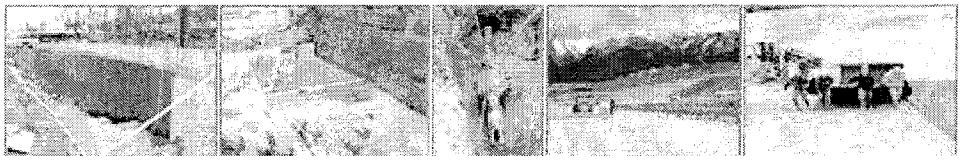
PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009142	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009143	150.0	15.0	2250.0	2624.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009156	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009221	150.0	15.0	2250.0	2667.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009239	150.0	15.0	2250.0	2654.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009258	150.0	15.0	2250.0	2658.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009260	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009262	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009278	150.0	15.0	2250.0	2598.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009279	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009281	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009284	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009293	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009294	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009310	150.0	15.0	2250.0	2660.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009316	150.0	15.0	2250.0	2594.0
							========	
							36000.0	
CV-CG 50	50B	EA					50.0	2500.0
							========	
							50.0	

1 pallet of Sample Rolls.

ORDER TOTALS..... ======== 44689.0

TOTAL ITEMS..... 17



Shippers No : 025559502 Previous Page

Straight Bill of Lading - Original Loader: WWYAT Time In: 10/19/09-16:43:50 Time Out: **10/19/09-18:31:11**

Carrier: BOYD
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/19/2009
Ship Date : 10/16/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7314 Trailer #: 50276/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	45036.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 45036

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per Earl R Bud

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559502
ORDER DATE: 9/25/2009
SHIP DATE:. 10/19/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009167	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009191	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009193	150.0	15.0	2250.0	2664.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009209	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009212	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009213	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009214	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009219	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009225	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009227	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009242	150.0	15.0	2250.0	2728.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009252	150.0	15.0	2250.0	2730.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009256	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009261	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009285	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009286	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009313	150.0	15.0	2250.0	2582.0
							========	
							38250.0	
							========	

ORDER TOTALS..... 45036.0

TOTAL ITEMS..... 17

Shippers No : 025559503 Previous Page

Straight Bill of Lading - Original

Loader: WWYAT Time In: 10/19/09-15:20:47 Time Out: **10/19/09-16:15:37**

Carrier: BOYD BROS
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/20/2009
Ship Date : 10/19/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 6940 Trailer #: 50666/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44122.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44122

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559503
ORDER DATE: 9/25/2009
SHIP DATE:. 10/19/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

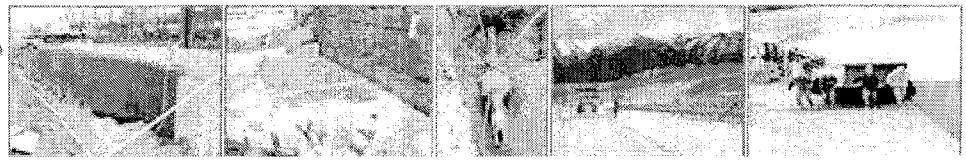
WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009296	150.0	15.0	2250.0	2610.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009298	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009301	150.0	15.0	2250.0	2604.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009304	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009307	150.0	15.0	2250.0	2592.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009308	150.0	15.0	2250.0	2604.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009309	150.0	15.0	2250.0	2596.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009311	150.0	15.0	2250.0	2598.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009312	150.0	15.0	2250.0	2586.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009315	150.0	15.0	2250.0	2596.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009317	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009318	150.0	15.0	2250.0	2602.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009319	150.0	15.0	2250.0	2590.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009320	150.0	15.0	2250.0	2588.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009324	150.0	15.0	2250.0	2582.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009326	150.0	15.0	2250.0	2586.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009329	150.0	15.0	2250.0	2588.0
							========	
							38250.0	
							========	

ORDER TOTALS..... 44122.0

TOTAL ITEMS..... 17



Shippers No : 025559504 Previous Page

Straight Bill of Lading - Original Loader: DPARR Time In: 10/19/09-15:06:20 Time Out: 10/19/09-15:17:07

Carrier: BOYD BROTHERS
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/20/2009
Ship Date : 10/19/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7105 Trailer #: 50322/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	43894.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 43894

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559504
ORDER DATE: 9/25/2009
SHIP DATE:. 10/19/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

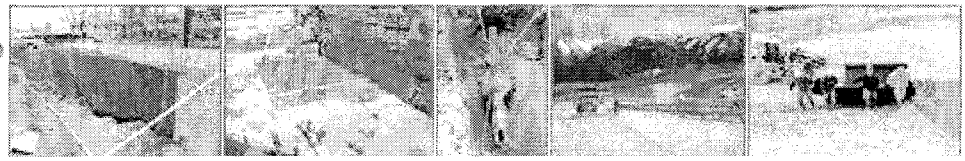
PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009314	150.0	15.0	2250.0	2584.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009321	150.0	15.0	2250.0	2588.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009322	150.0	15.0	2250.0	2602.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009323	150.0	15.0	2250.0	2590.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009327	150.0	15.0	2250.0	2588.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009328	150.0	15.0	2250.0	2584.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009330	150.0	15.0	2250.0	2574.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009331	150.0	15.0	2250.0	2572.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009332	150.0	15.0	2250.0	2570.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009333	150.0	15.0	2250.0	2584.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009334	150.0	15.0	2250.0	2578.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009335	150.0	15.0	2250.0	2578.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009336	150.0	15.0	2250.0	2584.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009337	150.0	15.0	2250.0	2568.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009338	150.0	15.0	2250.0	2580.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009339	150.0	15.0	2250.0	2580.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009340	150.0	15.0	2250.0	2590.0
							========	
							38250.0	

========

ORDER TOTALS..... 43894.0

TOTAL ITEMS..... 17

CETCO



Shippers No : 025559505 Previous Page

Straight Bill of Lading - Original

Loader: RPANK Time In: 10/19/09-16:40:24 Time Out: **10/19/09-18:22:58**

Carrier: BOYD BO.
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/20/2009
Ship Date : 10/19/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7106 Trailer #: 50077/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44894.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44894

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Johnny Bernabe

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559505
ORDER DATE: 9/25/2009
SHIP DATE:. 10/19/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009136	150.0	15.0	2250.0	2614.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009148	150.0	15.0	2250.0	2618.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009151	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009166	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009210	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009211	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009228	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009238	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009245	150.0	15.0	2250.0	2654.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009246	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009257	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009270	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009273	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009277	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009287	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009288	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009292	150.0	15.0	2250.0	2704.0
							========	
							38250.0	

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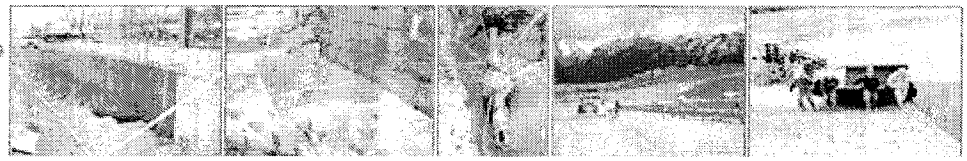
ORDER TOTALS..... 44894.0

TOTAL ITEMS..... 17



Shippers No : 025559506 Previous Page

Straight Bill of Lading - Original Loader: DPARR Time In: 10/20/09-13:31:02 Time Out: **10/20/09-14:13:46**

Carrier: wti
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/20/2009
Ship Date : 10/19/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 5205 Trailer #: 59026./

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44694.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44694

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559506
ORDER DATE: 9/25/2009
SHIP DATE:. 10/20/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009241	150.0	15.0	2250.0	2616.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009244	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009253	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009254	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009255	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009259	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009263	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009264	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009274	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009276	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009282	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009283	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009300	150.0	15.0	2250.0	2592.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009302	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009303	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009305	150.0	15.0	2250.0	2598.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009306	150.0	15.0	2250.0	2610.0
							========	
							38250.0	

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ORDER TOTALS..... 44694.0

TOTAL ITEMS..... 17

Shippers No : 025559507 Previous Page

Straight Bill of Lading - Original

Loader: RPANK Time In: 10/22/09-10:42:31 Time Out: **10/22/09-12:24:58**

Carrier: wti
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 5099 Trailer #: 48738/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
31500.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 14 rolls	36911.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 36911

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Webber Packard

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559507
ORDER DATE: 9/25/2009
SHIP DATE:. 10/22/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009145	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009149	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009150	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009152	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009154	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009157	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009158	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009183	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009185	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009189	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009190	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009192	150.0	15.0	2250.0	2620.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009194	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009234	150.0	15.0	2250.0	2633.0
							========	
							31500.0	
							========	

ORDER TOTALS..... 36911.0

TOTAL ITEMS..... 14

Shippers No : 025559508 Previous Page

Straight Bill of Lading - Original

Loader: DPARR Time In: 10/21/09-14:01:15 Time Out: **10/21/09-15:56:21**

Carrier: BOYD BROS
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7442 Trailer #: 50664/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44963.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44963

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only, COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Jerome J Morrison

Per

Placards Required? Yes / No **Supplied?** Yes / No

PACKING LIST

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559508
ORDER DATE: 9/25/2009
SHIP DATE:. 10/21/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

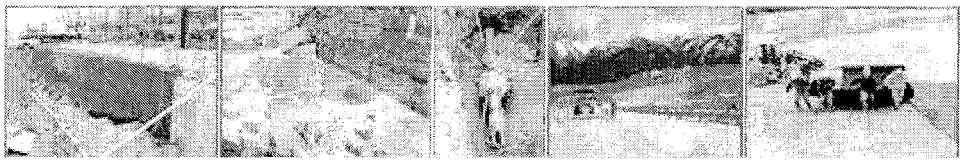
WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF	200942CV	00009134	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009161	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009165	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009170	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009178	150.0	15.0	2250.0	2684.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009184	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009186	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009187	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009188	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009207	150.0	15.0	2250.0	2656.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009215	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009222	150.0	15.0	2250.0	2667.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009230	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009231	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009232	150.0	15.0	2250.0	2656.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009233	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009235	150.0	15.0	2250.0	2656.0
								========	
								38250.0	
								========	

ORDER TOTALS..... 44963.0

TOTAL ITEMS..... 17



Shippers No : 025559509 Previous Page

Straight Bill of Lading - Original

Loader: DPARR Time In: 10/21/09-07:21:51 Time Out: **10/21/09-08:36:22**

Carrier: BOYD BROS
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7246 Trailer #: 50314/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44896.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44896

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Marvin McCotter

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559509
ORDER DATE: 9/25/2009
SHIP DATE:. 10/21/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

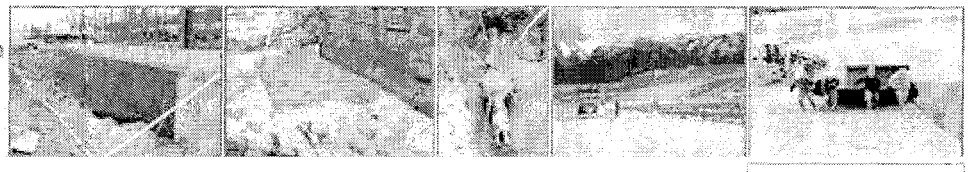
WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009137	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009140	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009144	150.0	15.0	2250.0	2622.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009160	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009163	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009164	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009195	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009236	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009237	150.0	15.0	2250.0	2680.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009243	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009265	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009267	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009268	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009269	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009280	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009289	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009290	150.0	15.0	2250.0	2638.0
							========	
							38250.0	
							========	

ORDER TOTALS..... 44896.0

TOTAL ITEMS..... 17



Shippers No : 025559510 Previous Page

Straight Bill of Lading - Original

Loader: RPANK Time In: 10/20/09-14:46:47 Time Out: 10/20/09-15:33:03

Carrier: boyd brothers
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7396 Trailer #: 49415/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44890.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44890

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per Spencer Easeley

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559510
ORDER DATE: 9/25/2009
SHIP DATE:. 10/20/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009153	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009155	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009169	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009196	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009197	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009220	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009223	150.0	15.0	2250.0	2654.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009229	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009247	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009248	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009249	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009266	150.0	15.0	2250.0	2706.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009271	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009272	150.0	15.0	2250.0	2620.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009291	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009295	150.0	15.0	2250.0	2610.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009297	150.0	15.0	2250.0	2600.0
							========	
							38250.0	

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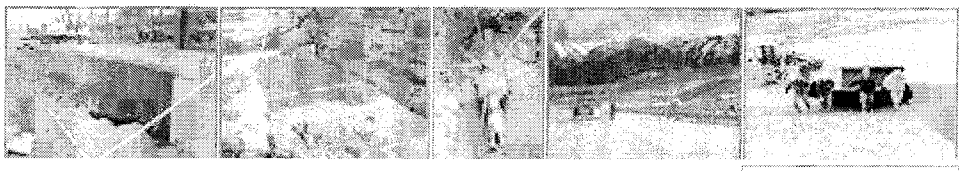
ORDER TOTALS..... 44890.0

TOTAL ITEMS..... 17



Shippers No : 025559511 Previous Page

Straight Bill of Lading - Original

Loader: DPARR Time In: 10/20/09-14:00:14 Time Out: 10/20/09-14:53:39

Carrier: boyd brothers
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 6966 Trailer #: 50496/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44875.0000

Gross: 0.0000 Tare: 0.0000 **Total:** 44875

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Richard Lowe

Per **Placards Required?** Yes / No **Supplied?** Yes / No

Keith Vess

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559511
ORDER DATE: 9/25/2009
SHIP DATE:. 10/20/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009162	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009168	150.0	15.0	2250.0	2620.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009171	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009172	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009173	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009174	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009175	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009176	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009198	150.0	15.0	2250.0	2654.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009200	150.0	15.0	2250.0	2651.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009201	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009224	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009226	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009250	150.0	15.0	2250.0	2668.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009251	150.0	15.0	2250.0	2668.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009275	150.0	15.0	2250.0	2624.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009299	150.0	15.0	2250.0	2598.0
							========	
							38250.0	

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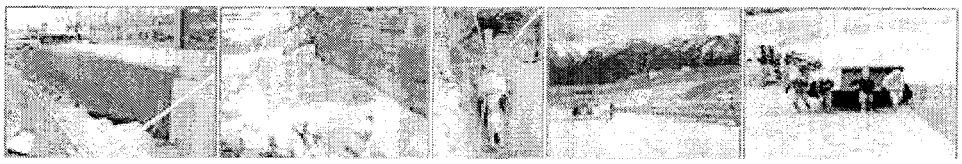
ORDER TOTALS..... 44875.0

TOTAL ITEMS..... 17

CETCO®



Shippers No : 025559512 Previous Page

Straight Bill of Lading - Original Loader: RPANK Time In: 10/20/09-13:58:46 Time Out: **10/20/09-14:52:31**

Carrier: boyd brothers
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7016 Trailer #: 49826/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10	44905.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44905

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Per Tony Hodgins Jr.

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559512
ORDER DATE: 9/25/2009
SHIP DATE:. 10/20/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009146	150.0	15.0	2250.0	2616.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009147	150.0	15.0	2250.0	2624.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009177	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009179	150.0	15.0	2250.0	2667.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009180	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009181	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009182	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009199	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009202	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009203	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009204	150.0	15.0	2250.0	2634.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009205	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009206	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009208	150.0	15.0	2250.0	2672.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009216	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009217	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009218	150.0	15.0	2250.0	2644.0
							========	
							38250.0	

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ORDER TOTALS..... 44905.0

TOTAL ITEMS..... 17

Shippers No : 025559508 Previous Page

Straight Bill of Lading - Original

Loader: DPARR Time In: 10/21/09-14:01:15 Time Out: **10/21/09-15:56:21**

Carrier: BOYD BROS
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 7442 Trailer #: 50664/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
38250.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 17 rolls	44963.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 44963

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only, COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier:**

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Jerome J Morrison

Per

Placards Required? Yes / No **Supplied?** Yes / No

PACKING LIST

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559508
ORDER DATE: 9/25/2009
SHIP DATE:. 10/21/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF	200942CV	00009134	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009161	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009165	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009170	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009178	150.0	15.0	2250.0	2684.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009184	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009186	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009187	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009188	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009207	150.0	15.0	2250.0	2656.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009215	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009222	150.0	15.0	2250.0	2667.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009230	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009231	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009232	150.0	15.0	2250.0	2656.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009233	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF	200942CV	00009235	150.0	15.0	2250.0	2656.0
								========	
								38250.0	
								========	

ORDER TOTALS..... 44963.0

TOTAL ITEMS..... 17

Shippers No : 025559507 Previous Page

Straight Bill of Lading - Original

Loader: RPANK Time In: 10/22/09-10:42:31 Time Out: **10/22/09-12:24:58**

Carrier: wti
Consigned To :
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD
WAYNESVILLE NC 28785
Phone: 410.583.7700

CETCO 2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192
Deliver Date : 10/21/2009
Ship Date : 10/20/2009 **Via**: NATI
FOB ORIGIN

Sold To : 2099 **Ship To** : 50
Consigned PO: P7005
Truck #: 5099 Trailer #: 48738/

Shipping Plant: CETCO CARTERSVILLE 218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
Product Lots: Seal #: --enter here-- Container #:

Global Comments: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER
Customer Comments:
Order Comments: CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700 not at site

Quantity	HM	Product Size / Description	Weight
31500.0000 SF		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTURE OF CLOTHING: CLASS 65 / ITEM 49265 SUB 10 14 rolls	36911.0000

Gross: 0.0000 Tare: 0.0000 **Total**: 36911

Subject to section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO

If the charges are to be prepaid, write or stamp here, "Prepaid."

Prepaid

Shipper liable for the linehaul charges only. COD charges to be paid by: Consignee

Phone:
Fax:
Attn:

Mark with an 'X' to designate hazardous materials as defined in title 49 of the code of Federal Regulations. Received Subject to the classifications and lawfully filed tariffs in effect on the date of issued of this billing of lading, the properly described above in apparent good order, expect as noted (contents and conditions of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of the said property over all or any portion of the said route to destination , and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Stright Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns. **Carrier**:

This is to certify that the above named materials are properly classified, described, packaged, and labeled and are in proper condition for transportation according to the applicable regulations of the department of Transportation.

Webber Packard

Per

Placards Required? Yes / No **Supplied?** Yes / No

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559507
ORDER DATE: 9/25/2009
SHIP DATE:. 10/22/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. AMERICO LOGISTICS

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009145	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009149	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009150	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009152	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009154	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009157	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009158	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009183	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009185	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009189	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009190	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009192	150.0	15.0	2250.0	2620.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009194	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009234	150.0	15.0	2250.0	2633.0
							========	
							31500.0	
							========	

ORDER TOTALS..... 36911.0

TOTAL ITEMS..... 14

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

Date: 5/27/2008
Purchase Order: P6362
ORDER NUMBER: 022476212

Kennedy Garber
Hallaton
Suite 203
Towson, MD 21286
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton. The shipments left our Cartersville, Georgia plant on 05/23/2008.

If you have any questions regarding this information, please contact me at (770) 387-7773.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: Quarantine Rd LF
CUSTOMER P.O.: P6362
ORDER NUMBER: 022476212
PREPARED FOR: Hallaton

CONTENTS:

- Daily production and needle detection certification
- GCL property specifications
- Order packing list
- GCL MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121

Telephone: (770) 387-7773
Fax:
E-Mail: melanie.king@cetco.com

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

PRODUCTION CERTIFICATION

PROJECT NAME: Quarantine Rd LF
CUSTOMER P.O.: P6362
PREPARED FOR: Hallaton

CETCO affirms that these products meet the physical and chemical criteria listed on the attached GCL property specification sheet.

NEEDLE REMOVAL AND DETECTION PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator
Colloid Environmental Technologies Co. (CETCO)

Ship Date: 05/23/2008
Order Number: 022476212
Prepared For: Hallaton

The GCL raw materials and GCL finished product manufactured for the above-referenced order number(s) are hereby certified to achieve the properties listed in the tables below.

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT DN

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft (3.6 kg/sq m) Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 4632	GCL Grab Strength	200,000 sq ft (20,000 sq m)	150 lbs (660 N) MARV
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	50 lbs/in MARV
ASTM D 5321	GCL Hydrated Internal Shear Strength	Periodic	500 psf (24 kPa) typ @ 200 psf
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5 x 10^-9 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	1 x 10^-8 m^3/m^2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min
ASTM D 4632	GCL Peel Strength	40,000 sq ft (4000 sq m)	15 lbs (65 N) Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction.

FABRIC SUPPLIER REQUIREMENTS FOR BENTOMAT DN

Raw Material	test method	mass per area	units
Nonwoven Cover Fabric	ASTM D 5261	6.0	oz/yd2
Bentomat DN Base Nonwoven Fabric	ASTM D 5261	6.0	oz/yd2

Fabric certifications from our raw material suppliers are on file at our production facility.

CETCO's MQA laboratory is GAI-accredited (www.geosynthetic-institute.org/gai/lab.html).

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

CETCO LINING TECHNOLOGIES
800.527.9948 www.cetco.com

GCL ORDER PACKING LIST

GCL shipped for certification package number 022476212

Order #	Product	Lot Number	Roll Number	Length (ft)	Width (ft)	Square Ft	Weight (lbs)
022476212	CV-BENTOMAT DN	200819CV	00001916	150	14	2100	2996
022476212	CV-BENTOMAT DN	200819CV	00001918	150	14	2100	2786
022476212	CV-BENTOMAT DN	200819CV	00001940	150	14	2100	2794
022476212	CV-BENTOMAT DN	200819CV	00001941	150	14	2100	2804
022476212	CV-BENTOMAT DN	200819CV	00001949	150	14	2100	2800
022476212	CV-BENTOMAT DN	200819CV	00001957	150	14	2100	2912
022476212	CV-BENTOMAT DN	200819CV	00002020	150	14	2100	2688
			Totals:	**1050**	**98**	**14700**	**19780**
						Total Number of Rolls Certified: **7**	

CETCO LINING TECHNOLOGIES
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GCL MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 022476212

GCL			Geotextiles				Clay
CV-BENTOMAT DN			CV-N/W-WHITE-DN			CV-N/W-BLACK-DN-6 OZ	CV-CG 50-DN
GCL Lot #	**GCL Roll #**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
200819CV	00001916	00001909	200818CV	00001708	00001708	2009789145	852623A
200819CV	00001918	00001909	200818CV	00001708	00001708	2009789145	852623A
200819CV	00001940	00001931	200818CV	00001710	00001708	2010002450	852623B
200819CV	00001941	00001931	200818CV	00001710	00001708	2010002450	852623B
200819CV	00001949	00001949	200818CV	00001694	00001688	2010000182	852623B
200819CV	00001957	00001949	200818CV	00001695	00001688	2010000182	852623B
200819CV	00002020	00002004	200818CV	00001668	00001660	2010155567	852626B

CETCO LINING TECHNOLOGIES
800.527.9948 www.cetco.com

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 022476212 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
		Standard Test Method:	ASTM D 5993	ASTM D 6768	ASTM D 6496
		Standard Specification:	0.75 lb/sq ft MARV	50lbs/in MARV	3.5lbs/in MARV
CV-BENTOMAT DN	200819CV	00001909	0.96	105.2	9.5
CV-BENTOMAT DN	200819CV	00001931	0.89	105.2	7.2
CV-BENTOMAT DN	200819CV	00001949	0.87	105.2	6.2
CV-BENTOMAT DN	200819CV	00002004	0.97	107.4	10.9

ASTM test methods and property specifications per CETCO standard unless non-standard specifications were requested.
Any non-standard property specifications requested for this order are noted on the attached GCL property specifications sheet.

CETCO
LINING TECHNOLOGIES
800.527.9948 www.cetco.com

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 022476212 has been tested by American Colloid Company and yeilded the following test results.

Reference	Swell	Fluid Loss
Test Method:	ASTM D 5890	ASTM D 5891
Specification:	24 Min	18 ml Max
852623A	25.0	17.6
852623B	26.0	17.4
852626B	26.0	16.8

CETCO LINING TECHNOLOGIES
800.527.9948 www.cetco.com

GEOTEXTILE TEST RESULTS FOR RAW MATERIAL SUPPLIED BY A CETCO FACILITY

The GCL in certification package number 022476212 was manufactured using these geotextiles:

Material	Lot #	Roll #	Mass Area	Grab Strenth
CV-NON-WOVEN	200818CV	00001660	6.6	40.0
CV-NON-WOVEN	200818CV	00001688	7.0	35.4
CV-NON-WOVEN	200818CV	00001708	6.7	39.9

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 022476212 was manufactured with geotextiles which were tested with the following results.

BASE			
Material	**Roll Number**	**Mass Area oz/yd2**	**Grab Strenth lbs**
PPX HH65L	2009789145	7.0	189.7
PPX HH65L	2010000182	6.8	223.6
PPX HH65L	2010002450	6.6	227.7
PPX HH65L	2010155567	6.6	193.2

STRAIGHT BILL OF LADING — NOT NEGOTIABLE — REPRINT

CARRIER NAME: NAT'W BOYD

DELIVERING CARRIER: NAT'W BOYD

CONSIGNED TO: WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785
PHONE: 410.583.7700

DEL DATE:10/19/09

SHIPPER'S NO: 025559501
SHIP DATE: 10/19/09

SHIPPER: Colloid Environmental
2870 Forbs Avenue
Hoffman Estates IL 60192
Job Code:

SOLDTO: 2099 **SHIPTO:** 50

CONSIGNED P.O. P7005
NAT'W BOYD

CAR/VEHICLE#:

SHIPPING PLANT: CETCO CARTERSVILLE
218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
FOB ORIGIN

ROUTING/CONTRACT

ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER

CUSTOMER COMMENTS DRIVER CALL 24 HRS. PRIOR

CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700
not at site

QUANTITY	HM	DESCRIPTION OF ARTICLES PROD DESCRIPTION	WEIGHT (SUBJECT TO CORRECTION)
36000.0000		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTUR CLASS 65 / ITEM 49265 SUB 10 CAR/VEHICLE #: NAT'W BOYD 16 rolls	46,188.0000
50.0000		COMMODITY GRANULAR-50 (10902/024) CLAY-BENTONITE-GROUND CLASS 50 ITEM 48170 / 3295232 3295232 CAR/VEHICLE #: NAT'W BOYD palletized	2,500.0000

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO
(Signature of Consignor)

If charges are to be prepaid, write or stamp here, "Prepaid."

PREPAID

Shipper liable for line haul charges only. COD charges to be paid by: Consignee

MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF THE CODE OF FEDERAL REGULATIONS

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Carrier:

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

Per

PLACARDS REQUIRED
☐ YES ☐ NO

PLACARDS SUPPLIED
☐ YES ☐ NO - FURNISHED BY CARRIER
DRIVERS SIGNATURE:

** CONTINUED ON NEXT PAGE **

STRAIGHT BILL OF LADING — NOT NEGOTIABLE — REPRINT

CARRIER NAME: NAT'W BOYD

+ DELIVERING CARRIER: NAT'W BOYD

CONSIGNED TO: WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785
PHONE: 410.583.7700

DEL DATE:10/19/09

SHIPPER'S NO: 025559501
SHIP DATE: 10/19/09

SHIPPER: Colloid Environmental
2870 Forbs Avenue
Hoffman Estates IL 60192
Job Code:

SOLDTO: 2099 SHIPTO: 50

CONSIGNED P.O. P7005 NAT'W BOYD

CAR/VEHICLE#:

SHIPPING PLANT: CETCO CARTERSVILLE
218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
FOB ORIGIN

ROUTING/CONTRACT QUANTITY	HM	DESCRIPTION OF ARTICLES PROD DESCRIPTION	WEIGHT (SUBJECT TO CORRECTION)

GROSS: .00 TARE: .00 NET: 48,688.00

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO
(Signature of Consignor)

If charges are to be prepaid, write or stamp here, "Prepaid."

PREPAID

Shipper liable for line haul charges only. COD charges to be paid by: Consignee

MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF THE CODE OF FEDERAL REGULATIONS

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Carrier:

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

Per

PLACARDS REQUIRED

☐ YES ☐ NO

PLACARDS SUPPLIED

☐ YES ☐ NO - FURNISHED BY CARRIER

DRIVERS SIGNATURE:

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559501
ORDER DATE: 9/25/2009
SHIP DATE:. 10/27/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NAT'W BOYD

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009142	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009143	150.0	15.0	2250.0	2624.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009156	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009221	150.0	15.0	2250.0	2667.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009239	150.0	15.0	2250.0	2654.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009258	150.0	15.0	2250.0	2658.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009260	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009262	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009278	150.0	15.0	2250.0	2598.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009279	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009281	150.0	15.0	2250.0	2650.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009284	150.0	15.0	2250.0	2646.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009293	150.0	15.0	2250.0	2600.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009294	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009310	150.0	15.0	2250.0	2660.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009316	150.0	15.0	2250.0	2594.0

ORDER TOTALS.....	36000.0	42189.0

TOTAL ITEMS..... 16

STRAIGHT BILL OF LADING — NOT NEGOTIABLE — REPRINT

CARRIER NAME: NAT'W WTI

DELIVERING CARRIER: NAT'W WTI

CONSIGNED TO: WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785
PHONE: 410.583.7700

DEL DATE:10/21/09

SHIPPER'S NO: 025559507
SHIP DATE: 10/22/09

SHIPPER: Colloid Environmental
2870 Forbs Avenue
Hoffman Estates IL 60192
Job Code:

SOLDTO: 2099 **SHIPTO:** 50

CONSIGNED P.O. P7005
NAT'W WTI

CAR/VEHICLE#:

SHIPPING PLANT: CETCO CARTERSVILLE
218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
FOB ORIGIN

ROUTING/CONTRACT: ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER

CUSTOMER COMMENTS DRIVER CALL 24 HRS. PRIOR

CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700
not at site

QUANTITY	HM	DESCRIPTION OF ARTICLES PROD DESCRIPTION	WEIGHT (SUBJECT TO CORRECTION)
31500.0000		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTUR CLASS 65 / ITEM 49265 SUB 10 CAR/VEHICLE #: NAT'W WTI 14 rolls	40,414.5000

GROSS: .00 TARE: .00 NET: 40,414.50

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO
(Signature of Consignor)

If charges are to be prepaid, write or stamp here, "Prepaid."

PREPAID

Shipper liable for line haul charges only. COD charges to be paid by: Consignee

MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF THE CODE OF FEDERAL REGULATIONS
RECEIVED, subject to the classifications and lawfully filed tariffs in effect on date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Carrier:

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

Per

PLACARDS REQUIRED
☐ YES ☐ NO

PLACARDS SUPPLIED
☐ YES ☐ NO - FURNISHED BY CARRIER
DRIVERS SIGNATURE:

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559507
ORDER DATE: 9/25/2009
SHIP DATE:. 10/27/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NAT'W WTI

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009145	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009149	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009150	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009152	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009154	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009157	150.0	15.0	2250.0	2648.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009158	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009183	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009185	150.0	15.0	2250.0	2630.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009189	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009190	150.0	15.0	2250.0	2638.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009192	150.0	15.0	2250.0	2620.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009194	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009234	150.0	15.0	2250.0	2633.0

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ORDER TOTALS.....	31500.0	36911.0

TOTAL ITEMS..... 14

STRAIGHT BILL OF LADING — NOT NEGOTIABLE — REPRINT

CARRIER NAME: NAT'W BOYD

DELIVERING CARRIER: NAT'W BOYD

CONSIGNED TO: WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785
PHONE: 410.583.7700

DEL DATE:10/21/09

SHIPPER'S NO: 025559508
SHIP DATE: 10/21/09

SHIPPER: Colloid Environmental
2870 Forbs Avenue
Hoffman Estates IL 60192
Job Code:

SOLDTO: 2099 SHIPTO: 50

CONSIGNED P.O. P7005
NAT'W BOYD

CAR/VEHICLE#:

SHIPPING PLANT: CETCO CARTERSVILLE
218 INDUSTRIAL PARK ROAD
CARTERSVILLE GA 30121
FOB ORIGIN

ROUTING/CONTRACT ALL SHIPMENTS LOADED ON FLATBED OR OPEN TOP TRAILERS MUST BE COVERED WITH ADEQUATE TARPAULIN PRIOR TO HIGHWAY MOVEMENT. CARRIER WILL BE HELD FULLY RESPONSIBLE FOR LOSS OR DAMAGE OCCURRING TO UNPROTECTED LOADS. LOADS MAY NOT BE UNTARPED FOR ANY REASON PRIOR TO DELIVERY TO THE CUSTOMER UNTARPING THE LOAD MAY RESULT IN REJECTION OF THE MATERIAL AND LIABILITY TO THE CARRIER

CUSTOMER COMMENTS DRIVER CALL 24 HRS. PRIOR

CALL KENNEDY 24 HRS PRIOR TO DELIVERY AT 410.583.7700
not at site

QUANTITY	HM	DESCRIPTION OF ARTICLES PROD DESCRIPTION	WEIGHT (SUBJECT TO CORRECTION)
38250.0000		BENTOMAT ST CLOTH,FABRIC OR PIECE GOODS,NOI,OTHER THAN FOR THE MANUFACTUR CLASS 65 / ITEM 49265 SUB 10 CAR/VEHICLE #: NAT'W BOYD 17 rolls	49,074.7500

GROSS: .00 TARE: .00 NET: 49,074.75

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges

CETCO
(Signature of Consignor)

If charges are to be prepaid, write or stamp here, "Prepaid."

PREPAID

Shipper liable for line haul charges only. COD charges to be paid by: Consignee

MARK WITH "X" TO DESIGNATE HAZARDOUS MATERIAL AS DEFINED IN TITLE 49 OF THE CODE OF FEDERAL REGULATIONS

RECEIVED, subject to the classifications and lawfully filed tariffs in effect on date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Uniform Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a motor carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, set forth in the classification of tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Carrier:

This is to certify that the above named materials are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation

Per

PLACARDS REQUIRED
☐ YES ☐ NO

PLACARDS SUPPLIED
☐ YES ☐ NO - FURNISHED BY CARRIER
DRIVERS SIGNATURE:

P A C K I N G L I S T

CETCO
2870 FORBS AVENUE
HOFFMAN ESTATES IL 60192

ORDER NO:.. 025559508
ORDER DATE: 9/25/2009
SHIP DATE:. 10/27/2009

SOLD TO: 2099
HALLATON, INC.
1206 SPARKS RD.

SPARKS MD 21152

SHIP FROM:. CETCO CARTERSVILLE
FRT TERMS:. PREPAID & ADD
SHIP VIA:.. NAT'W BOYD

SHIP TO: 50
WHITE OAK LF -HAYWOOD CO. LF
HALLATON C/O THALLE CONST.
3898 FINES CREEK ROAD

WAYNESVILLE NC 28785

PO: P7005

PRODUCT	SIZE	U/M	LOT #	ROLL#	LNGTH	WIDTH	SHIP QTY	WEIGHT
CV-BENTOMAT ST		SFT	SF 200942CV	00009134	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009161	150.0	15.0	2250.0	2632.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009165	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009170	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009178	150.0	15.0	2250.0	2684.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009184	150.0	15.0	2250.0	2626.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009186	150.0	15.0	2250.0	2640.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009187	150.0	15.0	2250.0	2628.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009188	150.0	15.0	2250.0	2636.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009207	150.0	15.0	2250.0	2656.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009215	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009222	150.0	15.0	2250.0	2667.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009230	150.0	15.0	2250.0	2644.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009231	150.0	15.0	2250.0	2642.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009232	150.0	15.0	2250.0	2656.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009233	150.0	15.0	2250.0	2652.0
CV-BENTOMAT ST		SFT	SF 200942CV	00009235	150.0	15.0	2250.0	2656.0

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ORDER TOTALS.....	38250.0	44963.0

TOTAL ITEMS..... 17

Date: 10/20/2009
Purchase Order: P7005
ORDER NUMBERS: 025559501, 025559502, 025559503, 025559504, 025559505

Kennedy Garber
Hallaton

Sparks, MD 21152
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559501, 025559502, 025559503, 025559504, 025559505
PREPARED FOR: Hallaton

CONTENTS:

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

PRODUCT CERTIFICATIONS

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559501, 025559502, 025559503, 025559504, 025559505
PREPARED FOR: Hallaton

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5.0E-9 cm/s Max
ASTM D 5887	GCL Index Flux	Weekly	1.0E-8 m3/m2/s Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using
ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 025559501

GCL								Geotextiles				Clay
CV-BENTOMAT ST								N/W-WHITE			WOVEN	CV-CG 50
Order	**GCL Lot #**	**GCL Roll #**	**Length**	**Width**	**weight**	**sq ft**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
025559505	200942CV	9136	150	15	2614	2250	9134	200941CV	00003945	00003945	2020351536	929877B
025559501	200942CV	9142	150	15	2626	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559501	200942CV	9143	150	15	2624	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559505	200942CV	9148	150	15	2618	2250	9134	200941CV	00004001	00003999	2020398989	929879A
025559505	200942CV	9151	150	15	2628	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559501	200942CV	9156	150	15	2642	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559505	200942CV	9166	150	15	2638	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559502	200942CV	9167	150	15	2630	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559502	200942CV	9191	150	15	2626	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559502	200942CV	9193	150	15	2664	2250	9193	200942CV	00004138	00004138	2020332136	929879B
025559502	200942CV	9209	150	15	2636	2250	9208	200942CV	00004098	00004090	WEA011909-7	929879B
025559505	200942CV	9210	150	15	2636	2250	9208	200942CV	00004098	00004090	WEA011909-7	929879B
025559505	200942CV	9211	150	15	2640	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
025559502	200942CV	9212	150	15	2652	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
025559502	200942CV	9213	150	15	2644	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
025559502	200942CV	9214	150	15	2638	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B
025559502	200942CV	9219	150	15	2644	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B
025559501	200942CV	9221	150	15	2667	2250	9208	200942CV	00004135	00004128	WEA011621-19	929879B
025559502	200942CV	9225	150	15	2650	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559502	200942CV	9227	150	15	2642	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559505	200942CV	9228	150	15	2636	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559505	200942CV	9238	150	15	2652	2250	9237	200942CV	00004096	00004090	WEA011909-4	929880A
025559501	200942CV	9239	150	15	2654	2250	9237	200942CV	00004096	00004090	WEA011909-4	929880A
025559502	200942CV	9242	150	15	2728	2250	9242	200942CV	00004096	00004090	WEA011909-4	929880A
025559505	200942CV	9245	150	15	2654	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559505	200942CV	9246	150	15	2640	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559502	200942CV	9252	150	15	2730	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559502	200942CV	9256	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
025559505	200942CV	9257	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
025559501	200942CV	9258	150	15	2658	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
025559501	200942CV	9260	150	15	2642	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
025559502	200942CV	9261	150	15	2640	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559501	200942CV	9262	150	15	2646	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559505	200942CV	9270	150	15	2632	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559505	200942CV	9273	150	15	2630	2250	9266	200938CV	00003629	00003629	WEA011621-20	929880A
025559505	200942CV	9277	150	15	2634	2250	9266	200938CV	00003629	00003629	WEA011909-5	929880A
025559501	200942CV	9278	150	15	2598	2250	9266	200938CV	00003629	00003629	WEA011909-5	929880A
025559501	200942CV	9279	150	15	2644	2250	9266	200938CV	00003629	00003629	WEA011909-5	929880A
025559501	200942CV	9281	150	15	2650	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559501	200942CV	9284	150	15	2646	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559502	200942CV	9285	150	15	2646	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559502	200942CV	9286	150	15	2640	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880B
025559505	200942CV	9287	150	15	2652	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559505	200942CV	9288	150	15	2642	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559505	200942CV	9292	150	15	2704	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559501	200942CV	9293	150	15	2600	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559501	200942CV	9294	150	15	2638	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559503	200942CV	9296	150	15	2610	2250	9296	200942CV	00004097	00004090	WEA011909-5	929880B
025559503	200942CV	9298	150	15	2600	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559503	200942CV	9301	150	15	2604	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559503	200942CV	9304	150	15	2600	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559503	200942CV	9307	150	15	2592	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559503	200942CV	9308	150	15	2604	2250	9296	200938CV	00003596	00003589	WEA011909-1	929880B
025559503	200942CV	9309	150	15	2596	2250	9296	200938CV	00003596	00003589	WEA011909-1	929880B
025559501	200942CV	9310	150	15	2660	2250	9310	200938CV	00003596	00003589	WEA011909-1	929880B
025559503	200942CV	9311	150	15	2598	2250	9310	200938CV	00003596	00003589	WEA011909-1	929880B
025559503	200942CV	9312	150	15	2586	2250	9310	200938CV	00003596	00003589	WEA011909-1	929880B
025559502	200942CV	9313	150	15	2582	2250	9310	200938CV	00003596	00003589	WEA011621-21	929880B
025559504	200942CV	9314	150	15	2584	2250	9310	200938CV	00003596	00003589	WEA011621-21	929880B
025559503	200942CV	9315	150	15	2596	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559501	200942CV	9316	150	15	2594	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559503	200942CV	9317	150	15	2600	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559503	200942CV	9318	150	15	2602	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559503	200942CV	9319	150	15	2590	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559503	200942CV	9320	150	15	2588	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559504	200942CV	9321	150	15	2588	2250	9310	200940CV	00003768	00003764	WEA011621-21	929880B
025559504	200942CV	9322	150	15	2602	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B
025559504	200942CV	9323	150	15	2590	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B
025559503	200942CV	9324	150	15	2582	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B
025559503	200942CV	9326	150	15	2586	2250	9310	200942CV	00004092	00004090	WEA011621-21	929880B

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
025559504	200942CV	9327	150	15	2588	2250	9327	200942CV	00004092	00004090	WEA011621-21	929880B
025559504	200942CV	9328	150	15	2584	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559503	200942CV	9329	150	15	2588	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9330	150	15	2574	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9331	150	15	2572	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9332	150	15	2570	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9333	150	15	2584	2250	9327	200941CV	00004000	00003999	WEA011621-21	929880B
025559504	200942CV	9334	150	15	2578	2250	9327	200941CV	00004000	00003999	WEA011909-8	929880B
025559504	200942CV	9335	150	15	2578	2250	9327	200941CV	00003922	00003918	WEA011909-8	929880B
025559504	200942CV	9336	150	15	2584	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9337	150	15	2568	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9338	150	15	2580	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9339	150	15	2580	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
025559504	200942CV	9340	150	15	2590	2250	9327	200941CV	00003922	00003918	WEA011909-8	929878A
					Total sq ft:	**189000**	Total Number of Rolls Certified: **84**					

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 025559501 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
		ASTM Test Method:	D 5993	D 6768	D 6496
		Required Value:	0.75 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
CV-BENTOMAT ST	200942CV	9134	0.82	61.2	6.5
CV-BENTOMAT ST	200942CV	9149	0.86	61.2	6.5
CV-BENTOMAT ST	200942CV	9164	0.80	61.2	6.2
CV-BENTOMAT ST	200942CV	9178	0.87	61.2	5.7
CV-BENTOMAT ST	200942CV	9193	0.85	61.2	4.3
CV-BENTOMAT ST	200942CV	9208	0.84	61.2	4.4
CV-BENTOMAT ST	200942CV	9222	0.85	86.1	7.5
CV-BENTOMAT ST	200942CV	9237	0.83	86.1	6.1
CV-BENTOMAT ST	200942CV	9242	0.85	86.1	5.0
CV-BENTOMAT ST	200942CV	9252	0.87	86.1	4.7
CV-BENTOMAT ST	200942CV	9266	0.87	86.1	4.4
CV-BENTOMAT ST	200942CV	9281	0.89	86.1	10.4
CV-BENTOMAT ST	200942CV	9296	0.86	86.1	10.6
CV-BENTOMAT ST	200942CV	9310	0.83	52.4	8.3
CV-BENTOMAT ST	200942CV	9327	0.84	52.4	8.6

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 025559501

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
929878A	9.60	31.00	16.40
929877B	10.40	26.00	15.60
929879A	9.80	29.00	17.00
929879B	9.50	31.00	15.60
929880A	10.30	31.00	16.80
929880B	10.10	30.00	16.40

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 025559501 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 82TEX	2020332136	3.5	218.5
PPX 82TEX	2020351536	3.4	206.4
PPX 82TEX	2020363400	3.5	175.9
PPX 82TEX	2020398989	3.5	200.5
MTX 1213	WEA011621-19	3.4	156.6
MTX 1213	WEA011621-20	3.4	156.6
MTX 1213	WEA011621-21	3.4	156.6
MTX 1213	WEA011909-1	3.6	162.2
MTX 1213	WEA011909-4	3.6	162.2
MTX 1213	WEA011909-5	3.5	155.3
MTX 1213	WEA011909-7	3.5	155.3
MTX 1213	WEA011909-8	3.5	155.3

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
CV-NON-WOVEN	00003589	6.5	48.7
CV-NON-WOVEN	00003629	6.9	49.6
CV-NON-WOVEN	00003764	6.8	45.8
CV-NON-WOVEN	00003804	6.8	45.1
CV-NON-WOVEN	00003854	7.0	55.2
CV-NON-WOVEN	00003918	6.7	47.3
CV-NON-WOVEN	00003945	6.4	46.4
CV-NON-WOVEN	00003999	6.2	41.9
CV-NON-WOVEN	00004090	6.3	34.5
CV-NON-WOVEN	00004128	6.3	44.6
CV-NON-WOVEN	00004138	6.8	41.0
CV-NON-WOVEN	00004163	6.5	37.6

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

Date: 10/21/2009
Purchase Order: P7005
ORDER NUMBERS: 025559506, 025559510, 025559511, 025559512

Kennedy Garber
Hallaton

Sparks, MD 21152
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559506, 025559510, 025559511, 025559512
PREPARED FOR: Hallaton

CONTENTS:

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

PRODUCT CERTIFICATIONS

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559506, 025559510, 025559511, 025559512
PREPARED FOR: Hallaton

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5.0E-9 cm/s Max
ASTM D 5887	GCL Index Flux	Weekly	1.0E-8 m3/m2/s Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using
ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 025559506

GCL								Geotextiles				Clay
CV-BENTOMAT ST								N/W-WHITE			WOVEN	CV-CG 50
Order	**GCL Lot #**	**GCL Roll #**	**Length**	**Width**	**weight**	**sq ft**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
025559512	200942CV	9146	150	15	2616	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559512	200942CV	9147	150	15	2624	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559510	200942CV	9153	150	15	2632	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559510	200942CV	9155	150	15	2632	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559511	200942CV	9162	150	15	2636	2250	9149	200941CV	00003924	00003918	2020398989	929879A
025559511	200942CV	9168	150	15	2620	2250	9164	200941CV	00003924	00003918	2020363400	929879A
025559510	200942CV	9169	150	15	2650	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9171	150	15	2644	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9172	150	15	2632	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9173	150	15	2642	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9174	150	15	2636	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559511	200942CV	9175	150	15	2642	2250	9164	200941CV	00003948	00003945	2020363400	929879A
025559511	200942CV	9176	150	15	2648	2250	9164	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9177	150	15	2640	2250	9164	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9179	150	15	2667	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9180	150	15	2630	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9181	150	15	2642	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559512	200942CV	9182	150	15	2636	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559510	200942CV	9196	150	15	2634	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559510	200942CV	9197	150	15	2640	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559511	200942CV	9198	150	15	2654	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559512	200942CV	9199	150	15	2642	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559511	200942CV	9200	150	15	2651	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559511	200942CV	9201	150	15	2640	2250	9193	200942CV	00004136	00004128	2020332136	929879B
025559512	200942CV	9202	150	15	2634	2250	9193	200942CV	00004136	00004128	WEA011909-7	929879B
025559512	200942CV	9203	150	15	2648	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9204	150	15	2634	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9205	150	15	2648	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9206	150	15	2636	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9208	150	15	2672	2250	9208	200942CV	00004164	00004163	WEA011909-7	929879B
025559512	200942CV	9216	150	15	2642	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
025559512	200942CV	9217	150	15	2650	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B
025559512	200942CV	9218	150	15	2644	2250	9208	200942CV	00004135	00004128	WEA011909-7	929879B
025559510	200942CV	9220	150	15	2644	2250	9208	200942CV	00004135	00004128	WEA011621-19	929879B
025559510	200942CV	9223	150	15	2654	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559511	200942CV	9224	150	15	2646	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559511	200942CV	9226	150	15	2626	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559510	200942CV	9229	150	15	2642	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559506	200942CV	9241	150	15	2616	2250	9237	200942CV	00004096	00004090	WEA011909-4	929880A
025559506	200942CV	9244	150	15	2646	2250	9242	200942CV	00004096	00004090	WEA011909-4	929880A
025559510	200942CV	9247	150	15	2642	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559510	200942CV	9248	150	15	2652	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559510	200942CV	9249	150	15	2652	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559511	200942CV	9250	150	15	2668	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559511	200942CV	9251	150	15	2668	2250	9242	200938CV	00003631	00003629	WEA011909-4	929880A
025559506	200942CV	9253	150	15	2646	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559506	200942CV	9254	150	15	2646	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559506	200942CV	9255	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011909-4	929880A
025559506	200942CV	9259	150	15	2644	2250	9252	200942CV	00004091	00004090	WEA011621-20	929880A
025559506	200942CV	9263	150	15	2644	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559506	200942CV	9264	150	15	2650	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559510	200942CV	9266	150	15	2706	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559510	200942CV	9271	150	15	2640	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559510	200942CV	9272	150	15	2620	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559506	200942CV	9274	150	15	2636	2250	9266	200938CV	00003629	00003629	WEA011621-20	929880A
025559511	200942CV	9275	150	15	2624	2250	9266	200938CV	00003629	00003629	WEA011621-20	929880A
025559506	200942CV	9276	150	15	2628	2250	9266	200938CV	00003629	00003629	WEA011909-5	929880A
025559506	200942CV	9282	150	15	2644	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559506	200942CV	9283	150	15	2650	2250	9281	200940CV	00003772	00003764	WEA011909-5	929880A
025559510	200942CV	9291	150	15	2640	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559510	200942CV	9295	150	15	2610	2250	9281	200942CV	00004097	00004090	WEA011909-5	929880B
025559510	200942CV	9297	150	15	2600	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559511	200942CV	9299	150	15	2598	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559506	200942CV	9300	150	15	2592	2250	9296	200942CV	00004097	00004090	WEA011909-1	929880B
025559506	200942CV	9302	150	15	2600	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559506	200942CV	9303	150	15	2600	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559506	200942CV	9305	150	15	2598	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
025559506	200942CV	9306	150	15	2610	2250	9296	200940CV	00003773	00003764	WEA011909-1	929880B
					Total sq ft:	**153000**					Total Number of Rolls Certified: **68**	

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 025559506 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
		ASTM Test Method:	D 5993	D 6768	D 6496
		Required Value:	0.75 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
CV-BENTOMAT ST	200942CV	9134	0.82	61.2	6.5
CV-BENTOMAT ST	200942CV	9149	0.86	61.2	6.5
CV-BENTOMAT ST	200942CV	9164	0.80	61.2	6.2
CV-BENTOMAT ST	200942CV	9178	0.87	61.2	5.7
CV-BENTOMAT ST	200942CV	9193	0.85	61.2	4.3
CV-BENTOMAT ST	200942CV	9208	0.84	61.2	4.4
CV-BENTOMAT ST	200942CV	9222	0.85	86.1	7.5
CV-BENTOMAT ST	200942CV	9237	0.83	86.1	6.1
CV-BENTOMAT ST	200942CV	9242	0.85	86.1	5.0
CV-BENTOMAT ST	200942CV	9252	0.87	86.1	4.7
CV-BENTOMAT ST	200942CV	9266	0.87	86.1	4.4
CV-BENTOMAT ST	200942CV	9281	0.89	86.1	10.4
CV-BENTOMAT ST	200942CV	9296	0.86	86.1	10.6

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 025559506

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
929879A	9.80	29.00	17.00
929879B	9.50	31.00	15.60
929880A	10.30	31.00	16.80
929880B	10.10	30.00	16.40

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 025559506 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 82TEX	2020332136	3.5	218.5
PPX 82TEX	2020363400	3.5	175.9
PPX 82TEX	2020398989	3.5	200.5
MTX 1213	WEA011621-19	3.4	156.6
MTX 1213	WEA011621-20	3.4	156.6
MTX 1213	WEA011909-1	3.6	162.2
MTX 1213	WEA011909-4	3.6	162.2
MTX 1213	WEA011909-5	3.5	155.3
MTX 1213	WEA011909-7	3.5	155.3

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
CV-NON-WOVEN	00003629	6.9	49.6
CV-NON-WOVEN	00003764	6.8	45.8
CV-NON-WOVEN	00003804	6.8	45.1
CV-NON-WOVEN	00003854	7.0	55.2
CV-NON-WOVEN	00003918	6.7	47.3
CV-NON-WOVEN	00003945	6.4	46.4
CV-NON-WOVEN	00003999	6.2	41.9
CV-NON-WOVEN	00004033	6.5	33.4
CV-NON-WOVEN	00004090	6.3	34.5
CV-NON-WOVEN	00004128	6.3	44.6
CV-NON-WOVEN	00004138	6.8	41.0
CV-NON-WOVEN	00004163	6.5	37.6

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

Date: 10/22/2009
Purchase Order: P7005
ORDER NUMBERS: 025559507, 025559508, 025559509

Kennedy Garber
Hallaton

Sparks, MD 21152
kgarber@hallaton.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to Hallaton.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Melanie King

Melanie King
Quality Assurance Coordinator
CETCO Cartersville Plant

GEOSYNTHETIC CLAY LINER
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559507, 025559508, 025559509
PREPARED FOR: Hallaton

CONTENTS:

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Melanie King
Quality Assurance Coordinator
CETCO
218 Industrial Park

Cartersville, GA 30121
Telephone: (770) 387-7773
E-Mail: melanie.king@cetco.com

PRODUCT CERTIFICATIONS

PROJECT NAME: White Oak LF-Haywood Co LF
CUSTOMER P.O.: P7005
ORDER NUMBERS: 025559507, 025559508, 025559509
PREPARED FOR: Hallaton

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

GCL PROPERTY SPECIFICATIONS FOR BENTOMAT ST

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.75 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	5.0E-9 cm/s Max
ASTM D 5887	GCL Index Flux	Weekly	1.0E-8 m3/m2/s Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using
ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

NEEDLE DETECTION AND REMOVAL PROCEDURE

CETCO hereby affirms that all Bentomat® geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat® to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Melanie King

Melanie King
Quality Assurance Coordinator

GCL PACKING LIST AND MQA TRACKING FORM

Listing of finished and raw materials used to produce certification package number 025559507

GCL								Geotextiles				Clay
CV-BENTOMAT ST								N/W-WHITE			WOVEN	CV-CG 50
Order	**GCL Lot #**	**GCL Roll #**	**Length**	**Width**	**weight**	**sq ft**	**Roll # Tested**	**Cap Lot #**	**Cap Roll #**	**Roll # Tested**	**Base Roll #**	**Clay Lot #**
025559508	200942CV	9134	150	15	2636	2250	9134	200941CV	00003945	00003945	2020351536	929877B
025559509	200942CV	9137	150	15	2632	2250	9134	200941CV	00003945	00003945	2020351536	929879A
025559509	200942CV	9140	150	15	2634	2250	9134	200941CV	00003945	00003945	2020351536	929879A
025559509	200942CV	9144	150	15	2622	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559507	200942CV	9145	150	15	2630	2250	9134	200942CV	00004144	00004138	2020398989	929879A
025559507	200942CV	9149	150	15	2638	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9150	150	15	2640	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9152	150	15	2636	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9154	150	15	2648	2250	9149	200941CV	00004001	00003999	2020398989	929879A
025559507	200942CV	9157	150	15	2648	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559507	200942CV	9158	150	15	2644	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559509	200942CV	9160	150	15	2634	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559508	200942CV	9161	150	15	2632	2250	9149	200941CV	00003923	00003918	2020398989	929879A
025559509	200942CV	9163	150	15	2636	2250	9149	200941CV	00003924	00003918	2020398989	929879A
025559509	200942CV	9164	150	15	2648	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559508	200942CV	9165	150	15	2626	2250	9164	200941CV	00003924	00003918	2020398989	929879A
025559508	200942CV	9170	150	15	2640	2250	9164	200942CV	00004035	00004033	2020363400	929879A
025559508	200942CV	9178	150	15	2684	2250	9178	200941CV	00003948	00003945	2020363400	929879A
025559507	200942CV	9183	150	15	2642	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559508	200942CV	9184	150	15	2626	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559507	200942CV	9185	150	15	2630	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559508	200942CV	9186	150	15	2640	2250	9178	200942CV	00004165	00004163	2020363400	929879A
025559508	200942CV	9187	150	15	2628	2250	9178	200942CV	00004165	00004163	2020363400	929879B
025559508	200942CV	9188	150	15	2636	2250	9178	200942CV	00004165	00004163	2020363400	929879B
025559507	200942CV	9189	150	15	2628	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559507	200942CV	9190	150	15	2638	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559507	200942CV	9192	150	15	2620	2250	9178	200942CV	00004138	00004138	2020363400	929879B
025559507	200942CV	9194	150	15	2636	2250	9193	200942CV	00004138	00004138	2020332136	929879B
025559509	200942CV	9195	150	15	2648	2250	9193	200942CV	00004138	00004138	2020332136	929879B
025559508	200942CV	9207	150	15	2656	2250	9193	200942CV	00004164	00004163	WEA011909-7	929879B
025559508	200942CV	9215	150	15	2642	2250	9208	200942CV	00004298	00004163	WEA011909-7	929879B

Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
025559508	200942CV	9222	150	15	2667	2250	9222	200942CV	00004135	00004128	WEA011621-19	929879B
025559508	200942CV	9230	150	15	2644	2250	9222	200938CV	00003632	00003629	WEA011621-19	929879B
025559508	200942CV	9231	150	15	2642	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559508	200942CV	9232	150	15	2656	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559508	200942CV	9233	150	15	2652	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559507	200942CV	9234	150	15	2633	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559508	200942CV	9235	150	15	2656	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559509	200942CV	9236	150	15	2650	2250	9222	200942CV	00004094	00004090	WEA011621-19	929879B
025559509	200942CV	9237	150	15	2680	2250	9237	200942CV	00004094	00004090	WEA011621-19	929880A
025559509	200942CV	9243	150	15	2646	2250	9242	200942CV	00004096	00004090	WEA011909-4	929880A
025559509	200942CV	9265	150	15	2636	2250	9252	200940CV	00003817	00003804	WEA011621-20	929880A
025559509	200942CV	9267	150	15	2640	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559509	200942CV	9268	150	15	2640	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559509	200942CV	9269	150	15	2634	2250	9266	200940CV	00003859	00003854	WEA011621-20	929880A
025559509	200942CV	9280	150	15	2646	2250	9266	200940CV	00003772	00003764	WEA011909-5	929880A
025559509	200942CV	9289	150	15	2632	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
025559509	200942CV	9290	150	15	2638	2250	9281	200940CV	00003858	00003854	WEA011909-5	929880B
						Total sq ft: **108000**	Total Number of Rolls Certified: **48**					

GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 025559507 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
		ASTM Test Method:	D 5993	D 6768	D 6496
		Required Value:	0.75 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
CV-BENTOMAT ST	200942CV	9134	0.82	61.2	6.5
CV-BENTOMAT ST	200942CV	9149	0.86	61.2	6.5
CV-BENTOMAT ST	200942CV	9164	0.80	61.2	6.2
CV-BENTOMAT ST	200942CV	9178	0.87	61.2	5.7
CV-BENTOMAT ST	200942CV	9193	0.85	61.2	4.3
CV-BENTOMAT ST	200942CV	9208	0.84	61.2	4.4
CV-BENTOMAT ST	200942CV	9222	0.85	86.1	7.5
CV-BENTOMAT ST	200942CV	9237	0.83	86.1	6.1
CV-BENTOMAT ST	200942CV	9242	0.85	86.1	5.0
CV-BENTOMAT ST	200942CV	9252	0.87	86.1	4.7
CV-BENTOMAT ST	200942CV	9266	0.87	86.1	4.4
CV-BENTOMAT ST	200942CV	9281	0.89	86.1	10.4

BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 025559507

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
929877B	10.40	26.00	15.60
929879A	9.80	29.00	17.00
929879B	9.50	31.00	15.60
929880A	10.30	31.00	16.80
929880B	10.10	30.00	16.40

GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 025559507 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
PPX 82TEX	2020332136	3.5	218.5
PPX 82TEX	2020351536	3.4	206.4
PPX 82TEX	2020363400	3.5	175.9
PPX 82TEX	2020398989	3.5	200.5
MTX 1213	WEA011621-19	3.4	156.6
MTX 1213	WEA011621-20	3.4	156.6
MTX 1213	WEA011909-4	3.6	162.2
MTX 1213	WEA011909-5	3.5	155.3
MTX 1213	WEA011909-7	3.5	155.3

COVER GEOTEXTILE

Material	Roll Number	Mass Area oz/yd2	Grab Strength lbs
CV-NON-WOVEN	00003629	6.9	49.6
CV-NON-WOVEN	00003764	6.8	45.8
CV-NON-WOVEN	00003804	6.8	45.1
CV-NON-WOVEN	00003854	7.0	55.2
CV-NON-WOVEN	00003918	6.7	47.3
CV-NON-WOVEN	00003945	6.4	46.4
CV-NON-WOVEN	00003999	6.2	41.9
CV-NON-WOVEN	00004033	6.5	33.4
CV-NON-WOVEN	00004090	6.3	34.5
CV-NON-WOVEN	00004128	6.3	44.6
CV-NON-WOVEN	00004138	6.8	41.0
CV-NON-WOVEN	00004163	6.5	37.6

Certifications from our suppliers are on file at our production facility.

An '*' or 'PT' indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

CETCO
COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY

Please Note: This Recap is thru 3 pm. Other trucks could be loaded.

RECAP SHEETS

TO:
Hallaton
White Oak LF
3898 Fines Creek Road
Waynesville, NC 28785
Kennedy Garber
410.583.7700
kgarber@hallaton.com

FROM: **CETCO**
Cartersville,GA

ATTN: **JUDY**
PHONE: **770 387 7751**
FAX:

CUSTOMER P.O. P7005
ORDER APPROX. 450,000 **sf BMST**
ORDERED 200 **rolls** 50 **bags**

	ORDER #	TRUCK	SHIP DATE	ROLLS	SQ FT	BAGS	COMMENTS
1	25559501	Nationwide	10/19/2009	16	36,000	50	includes 1 pallet of conformance samples
2	25559502	Nationwide	10/19/2009	17	38,250		
3	25559503	Nationwide	10/19/2009	17	38,250		
4	25559504	Nationwide	10/19/2009	17	38,250		
5	25559505	Nationwide	10/19/2009	17	38,250		
6	25559506	Nationwide	10/20/2009	17	38,250		
7	25559511	Nationwide	10/20/2009	17	38,250		
8	25559512	Nationwide	10/20/2009	17	38,250		
9	25559510	Nationwide	10/20/2009	17	38,250		
10	25559509	Nationwide	10/21/2009	17	38,250		
11	25559508	Nationwide	10/21/2009	17	38,250		
12	25559507	Nationwide	10/22/2009	14	31,500		
					Complete		
	TOTALS			200	450,000	50	

Appendix II B – Interface Friction Angle Test Results

TRI/ENVIRONMENTAL, INC.

A Texas Research International Company

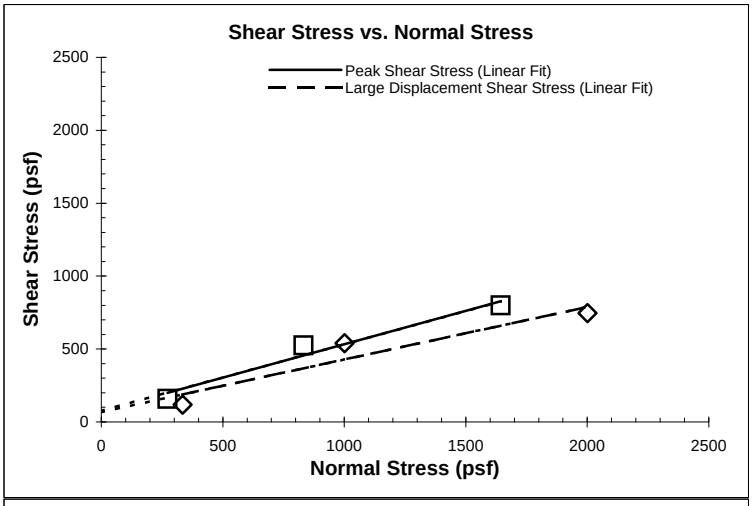
Interface Friction Test Report

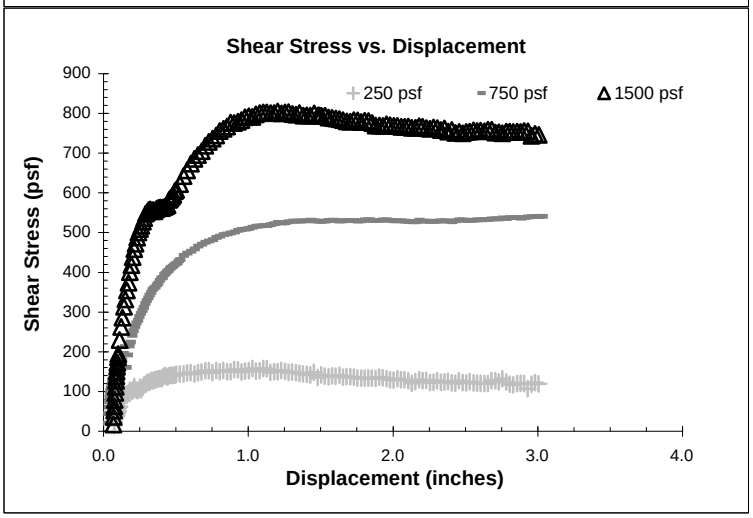
Client: **Hallaton**
Project: **White Oak Landfill**
Test Date: 10/30/09-11/02/09

TRI Log#: E2325-88-02
Test Method: ASTM D 6243

John M. Allen, P.E., 11/02/2009
Quality Review/Date

Tested Interface: Bentomat ST GCL (8489) vs. Clay Soil





Test Results		
	Peak	**Large Displacement (@ 3.0 in.)**
Friction Angle (degrees):	**24.6**	**19.9**
Y-intercept or Adhesion (psf):	**75**	**65**

Note: Regression angles include an area correction.

Test Conditions

Upper Box & Bentomat ST GCL (white side)

Lower Box Clay soil remolded to 92 pcf at 28.9% moisture content

Box Dimensions: 12"x12"x4"

Interface Conditioning: Interface soaked and loading applied for a minimum of 24 hours prior to shear.

Test Condition: Wet

Shearing Rate: 0.04 inches/minute

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	10	15	22
Area Corrected Normal Stress (psf)	273	832	1644
Area Corrected Peak Shear Stress (psf)	158	525	798
Area Corrected Large Displacement Normal Stress (psf)	334	1001	2001
Area Corrected Large Displacement Shear Stress (psf)	119	540	746
Peak Secant Angle (degrees)	30.1	32.3	25.9
Large Displacement Secant Angle (degrees)	19.6	28.4	20.4

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

9063 Bee Caves Road □ Austin, TX 78733-6201 □ (512) 263-2101 □ (512) 263-2558 □ 1-800-880-TEST

TRI/ENVIRONMENTAL, INC.

A Texas Research International Company

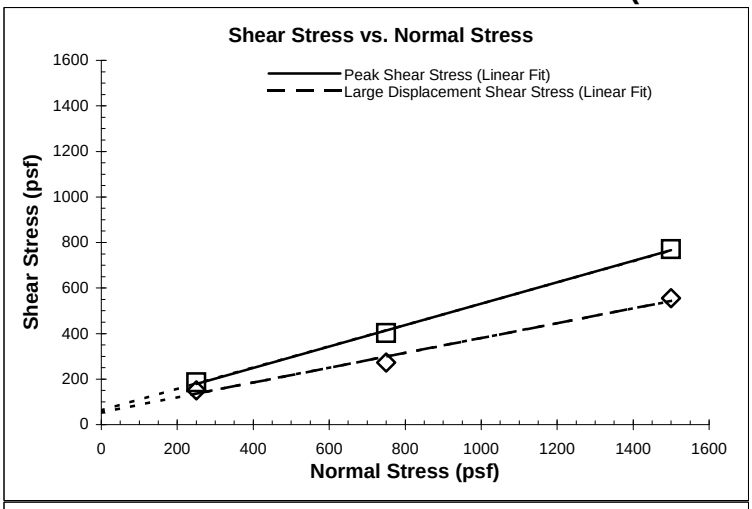
Interface Friction Test Report

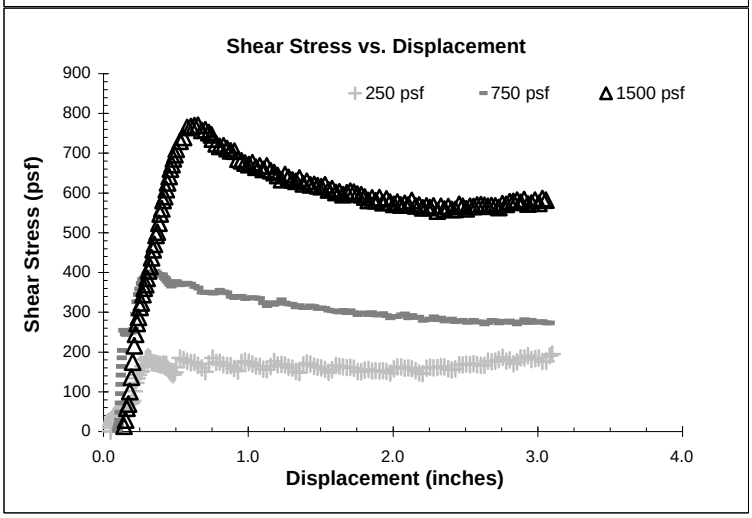
Client: **Hallaton**
Project: **White Oak Landfill**
Test Date: 10/20/09-10/21/09

TRI Log#: E2325-88-02
Test Method: ASTM D 6243

John M. Allen, P.E., 10/21/2009
Quality Review/Date

Tested Interface: Bentomat ST GCL (8489) vs. Agru 60 mil HDPE Microspike Geomembrane (337201.09)





Test Results

	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	**25.1**	**18.1**
Y-intercept or Adhesion (psf):	**62**	**54**

Shearing occurred at the interface.

Test Conditions

Upper Box & Bentomat ST GCL (black side)

Lower Box Agru 60 mil HDPE Microspike Geomembrane (shiny side)

Box Dimensions: 12"x12"x4"

Interface Conditioning: Interface soaked and loading applied for a minimum of 24 hours prior to shear.

Test Condition: Wet

Shearing Rate: 0.04 inches/minute

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	10	15	22
Normal Stress (psf)	250	750	1500
Corrected Peak Shear Stress (psf)	186	403	770
Corrected Large Displacement Shear Stress (psf)	151	273	555
Peak Secant Angle (degrees)	36.6	28.2	27.2
Large Displacement Secant Angle (degrees)	31.1	20.0	20.3
Asperity (mils)	35.0	34.6	34.6

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

9063 Bee Caves Road □ Austin, TX 78733-6201 □ (512) 263-2101 □ (512) 263-2558 □ 1-800-880-TEST

TRI/ENVIRONMENTAL, INC.

A Texas Research International Company

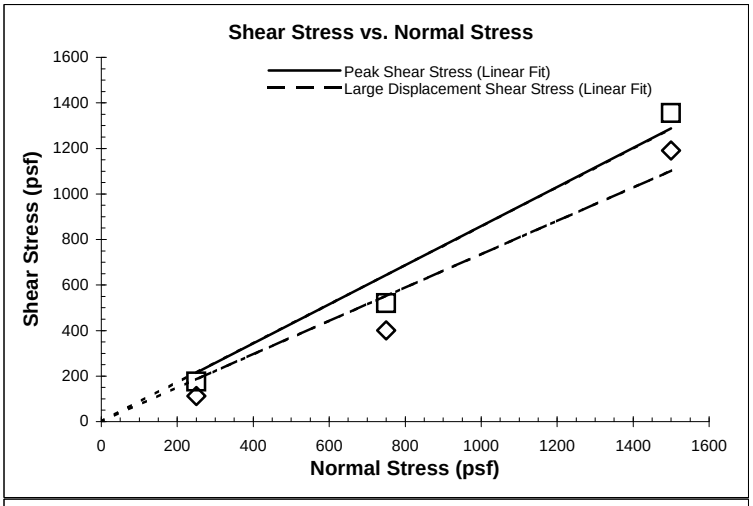
Interface Friction Test Report

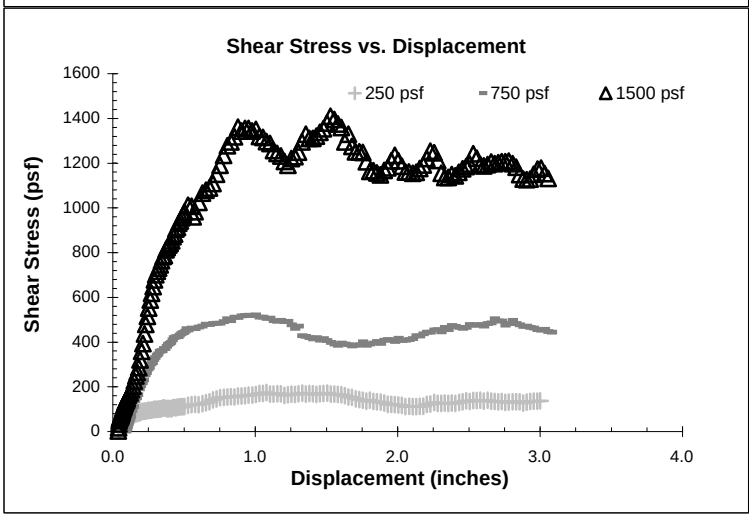
Client: **Hallaton**
Project: **White Oak Landfill**
Test Date: 10/19/09-10/19/09

TRI Log#: E2325-88-02
Test Method: ASTM D 5321

John M. Allen, P.E., 10/19/2009
Quality Review/Date

Tested Interface: 57 Stone vs. Skaps GE 116 Non-woven Geotextile





Test Results		
	Peak	**Large Displacement (@ 1.5 in.)**
Friction Angle (degrees):	**40.6**	**36.3**
Y-intercept or Adhesion (psf):	**0**	**0**

Regression friction angles include the origin.
Shearing occurred at the interface.

Test Conditions

Upper Box & 57 Stone tamped in place

Lower Box Skaps GE 116 non-woven geotextile

Box Dimensions: 12"x12"x4"

Interface Conditioning: Interface soaked and loading applied for a minimum of 1 hour prior to shear.

Test Condition: Wet

Shearing Rate: 0.04 inches/minute

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	10	15	22
Normal Stress (psf)	250	750	1500
Corrected Peak Shear Stress (psf)	175	521	1356
Corrected Large Displacement Shear Stress (psf)	113	401	1191
Peak Secant Angle (degrees)	35.0	34.8	42.1
Large Displacement Secant Angle (degrees)	24.3	28.1	38.4

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

9063 Bee Caves Road □ Austin, TX 78733-6201 □ (512) 263-2101 □ (512) 263-2558 □ 1-800-880-TEST

McGill ASSOCIATES

COPY

25th anniversary 1984-2009

October 28, 2009

Mr. Christopher R. Haverstrom, P.E.
Thalle Construction Company, Inc.
900 NC 86 North
Hillsborough, North Carolina 27278

RECEIVED NOV 02 2009

RE: Shop Drawings Submittal
2300-003
MSW Phase 3
White Oak MSW Landfill
Haywood County, North Carolina

Dear Mr. Haverstrom:

Please find attached a copy of the shop drawing that was submitted to us for review:

Submittal #

- **2300-003** **Interface Friction Angle:**
  HDPE Geomembrane vs. Double-Sided Geocomposite **APPROVED**
  HDPE Geommebrane vs. Non-Woven Geotextile Cushion **APPROVED**

Please note that additional friction angle information pertaining to the GCL, clay material, and stone drainage layer is required. Feel free to contact Jeff Bishop, Bill Sperry, or me if you wish to discuss this submittal.

Sincerely,
McGILL ASSOCIATES, P.A.

Dave Pasko

DAVE PASKO
Senior Engineering Technician

Enclosures

cc: Mr. Stephen King, Haywood County, 2 copies
Mr. Roy Alexander, McGill Associates, 2 copies
✓Mr. Evan Andrews, P.E., Joyce Engineering, 1 copy

P:\2007\07518\Construction Administration\Letters\ch28oct09-shop2300-003.DOC

TRI/ENVIRONMENTAL, INC.

A Texas Research International Company

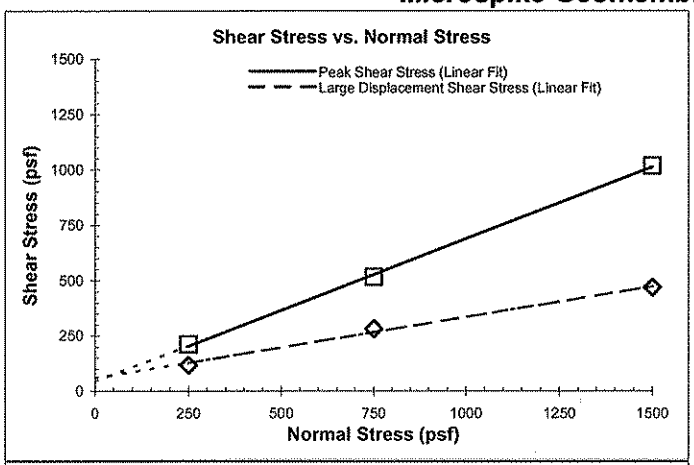
Interface Friction Test Report

Client: **Hallaton, Inc.**
Project: **White Oak Landfill**
Test Date: 07/23/09-07/23/09

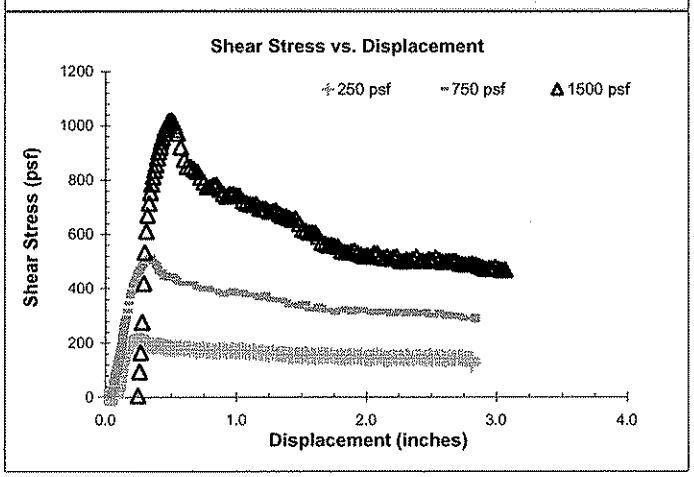
TRI Log#: E2325-56-07
Test Method: ASTM D 5321

John M. Allen, P.E., 07/23/2009
Quality Review/Date

Tested Interface: Skaps TN250-2-8 Double-sided Geocomposite vs. Agru 60 mil HDPE Microspike Geomembrane (226477.09)



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	32.9	15.5
Y-intercept or Adhesion (psf):	43	59



Test Conditions

Upper Box & Lower Box: Skaps TN250-2-8 double-sided geocomposite; Agru 60 mil HDPE Microspike geomembrane (dull side)

Box Dimensions: 12"x12"x4"

Interface Conditioning: Interface soaked and loading applied for a minimum of 1 hour prior to shear.

Test Condition: Wet

Shearing Rate: 0.2 inches/minute

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	3	3	22
Normal Stress (psf)	250	750	1500
Corrected Peak Shear Stress (psf)	212	516	1019
Corrected Large Displacement Shear Stress (psf)	119	282	469
Peak Secant Angle (degrees)	40.3	34.5	34.2
Large Displacement Secant Angle (degrees)	25.5	20.6	17.4
Asperity (mils)	25.8	25.6	22.8

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

Hallaton Construction Company, Inc.

TRI/ENVIRONMENTAL, INC.

A Texas Research International Company

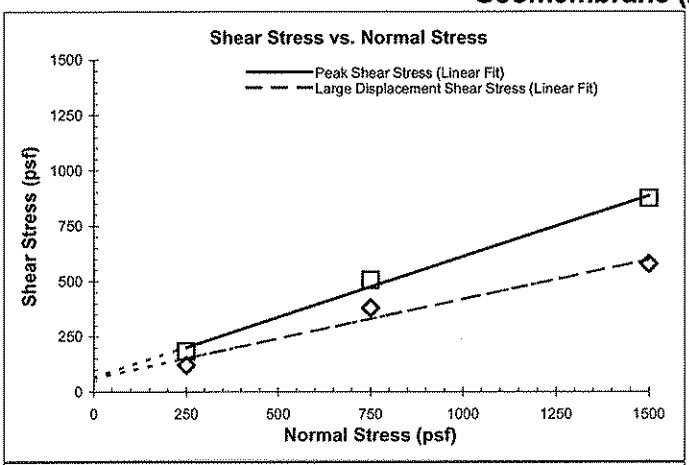
Interface Friction Test Report

Client: **Hallaton, Inc.**
Project: **White Oak Landfill**
Test Date: 07/23/09-07/28/09

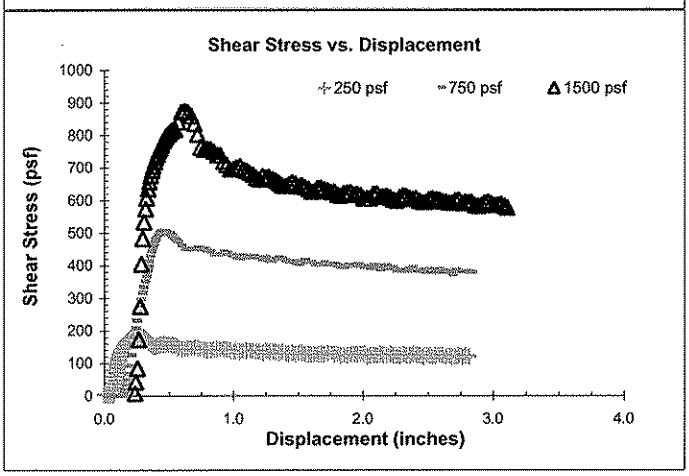
TRI Log#: E2325-56-07
Test Method: ASTM D 5321

John M. Allen, P.E., 07/28/2009
Quality Review/Date

Tested Interface: Skaps GE116 Non-woven Geotextile vs. Agru 60 mil HDPE Microspike Geomembrane (226477.09)



Test Results		
	Peak	Large Displacement (@ 3.0 in.)
Friction Angle (degrees):	28.7	19.7
Y-intercept or Adhesion (psf):	65	62



Test Conditions

Upper Box & Lower Box: Skaps GE116 Non-woven Geotextile

Lower Box: Agru 60 mil HDPE Microspike geomembrane (shiny side)

Box Dimensions: 12"x12"x4"

Interface Conditioning: Interface soaked and loading applied for a minimum of 1 hour prior to shear.

Test Condition: Wet

Shearing Rate: 0.2 inches/minute

Test Data

Specimen No.	1	2	3
Bearing Slide Resistance (lbs)	3	3	22
Normal Stress (psf)	250	750	1500
Corrected Peak Shear Stress (psf)	184	506	875
Corrected Large Displacement Shear Stress (psf)	121	380	578
Peak Secant Angle (degrees)	36.4	34.0	30.2
Large Displacement Secant Angle (degrees)	25.8	26.9	21.1
Asperity (mils)	26.6	24.4	21.8

The testing herein is based upon accepted industry practice as well as the test method listed. Test results reported herein do not apply to samples other than those tested. TRI neither accepts responsibility for nor makes claim as to the final use and purpose of the material. TRI observes and maintains client confidentiality. TRI limits reproduction of this report, except in full, without prior approval of TRI.

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Appendix III

Appendix III – HDPE Geomembrane

Appendix III A – Manufacturer Certifications

ATTENTION: CONSTRUCTION ADMINISTRATION

SUBMITTAL AND ROUTING FORM

(TO BE USED WITH EACH INDIVIDUAL PLAN SUBMITTAL OR SHOP DRAWING)

SUBMITTAL AND APPROVAL (Contractor to Complete)

Project Name: White Oak Landfill MSW Phase 3 — McGill Project #: 7518

Contractor: Thalle Construction Company — Submittal #: 2620-007

Contract for: — Spec Section: 2620

Submittal Title: HDPE Liner MQC Reports

Sheet / item numbers:

Subcontractor: Hallaton — Supplier: Agru

Date Transmitted: 10/26/2009 — Date Needed:

Change from Contract Documents? Yes **No** — Attached Documentation:

Submittal Complete: **Yes** No

The Contractor must review and approve this submittal for all requirements and conformance to the contract documents prior to submittal to McGill Associates. Submittals forwarded without the Contractor's approval will be returned without review or comment.

Reviewed by: Sarah McKee — Date: 10/26/2009

McGILL ASSOCIATES SUBMITTAL ROUTING (McGill to complete)

Date Received: _____ Logged By: _____ To: _____ Returned By: _____

Review Codes: **1=Approved: 2=Approved as Noted: 3=Revise and Resubmitt: 4=Not Approved**

Reviewed By	Review Code	COMMENTS	Initials	Date

Project Engineers Approval: _____ Date: _____

microspike liner

HDPE

60 mil

Hallaton (Haywood Cty) White Oak LF doc 12271

Waynesville, NC

PO#	P6906

48 rolls 60 HD micro (MIN)	48	left

METRIC DIMENSIONS

roll #	width	length	area	check weld rod qty						
(K)339218 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	1	3388	STAGE for ???	8190496
(K)339219 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	2	3414		8190496
(K)339220 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	3	3526		8190369
(K)339221 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	4	3526		8190369
(K)339222 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	5	3520		8190369
(K)339223 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	6	3518		8190369
(K)339224 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	7	3460		8190369
(K)339225 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	8	3374		8190369
(K)339226 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	9	3374		8190369
(K)339227 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	10	3372		8190369
(K)339330 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	11	3418	STAGE for ???	8190369
(K)339331 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	12	3418		8190369
(K)339332 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	13	3416		8190369
(K)339333 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	14	3416		8190369
(K)339334 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	15	3420		8190369
(K)339335 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	16	3424		8190369
(K)339336 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	17	3426		8190369
(K)339337 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	18	3426		8190369
(K)339338 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	19	3428		8190369
(K)339339 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	20	3426		8190369
(K)339342 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	21	3416		8190369
(K)339445 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	22	3420	STAGE for ???	8190369
(K)339446 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	23	3415		8190369
(K)339447 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	24	3412		8190369
(K)339448 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	25	3420		8190369
(K)339449 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	26	3410		8190369
(K)339450 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	27	3318		8190369
(K)339451 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	28	3326		8190369
(K)339454 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	29	3328		8190369
(K)339457 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	30	3366		8190369
(K)339458 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	31	3356		8190369
(K)339562 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	32	3386	STAGE for ???	8190369
(K)339563 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	33	3390		8190369
(K)339564 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	34	3380		8190369
(K)339565 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	35	3350		8190369
(K)339566 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	36	3388		8190369
(K)339567 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	37	3390		8190369
(K)339568 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	38	3380		8190369
(K)339569 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	39	3380		8190369
(K)339572 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	40	3312		8190369
(K)339573 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	41	3310		8190369
(K)339574 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	42	3314		8190369
(K)339675 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	43	3298	STAGE for ???	8190369
(K)339676 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	44	3320		8190369
(K)339684 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	45	3400		7290649
(K)339685 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	46	3400		7290649
(K)339686 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	47	3410		7290649
(K)339687 .09	7	125	875	Hallaton White Oak LF (60MIN)	48tot	48	3402		7290649

agru america quality control dept.

quality certificate

ROLL # **339218-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.52**	mm	**60**	mil
	MAX:	**1.70**	mm	**67**	mil
Asperity ASTM D7466: **33/35** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range		%				**2.35**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,675**	psi	
	Average Strength @ Break	**33**	N/mm (kN/m)	**187**	ppi	**2,957**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**18.50**	
Lo = 2.0" Break	Average Elongation @ Break		%				**427.1**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.1**	N			**58.485**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**469.1**	N			**105.47**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**661.5**	N			**148.72**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-22-09**

Signature.....
Quality Control Department

60HDmic.FRM
REV 03
12/23/05

agru america quality control dept.

quality certificate

ROLL # **339219-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.60**	mm	**63**	mil
Asperity ASTM D7466: **30/31** mil	AVE:	**1.57**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**183**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.28**	
Carbon Black Content ASTM D4218	Range		%			**2.35**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**165**	ppi	**2,675**	psi
	Average Strength @ Break	**32**	N/mm (kN/m)	**183**	ppi	**2,957**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.50**	
Lo = 2.0" Break	Average Elongation @ Break		%			**427.1**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.1**	N			**58.485**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**469.1**	N			**105.47**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**661.5**	N			**148.72**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-22-09**

Signature.....
Quality Control Department

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12/23/05

agru america quality control dept.

quality certificate

ROLL # **339220-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.57**	mm	**62**	mil
	MAX:	**1.76**	mm	**69**	mil
Asperity ASTM D7466: **32/35** mil	AVE:	**1.67**	mm	**66**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range		%				**2.35**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**176**	ppi	**2,675**	psi	
	Average Strength @ Break	**34**	N/mm (kN/m)	**194**	ppi	**2,957**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**18.50**	
Lo = 2.0" Break	Average Elongation @ Break		%				**427.1**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.1**	N			**58.485**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**469.1**	N			**105.47**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**661.5**	N			**148.72**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-22-09**

Signature.....
Quality Control Department

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REV 03
12/23/05

agru america quality control dept.

quality certificate

ROLL # **339221-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.57**	mm	**62**	mil
	MAX:	**1.62**	mm	**64**	mil
Asperity ASTM D7466: **36/30** mil	AVE:	**1.59**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**183**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range	%				**2.35**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**167**	ppi	**2,675**	psi
	Average Strength @ Break	**32**	N/mm (kN/m)	**185**	ppi	**2,957**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**18.50**	
Lo = 2.0" Break	Average Elongation @ Break	%				**427.1**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.1**	N			**58.485**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**469.1**	N			**105.47**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**661.5**	N			**148.72**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339222-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.57**	mm	**62**	mil
	MAX:	**1.67**	mm	**66**	mil
Asperity ASTM D7466: **30/34** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**183**	

						TEST RESULTS
Specific Gravity ASTM D792	Density		g/cc			**.945**
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.28**
Carbon Black Content ASTM D4218	Range		%			**2.35**
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,675** psi
	Average Strength @ Break	**33**	N/mm (kN/m)	**187**	ppi	**2,957** psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.50**
Lo = 2.0" Break	Average Elongation @ Break		%			**427.1**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.91**
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.1**	N			**58.485** lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**469.1**	N			**105.47** lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**661.5**	N			**148.72** lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339223-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.60**	mm	**63**	mil
Asperity ASTM D7466: **33/33** mil	AVE:	**1.56**	mm	**61**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**183**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.28**	
Carbon Black Content ASTM D4218	Range		%			**2.22**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**172**	ppi	**2,799**	psi
	Average Strength @ Break	**35**	N/mm (kN/m)	**199**	ppi	**3,233**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**19.69**	
Lo = 2.0" Break	Average Elongation @ Break		%			**428.8**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.9**	N			**57.088**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**433.8**	N			**97.522**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**611.5**	N			**137.47**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
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ROLL # **339224-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.64**	mm	**65**	mil
	MAX:	**1.79**	mm	**70**	mil
Asperity ASTM D7466: **32/35** mil	AVE:	**1.70**	mm	**67**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5** mm	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range		%				**2.22**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**33**	N/mm (kN/m)	**187**	ppi	**2,799**	psi	
	Average Strength @ Break	**38**	N/mm (kN/m)	**216**	ppi	**3,233**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**19.69**	
Lo = 2.0" Break	Average Elongation @ Break		%				**428.8**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.9**	N			**57.088**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**433.8**	N			**97.522**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**611.5**	N			**137.47**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
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ROLL # **339225-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.74**	mm	**69**	mil
Asperity ASTM D7466: **31/36** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range	%				**2.22**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**32**	N/mm (kN/m)	**181**	ppi	**2,799**	psi
	Average Strength @ Break	**37**	N/mm (kN/m)	**209**	ppi	**3,233**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**19.69**	
Lo = 2.0" Break	Average Elongation @ Break	%				**428.8**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.9**	N			**57.088**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**433.8**	N			**97.522**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**611.5**	N			**137.47**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
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ROLL # **339226-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.67**	mm	**66**	mil
Asperity ASTM D7466: **35/37** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**183**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range	%				**2.22**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**177**	ppi	**2,799**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**205**	ppi	**3,233**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**19.69**	
Lo = 2.0" Break	Average Elongation @ Break	%				**428.8**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.9**	N			**57.088**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**433.8**	N			**97.522**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**611.5**	N			**137.47**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339227-09** Lot #: **8190496** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.72**	mm	**68**	mil
Asperity ASTM D7466: **33/33** mil	AVE:	**1.63**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.28**	
Carbon Black Content ASTM D4218	Range		%				**2.22**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**180**	ppi	**2,799**	psi	
	Average Strength @ Break	**36**	N/mm (kN/m)	**207**	ppi	**3,233**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**19.69**	
Lo = 2.0" Break	Average Elongation @ Break		%				**428.8**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.91**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.9**	N			**57.088**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**433.8**	N			**97.522**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**611.5**	N			**137.47**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
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ROLL # **339330-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.72**	mm	**68**	mil
Asperity ASTM D7466: **32/35** mil	AVE:	**1.63**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.33**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**171**	ppi	**2,659**	psi	
	Average Strength @ Break	**34**	N/mm (kN/m)	**194**	ppi	**3,025**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**17.91**	
Lo = 2.0" Break	Average Elongation @ Break		%				**457.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**258.3**	N			**58.072**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**423.8**	N			**95.289**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**620.6**	N			**139.53**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339331-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.71**	mm	**67**	mil
Asperity ASTM D7466: **33/33** mil	AVE:	**1.62**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

								TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc					**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min					**.26**	
Carbon Black Content ASTM D4218	Range		%					**2.33**	
Carbon Black Dispersion ASTM D5596	Category							**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,659**	psi		
	Average Strength @ Break	**34**	N/mm (kN/m)	**193**	ppi	**3,025**	psi		
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**17.91**			
Lo = 2.0" Break	Average Elongation @ Break		%			**457.4**			
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**			
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**258.3**	N			**58.072**	lbs		
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**423.8**	N			**95.289**	lbs		
Puncture Resistance ASTM D4833 (Modified)	Load	**620.6**	N			**139.53**	lbs		
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs						**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs						**ONGOING**	

Customer: **Hallaton, Inc.**
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ROLL # **339332-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.66**	mm	**65**	mil
Asperity ASTM D7466: **32/35** mil	AVE:	**1.60**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.33**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**167**	ppi	**2,659**	psi	
	Average Strength @ Break	**33**	N/mm (kN/m)	**191**	ppi	**3,025**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**17.91**	
Lo = 2.0" Break	Average Elongation @ Break		%				**457.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**258.3**	N			**58.072**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**423.8**	N			**95.289**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**620.6**	N			**139.53**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
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ROLL # **339333-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.76**	mm	**69**	mil
Asperity ASTM D7466: **32/35** mil	AVE:	**1.65**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.56**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**179**	ppi	**2,762**	psi	
	Average Strength @ Break	**38**	N/mm (kN/m)	**215**	ppi	**3,312**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**18.95**	
Lo = 2.0" Break	Average Elongation @ Break		%				**492.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**261.0**	N			**58.676**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**472.1**	N			**106.13**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**679.4**	N			**152.75**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-23-09**

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ROLL # **339334-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.73**	mm	**68**	mil
Asperity ASTM D7466: **31/35** mil	AVE:	**1.63**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.56**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**177**	ppi	**2,762**	psi
	Average Strength @ Break	**37**	N/mm (kN/m)	**213**	ppi	**3,312**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**18.95**	
Lo = 2.0" Break	Average Elongation @ Break	%				**492.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**261.0**	N			**58.676**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**472.1**	N			**106.13**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**679.4**	N			**152.75**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339335-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.61**	mm	**63**	mil
Asperity ASTM D7466: **33/34** mil	AVE:	**1.58**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

								TEST RESULTS	
Specific Gravity ASTM D792	Density			g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g			g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range			%				**2.56**	
Carbon Black Dispersion ASTM D5596	Category							**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)		**172**	ppi	**2,762**	psi	
	Average Strength @ Break	**36**	N/mm (kN/m)		**206**	ppi	**3,312**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield			%				**18.95**	
Lo = 2.0" Break	Average Elongation @ Break			%				**492.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change			%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**261.0**	N				**58.676**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**472.1**	N				**106.13**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**679.4**	N				**152.75**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs					**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs					**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-23-09**

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ROLL # **339336-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.74**	mm	**69**	mil
Asperity ASTM D7466: **31/37** mil	AVE:	**1.65**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **180**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.20**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**179**	ppi	**2,762**	psi	
	Average Strength @ Break	**38**	N/mm (kN/m)	**215**	ppi	**3,312**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**18.95**	
Lo = 2.0" Break	Average Elongation @ Break		%				**492.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**261.0**	N			**58.676**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**472.1**	N			**106.13**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**679.4**	N			**152.75**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339337-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.58**	mm	**62**	mil
Asperity ASTM D7466: **32/34** mil	AVE:	**1.56**	mm	**61**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**180**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.20**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,762**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**203**	ppi	**3,312**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.95**	
Lo = 2.0" Break	Average Elongation @ Break		%			**492.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**261.0**	N			**58.676**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**472.1**	N			**106.13**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**679.4**	N			**152.75**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-23-09**

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ROLL # **339338-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.58**	mm	**62**	mil
	MAX:	**1.68**	mm	**66**	mil
Asperity ASTM D7466: **33/36** mil	AVE:	**1.62**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

								TEST RESULTS	
Specific Gravity ASTM D792	Density			g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g			g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range			%				**2.41**	
Carbon Black Dispersion ASTM D5596	Category							**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)		**171**	ppi	**2,677**	psi	
	Average Strength @ Break	**34**	N/mm (kN/m)		**191**	ppi	**3,003**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield			%				**14.27**	
Lo = 2.0" Break	Average Elongation @ Break			%				**438.3**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change			%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.8**	N				**57.052**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**484.8**	N				**109.00**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**649.9**	N				**146.11**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs					**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs					**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339339-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.61**	mm	**63**	mil
Asperity ASTM D7466: **32/33** mil	AVE:	**1.56**	mm	**61**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

								TEST RESULTS	
Specific Gravity ASTM D792	Density			g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g			g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range			%				**2.41**	
Carbon Black Dispersion ASTM D5596	Category							**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)		**164**	ppi	**2,677**	psi	
	Average Strength @ Break	**32**	N/mm (kN/m)		**184**	ppi	**3,003**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield			%				**14.27**	
Lo = 2.0" Break	Average Elongation @ Break			%				**438.3**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change			%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.8**	N				**57.052**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**484.8**	N				**109.00**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**649.9**	N				**146.11**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs					**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs					**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-23-09**

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ROLL # **339342-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.75**	mm	**69**	mil
Asperity ASTM D7466: **35/36** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.41**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**173**	ppi	**2,677**	psi	
	Average Strength @ Break	**34**	N/mm (kN/m)	**194**	ppi	**3,003**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**14.27**	
Lo = 2.0" Break	Average Elongation @ Break		%				**438.3**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.8**	N			**57.052**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**484.8**	N			**109.00**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**649.9**	N			**146.11**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-23-09**

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ROLL # **339445-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.77**	mm	**70**	mil
Asperity ASTM D7466: **35/35** mil	AVE:	**1.65**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.35**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**172**	ppi	**2,648**	psi
	Average Strength @ Break	**33**	N/mm (kN/m)	**189**	ppi	**2,917**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**16.92**	
Lo = 2.0" Break	Average Elongation @ Break	%				**444.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**263.5**	N			**59.240**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**462.8**	N			**104.05**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**620.0**	N			**139.38**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-23-09**

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ROLL # **339446-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.68**	mm	**66**	mil
Asperity ASTM D7466: **31/35** mil	AVE:	**1.62**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.32**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**169**	ppi	**2,648**	psi	
	Average Strength @ Break	**33**	N/mm (kN/m)	**186**	ppi	**2,917**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**16.92**	
Lo = 2.0" Break	Average Elongation @ Break		%				**444.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**263.5**	N			**59.240**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**462.8**	N			**104.05**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**620.0**	N			**139.38**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-24-09**

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ROLL # **339447-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.52**	mm	**60**	mil
	MAX:	**1.79**	mm	**70**	mil
Asperity ASTM D7466: **34/37** mil	AVE:	**1.58**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

								TEST RESULTS	
Specific Gravity ASTM D792	Density			g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g			g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range			%				**2.32**	
Carbon Black Dispersion ASTM D5596	Category							**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)		**165**	ppi	**2,648**	psi	
	Average Strength @ Break	**32**	N/mm (kN/m)		**181**	ppi	**2,917**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield			%				**16.92**	
Lo = 2.0" Break	Average Elongation @ Break			%				**444.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change			%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**263.5**	N				**59.240**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**462.8**	N				**104.05**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**620.0**	N				**139.38**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs					**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs					**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339448-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.82**	mm	**72**	mil
Asperity ASTM D7466: **34/35** mil	AVE:	**1.66**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.32**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**179**	ppi	**2,737**	psi
	Average Strength @ Break	**37**	N/mm (kN/m)	**210**	ppi	**3,216**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**16.75**	
Lo = 2.0" Break	Average Elongation @ Break	%				**484.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**266.7**	N			**59.958**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**427.0**	N			**95.988**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**617.0**	N			**138.72**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339449-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.68**	mm	**66**	mil
Asperity ASTM D7466: **34/35** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.32**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**173**	ppi	**2,737**	psi	
	Average Strength @ Break	**36**	N/mm (kN/m)	**204**	ppi	**3,216**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**16.75**	
Lo = 2.0" Break	Average Elongation @ Break		%				**484.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**266.7**	N			**59.958**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**427.0**	N			**95.988**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**617.0**	N			**138.72**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
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ROLL # **339450-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.52**	mm	**60**	mil
	MAX:	**1.76**	mm	**69**	mil
Asperity ASTM D7466: **34/38** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.26**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**177**	ppi	**2,737**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**208**	ppi	**3,216**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**16.75**	
Lo = 2.0" Break	Average Elongation @ Break		%			**484.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**266.7**	N			**59.958**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**427.0**	N			**95.988**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**617.0**	N			**138.72**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
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ROLL # **339451-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.52**	mm	**60**	mil
	MAX:	**1.75**	mm	**69**	mil
Asperity ASTM D7466: **36/36** mil	AVE:	**1.60**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.26**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**172**	ppi	**2,737**	psi
	Average Strength @ Break	**35**	N/mm (kN/m)	**203**	ppi	**3,216**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**16.75**	
Lo = 2.0" Break	Average Elongation @ Break		%			**484.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**266.7**	N			**59.958**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**427.0**	N			**95.988**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**617.0**	N			**138.72**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339454-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.70**	mm	**67**	mil
Asperity ASTM D7466: **34/35** mil	AVE:	**1.60**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.44**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**171**	ppi	**2,712**	psi
	Average Strength @ Break	**33**	N/mm (kN/m)	**189**	ppi	**2,993**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**16.86**	
Lo = 2.0" Break	Average Elongation @ Break	%				**454.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**257.2**	N			**57.823**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**428.8**	N			**96.404**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**603.0**	N			**135.56**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
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ROLL # **339457-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.74**	mm	**69**	mil
Asperity ASTM D7466: **36/36** mil	AVE:	**1.63**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.18**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**174**	ppi	**2,712**	psi
	Average Strength @ Break	**34**	N/mm (kN/m)	**192**	ppi	**2,993**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**16.86**	
Lo = 2.0" Break	Average Elongation @ Break		%			**454.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**257.2**	N			**57.823**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**428.8**	N			**96.404**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**603.0**	N			**135.56**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339458-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.77**	mm	**70**	mil
Asperity ASTM D7466: **34/36** mil	AVE:	**1.65**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.15**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**175**	ppi	**2,695**	psi
	Average Strength @ Break	**35**	N/mm (kN/m)	**202**	ppi	**3,110**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**18.01**	
Lo = 2.0" Break	Average Elongation @ Break	%				**490.9**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**270.7**	N			**60.870**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**412.8**	N			**92.815**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**605.2**	N			**136.05**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339562-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.77**	mm	**70**	mil
Asperity ASTM D7466: **36/38** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**181**	

						TEST RESULTS
Specific Gravity ASTM D792	Density		g/cc			**.946**
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**
Carbon Black Content ASTM D4218	Range		%			**2.21**
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**174**	ppi	**2,695** psi
	Average Strength @ Break	**35**	N/mm (kN/m)	**201**	ppi	**3,110** psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.01**
Lo = 2.0" Break	Average Elongation @ Break		%			**490.9**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**270.7**	N			**60.870** lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**412.8**	N			**92.815** lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**605.2**	N			**136.05** lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339563-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.76**	mm	**69**	mil
Asperity ASTM D7466: **32/37** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**171**	ppi	**2,642**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**207**	ppi	**3,207**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**17.41**	
Lo = 2.0" Break	Average Elongation @ Break		%			**506.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**255.4**	N			**57.428**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**437.4**	N			**98.329**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**618.6**	N			**139.07**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
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ROLL # **339564-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.70**	mm	**67**	mil
Asperity ASTM D7466: **36/37** mil	AVE:	**1.59**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**165**	ppi	**2,642**	psi
	Average Strength @ Break	**35**	N/mm (kN/m)	**201**	ppi	**3,207**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**17.41**	
Lo = 2.0" Break	Average Elongation @ Break	%				**506.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**255.4**	N			**57.428**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**437.4**	N			**98.329**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**618.6**	N			**139.07**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
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ROLL # **339565-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.59**	mm	**63**	mil
	MAX:	**1.78**	mm	**70**	mil
Asperity ASTM D7466: **36/37** mil	AVE:	**1.66**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**173**	ppi	**2,642**	psi
	Average Strength @ Break	**37**	N/mm (kN/m)	**210**	ppi	**3,207**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**17.41**	
Lo = 2.0" Break	Average Elongation @ Break		%			**506.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**255.4**	N			**57.428**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**437.4**	N			**98.329**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**618.6**	N			**139.07**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339566-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.79**	mm	**70**	mil
Asperity ASTM D7466: **33/35** mil	AVE:	**1.67**	mm	**66**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**174**	ppi	**2,642**	psi
	Average Strength @ Break	**37**	N/mm (kN/m)	**211**	ppi	**3,207**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**17.41**	
Lo = 2.0" Break	Average Elongation @ Break	%				**506.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**255.4**	N			**57.428**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**437.4**	N			**98.329**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**618.6**	N			**139.07**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339567-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.80**	mm	**71**	mil
Asperity ASTM D7466: **36/38** mil	AVE:	**1.62**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**168**	ppi	**2,642**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**205**	ppi	**3,207**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**17.41**	
Lo = 2.0" Break	Average Elongation @ Break	%				**506.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**255.4**	N			**57.428**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**437.4**	N			**98.329**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**618.6**	N			**139.07**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339568-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.75**	mm	**69**	mil
Asperity ASTM D7466: **36/38** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,685**	psi
	Average Strength @ Break	**33**	N/mm (kN/m)	**191**	ppi	**3,012**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**17.05**	
Lo = 2.0" Break	Average Elongation @ Break		%			**464.7**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.7**	N			**57.037**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**460.6**	N			**103.54**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**641.2**	N			**144.15**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

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ROLL # **339569-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.72**	mm	**68**	mil
Asperity ASTM D7466: **31/39** mil	AVE:	**1.65**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.38**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**174**	ppi	**2,685**	psi
	Average Strength @ Break	**34**	N/mm (kN/m)	**196**	ppi	**3,012**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**17.05**	
Lo = 2.0" Break	Average Elongation @ Break	%				**464.7**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.7**	N			**57.037**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**460.6**	N			**103.54**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**641.2**	N			**144.15**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
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ROLL # **339572-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.74**	mm	**69**	mil
Asperity ASTM D7466: **36/37** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.26**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,685**	psi
	Average Strength @ Break	**33**	N/mm (kN/m)	**191**	ppi	**3,012**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**17.05**	
Lo = 2.0" Break	Average Elongation @ Break		%			**464.7**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**253.7**	N			**57.037**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**460.6**	N			**103.54**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**641.2**	N			**144.15**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339573-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.52**	mm	**60**	mil
	MAX:	**1.73**	mm	**68**	mil
Asperity ASTM D7466: **35/37** mil	AVE:	**1.60**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.35**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**171**	ppi	**2,715**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**207**	ppi	**3,291**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.30**	
Lo = 2.0" Break	Average Elongation @ Break		%			**490.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.2**	N			**58.508**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**430.6**	N			**96.816**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**645.0**	N			**145.01**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
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ROLL # **339574-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.66**	mm	**65**	mil
Asperity ASTM D7466: **29/33** mil	AVE:	**1.58**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet
OIT(Standard) ASTM D3895	minutes	**181**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.35**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**169**	ppi	**2,715**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**205**	ppi	**3,291**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.30**	
Lo = 2.0" Break	Average Elongation @ Break		%			**490.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.2**	N			**58.508**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**430.6**	N			**96.816**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**645.0**	N			**145.01**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

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ROLL # **339675-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.61**	mm	**63**	mil
Asperity ASTM D7466: **33/34** mil	AVE:	**1.58**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.26**	
Carbon Black Content ASTM D4218	Range		%			**2.35**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**169**	ppi	**2,715**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**205**	ppi	**3,291**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.30**	
Lo = 2.0" Break	Average Elongation @ Break		%			**490.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.2**	N			**58.508**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**430.6**	N			**96.816**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**645.0**	N			**145.01**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-26-09**

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ROLL # **339676-09** Lot #: **8190369** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.62**	mm	**64**	mil
Asperity ASTM D7466: **28/30** mil	AVE:	**1.59**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **181**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.48**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**170**	ppi	**2,715**	psi
	Average Strength @ Break	**36**	N/mm (kN/m)	**206**	ppi	**3,291**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.30**	
Lo = 2.0" Break	Average Elongation @ Break		%			**490.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.66**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**260.2**	N			**58.508**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**430.6**	N			**96.816**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**645.0**	N			**145.01**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-26-09**

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ROLL # **339684-09** Lot #: **7290649** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.57**	mm	**62**	mil
	MAX:	**1.74**	mm	**69**	mil
Asperity ASTM D7466: **34/34** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.29**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**169**	ppi	**2,615**	psi
	Average Strength @ Break	**35**	N/mm (kN/m)	**198**	ppi	**3,059**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**18.41**	
Lo = 2.0" Break	Average Elongation @ Break	%				**456.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.89**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**254.9**	N			**57.316**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**456.9**	N			**102.72**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**660.2**	N			**148.43**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-26-09**

Signature.....
Quality Control Department

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ROLL # **339685-09** Lot #: **7290649** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.73**	mm	**68**	mil
Asperity ASTM D7466: **32/33** mil	AVE:	**1.64**	mm	**65**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.29**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**169**	ppi	**2,615**	psi	
	Average Strength @ Break	**35**	N/mm (kN/m)	**198**	ppi	**3,059**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**18.41**	
Lo = 2.0" Break	Average Elongation @ Break		%				**456.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.89**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**254.9**	N			**57.316**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**456.9**	N			**102.72**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**660.2**	N			**148.43**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**		

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-26-09**

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ROLL # **339686-09** Lot #: **7290649** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.56**	mm	**61**	mil
	MAX:	**1.77**	mm	**70**	mil
Asperity ASTM D7466: **32/34** mil	AVE:	**1.62**	mm	**64**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**183**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.29**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**167**	ppi	**2,615**	psi
	Average Strength @ Break	**34**	N/mm (kN/m)	**195**	ppi	**3,059**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**18.41**	
Lo = 2.0" Break	Average Elongation @ Break	%				**456.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.89**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**254.9**	N			**57.316**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**456.9**	N			**102.72**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**660.2**	N			**148.43**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-26-09**

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ROLL # **339687-09** Lot #: **7290649** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.57**	mm	**62**	mil
	MAX:	**1.78**	mm	**70**	mil
Asperity ASTM D7466: **35/35** mil	AVE:	**1.61**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**183**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.947**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range	%				**2.29**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**166**	ppi	**2,615**	psi
	Average Strength @ Break	**34**	N/mm (kN/m)	**194**	ppi	**3,059**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**18.41**	
Lo = 2.0" Break	Average Elongation @ Break	%				**456.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.89**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**254.9**	N			**57.316**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**456.9**	N			**102.72**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**660.2**	N			**148.43**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6906 White Oak LF - Haywood County**
Destination **Waynesville, NC**

Date:..... **9-26-09**

Signature.....
Quality Control Department

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CoA Date: 05/17/2009

Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87859320
PO #: 5071
Weight: 188700 LB
Ship Date: 05/17/2009
Package: BULK
Mode: Hopper Car
Car #: CHVX890205
Seal No: 261469

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 8190496

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.280	g/10mi
HLMI Flow Rate	ASTM D1238	21.00	g/10mi
Density	ASTM D1505	0.9390	g/cm3
Pellet Count	P02.08.03	27.000	pel/g
Production Date		05/08/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

CoA Date: 03/31/2009

Certificate of Analysis

Shipped To: AGRU AMERICA INC
500 GARRISON RD
GEORGETOWN SC 29440
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87834891
PO #: 4962
Weight: 187600 LB
Ship Date: 03/31/2009
Package: BULK
Mode: Hopper Car
Car #: PSPX006848
Seal No: 259671

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 8190369

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.260	g/10mi
HLMI Flow Rate	ASTM D1238	20.00	g/10mi
Density	ASTM D1505	0.9370	g/cm3
Pellet Count	P02.08.03	31.000	pel/g
Production Date		03/19/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

CoA Date: 05/24/2009

Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87862722
PO #: 5071
Weight: 196400 LB
Ship Date: 05/24/2009
Package: BULK
Mode: Hopper Car
Car #: CEFX053725
Seal No: 260536

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 7290649

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.260	g/10mi
HLMI Flow Rate	ASTM D1238	22.00	g/10mi
Density	ASTM D1505	0.9370	g/cm3
Pellet Count	P02.08.03	32.000	pel/g
Production Date		05/21/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

microspike liner				Hallaton	(Haywood Cty) White Oak LF ADDS doc 13164					PO#	P7056
HDPE					Waynesville, NC						
60 mil				7 rolls 60 HD micro (MIN)				7			left
	METRIC DIMENSIONS										
roll #	width	length	area	check weld rod qty !!!							
(K)339688 .09	7	125	875	extra from orig run > Hallaton White Oak adds		7tot	1	3424			7290649
(K)244346 .09	7	125	875	Hallaton White Oak adds		7tot	2	3205		stage	8190643
(K)244347 .09	7	125	875	Hallaton White Oak adds		7tot	3	3210			8190643
(K)244348 .09	7	125	875	Hallaton White Oak adds		7tot	4	3200			8190643
(K)244349 .09	7	125	875	Hallaton White Oak adds		7tot	5	3195			8190643
(K)244350 .09	7	125	875	Hallaton White Oak adds		7tot	6	3205			8190643
(K)244351 .09	7	125	875	Hallaton White Oak adds		7tot	7	3220			8190643

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ROLL # **339688-09** Lot #: **7290649** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.70**	mm	**67**	mil
Asperity ASTM D7466: **35/38** mil	AVE:	**1.59**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **183**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.946**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.26**	
Carbon Black Content ASTM D4218	Range		%				**2.69**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**171**	ppi	**2,739**	psi	
	Average Strength @ Break	**35**	N/mm (kN/m)	**198**	ppi	**3,162**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**18.36**	
Lo = 2.0" Break	Average Elongation @ Break		%				**462.5**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.89**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**263.3**	N			**59.197**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**415.8**	N			**93.475**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**637.8**	N			**143.39**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**PASS**		

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **9-26-09**

Signature.....
Quality Control Department

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ROLL # **244346-09** Lot #: **8190643** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.67**	mm	**66**	mil
Asperity ASTM D7466: **27/31** mil	AVE:	**1.60**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **179**

						TEST RESULTS	
Specific Gravity ASTM D792	Density	g/cc				**.943**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g	g/10 min				**.27**	
Carbon Black Content ASTM D4218	Range	%				**2.54**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**31**	N/mm (kN/m)	**175**	ppi	**2,780**	psi
	Average Strength @ Break	**34**	N/mm (kN/m)	**194**	ppi	**3,085**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield	%				**17.04**	
Lo = 2.0" Break	Average Elongation @ Break	%				**506.3**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change	%				**-0.45**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**243.6**	N			**54.773**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**482.8**	N			**108.54**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**627.8**	N			**141.14**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**PASS**	

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **10-28-09**

Signature.....
Quality Control Department

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ROLL # **244347-09** Lot #: **8190643** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.53**	mm	**60**	mil
	MAX:	**1.60**	mm	**63**	mil
Asperity ASTM D7466: **29/31** mil	AVE:	**1.57**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **179**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.943**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.27**	
Carbon Black Content ASTM D4218	Range		%				**2.54**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**28**	N/mm (kN/m)	**157**	ppi	**2,543**	psi
	Average Strength @ Break	**22**	N/mm (kN/m)	**124**	ppi	**2,006**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**15.37**	
Lo = 2.0" Break	Average Elongation @ Break		%			**268.7**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.45**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**258.1**	N			**58.034**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**475.3**	N			**106.85**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**627.8**	N			**141.14**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**PASS**	

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **10-28-09**

Signature.....
Quality Control Department

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ROLL # **244348-09** Lot #: **8190643** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.64**	mm	**65**	mil
Asperity ASTM D7466: **28/32** mil	AVE:	**1.58**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **179**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.943**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.27**	
Carbon Black Content ASTM D4218	Range		%			**2.54**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**169**	ppi	**2,713**	psi
	Average Strength @ Break	**32**	N/mm (kN/m)	**182**	ppi	**2,923**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**16.56**	
Lo = 2.0" Break	Average Elongation @ Break		%			**485.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.45**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**247.3**	N			**55.608**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**451.3**	N			**101.46**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**627.8**	N			**141.14**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500	hrs			**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			**PASS**	

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **10-28-09**

Signature.....
Quality Control Department

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ROLL # **244349-09** Lot #: **8190643** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.55**	mm	**61**	mil
	MAX:	**1.69**	mm	**67**	mil
Asperity ASTM D7466: **29/32** mil	AVE:	**1.59**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **179**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.943**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.27**	
Carbon Black Content ASTM D4218	Range		%				**2.54**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**30**	N/mm (kN/m)	**173**	ppi	**2,757**	psi	
	Average Strength @ Break	**34**	N/mm (kN/m)	**195**	ppi	**3,117**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**16.77**	
Lo = 2.0" Break	Average Elongation @ Break		%				**482.6**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.45**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**246.2**	N			**55.347**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**485.3**	N			**109.10**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**627.8**	N			**141.14**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**PASS**		

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **10-28-09**

Signature.....
Quality Control Department

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quality certificate

ROLL # **244350-09** Lot #: **8190643** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.61**	mm	**63**	mil
Asperity ASTM D7466: **28/33** mil	AVE:	**1.57**	mm	**62**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **179**

							TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc				**.943**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min				**.27**	
Carbon Black Content ASTM D4218	Range		%				**2.54**	
Carbon Black Dispersion ASTM D5596	Category						**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**28**	N/mm (kN/m)	**163**	ppi	**2,631**	psi	
	Average Strength @ Break	**32**	N/mm (kN/m)	**181**	ppi	**2,933**	psi	
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%				**16.49**	
Lo = 2.0" Break	Average Elongation @ Break		%				**507.4**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%				**-0.45**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**246.8**	N			**55.486**	lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**453.3**	N			**101.91**	lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	**627.8**	N			**141.14**	lbs	
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**PASS**		

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **10-28-09**

Signature.....
Quality Control Department

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12/23/05

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quality certificate

ROLL # **244351-09** Lot #: **8190643** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.54**	mm	**61**	mil
	MAX:	**1.64**	mm	**65**	mil
Asperity ASTM D7466: **29/32** mil	AVE:	**1.60**	mm	**63**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5 mm**	**60 mil**
Length.....	**125** m	**410.1** feet
Width.....	**7.00** m;	**23.0** feet
OIT(Standard) ASTM D3895 minutes	**179**	

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.945**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.27**	
Carbon Black Content ASTM D4218	Range		%			**2.46**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**29**	N/mm (kN/m)	**167**	ppi	**2,646**	psi
	Average Strength @ Break	**32**	N/mm (kN/m)	**184**	ppi	**2,927**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**17.72**	
Lo = 2.0" Break	Average Elongation @ Break		%			**483.1**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.45**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**238.0**	N			**53.498**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**482.7**	N			**108.51**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**627.8**	N			**141.14**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**PASS**	

Customer: **Hallaton, Inc.**
PO: **P7056 White Oak LF Extra Material**
Destination **Haywood Cty., NC**

Date:..... **10-28-09**

Signature.....
Quality Control Department

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12/23/05

CoA Date: 05/24/2009

Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87862722
PO #: 5071
Weight: 196400 LB
Ship Date: 05/24/2009
Package: BULK
Mode: Hopper Car
Car #: CEFX053725
Seal No: 260536

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 7290649

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.260	g/10mi
HLMI Flow Rate	ASTM D1238	22.00	g/10mi
Density	ASTM D1505	0.9370	g/cm3
Pellet Count	P02.08.03	32.000	pel/g
Production Date		05/21/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

CoA Date: 06/17/2009

Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87874707
PO #: 5067
Weight: 188500 LB
Ship Date: 06/17/2009
Package: BULK
Mode: Hopper Car
Car #: PSPX007173
Seal No: 261504

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 8190643

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.270	g/10mi
HLMI Flow Rate	ASTM D1238	20.00	g/10mi
Density	ASTM D1505	0.9370	g/cm3
Pellet Count	P02.08.03	27.000	pel/g
Production Date		06/14/2009	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

agru america quality control dept.

quality certificate

ROLL # **230353-09** Lot #: **7190230** **Liner Type: MICROSPIKE™ HDPE**

Measurement ASTM D5994 (Modified)		METRIC		ENGLISH	
	MIN:	**1.50**	mm	**59**	mil
	MAX:	**1.59**	mm	**63**	mil
Asperity ASTM D7466: **30** mil	AVE:	**1.55**	mm	**61**	mil

ODD # : TOP EVEN #: BOTTOM

Thickness.....	**1.5**	**mm**	**60 mil**
Length.....	**125**	m	**410.1** feet
Width.....	**7.00**	m;	**23.0** feet

OIT(Standard) ASTM D3895 minutes **175**

						TEST RESULTS	
Specific Gravity ASTM D792	Density		g/cc			**.948**	
MFI ASTM D1238 COND. E GRADE: **K307**	Melt Flow Index 190ºC /2160 g		g/10 min			**.21**	
Carbon Black Content ASTM D4218	Range		%			**2.69**	
Carbon Black Dispersion ASTM D5596	Category					**10 In Cat 1**	
Tensile Strength ASTM D6693 ASTM D638 (Modified) (2 inches / minute)	Average Strength @ Yield	**26**	N/mm (kN/m)	**148**	ppi	**2,418**	psi
	Average Strength @ Break	**34**	N/mm (kN/m)	**195**	ppi	**3,203**	psi
Elongation ASTM D6693 ASTM D638 (Modified) (2 inches / minute) Lo = 1.3" Yield	Average Elongation @ Yield		%			**18.73**	
Lo = 2.0" Break	Average Elongation @ Break		%			**494.1**	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional change		%			**-0.59**	
Tear Resistance ASTM D-1004 (Modified)	Average Tear Resistance	**226.9**	N			**51.005**	lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	**416.2**	N			**93.569**	lbs
Puncture Resistance ASTM D4833 (Modified)	Load	**605.1**	N			**136.04**	lbs
ESCR ASTM D1693	Minimum Hrs w/o Failures	1500 hrs				**CERTIFIED**	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs				**ONGOING**	

Customer: **Hallaton, Inc.**
PO: **P6885 Midshore II Landfill**
Destination **Easton, MD**

Date:..... **7-22-09**

Signature.....
Quality Control Department

60HDmic.FRM
REV 03
12/23/05

CoA Date: 02/19/2009

Certificate of Analysis

Shipped To: AGRU AMERICA:RAINS
MILEPOST SH317
RAINS SC 29589
USA

Recipient: PALMER
Fax:

CPC Delivery #: 87816172
PO #: 4960
Weight: 193900 LB
Ship Date: 02/19/2009
Package: BULK
Mode: Hopper Car
Car #: CITX703383
Seal No: 263059

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: 7190230

Property	Test Method	Value	Unit
HLMI Flow Rate	ASTM D1238	21.00	g/10mi
Density	ASTM D1505	0.9380	g/cm3

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP.
However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4637

Appendix III B – Conformance Test Results

CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-03
LAB ID NO.: L09101-03-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
SAMPLE I.D. 1
ROLL NO: 339218

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	68	64	66	63	61		
			63	67	68	68	66	**65.4**	2.50
DENSITY	D 1505	g/cc	0.9478	0.9476	0.9476			**0.9477**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.42	2.44				**2.43**	0.013
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	158.3	158.5	158.7	163.2	160.1		
			158.7	142.2	143.6	143.4	157.2		
			151.5	152.6	153.8	153.5	158.0	**154.2**	6.54
TEAR RESISTANCE	D 1004	MD-lbs	67.5	65.9	65.2	67.7	65.9		
			61.5	64.9	54.2	55.8	65.6	**63.4**	4.76
		CD-lbs	58.4	60.9	59.7	59.5	59.1		
			56.6	59.9	56.4	54.1	58.1	**58.3**	2.04
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	176	168	178	156	172	**170**	8.57
		CD-ppi	168	196	200	189	189	**188**	12.31
STRENGTH AT BREAK		MD-ppi	220	209	229	190	215	**213**	14.44
		CD-ppi	197	196	200	193	189	**195**	4.17
ELONGATION AT YIELD		MD%	23.0	21.6	21.6	20.0	20.8	**21.4**	1.11
Lo = 1.3"		CD%	17.9	14.9	14.0	16.0	14.3	**15.4**	1.58
ELONGATION AT BREAK		MD%	385	404	414	495	449	**429**	43.42
Lo = 2.0"		CD%	584	516	214	502	518	**467**	144.85

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-03
LAB ID NO.: L09101-03-02
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
SAMPLE I.D. 2
ROLL NO: 339330

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	65	66	66	68	67		
			65	70	71	68	65	**67.1**	2.13
DENSITY	D 1505	g/cc	0.9466	0.9466	0.9465			**0.9466**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.38	2.29				**2.34**	0.064
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	162.1	158.8	159.8	166.1	163.3		
			165.3	163.4	160.9	154.6	149.9		
			152.3	158.1	148.1	149.6	146.1	**157.2**	6.63
TEAR RESISTANCE	D 1004	MD-lbs	61.8	62.5	64.9	58.6	57.2		
			62.6	68.2	69.5	66.5	63.3	**63.5**	3.91
		CD-lbs	59.8	64.1	63.5	57.1	57.6		
			56.7	58.0	58.1	55.6	55.6	**58.6**	3.00
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	178	172	183	162	172	**173**	7.62
		CD-ppi	196	173	193	176	188	**185**	10.53
STRENGTH AT BREAK		MD-ppi	223	228	234	203	188	**215**	19.23
		CD-ppi	196	189	193	182	190	**190**	5.24
ELONGATION AT YIELD		MD%	21.9	21.9	20.8	21.1	18.9	**20.9**	1.23
Lo = 1.3"		CD%	15.6	17.6	15.0	15.0	14.5	**15.5**	1.22
ELONGATION AT BREAK		MD%	404	430	452	437	452	**435**	19.80
Lo = 2.0"		CD%	576	535	473	524	520	**526**	36.84

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-03
LAB ID NO.: L09101-03-03
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
SAMPLE I.D. 3
ROLL NO: 339445

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	66	63	65	64	68		
			66	67	70	68	71	**66.8**	2.53
DENSITY	D 1505	g/cc	0.9470	0.9470	0.9470			**0.9470**	0.0000
CARBON BLACK CONTENT	D 1603	%	2.38	2.32				**2.35**	0.040
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	158.6	162.4	153.7	159.7	161.3		
			161.0	162.3	159.7	161.0	146.6		
			146.5	148.3	145.5	151.5	153.5	**155.4**	6.37
TEAR RESISTANCE	D 1004	MD-lbs	67.2	64.0	64.2	63.9	60.5		
			59.9	59.4	59.4	59.9	66.4	**62.5**	3.00
		CD-lbs	60.4	56.5	55.9	54.2	58.8		
			56.3	57.2	58.4	58.8	56.0	**57.3**	1.83
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	172	167	158	174	178	**170**	7.63
		CD-ppi	181	184	168	194	188	**183**	9.74
STRENGTH AT BREAK		MD-ppi	248	207	213	220	242	**226**	18.31
		CD-ppi	199	184	208	194	208	**199**	10.18
ELONGATION AT YIELD		MD%	21.1	21.7	20.8	21.4	21.4	**21.3**	0.34
Lo = 1.3"		CD%	14.3	16.0	16.8	14.6	14.6	**15.3**	1.09
ELONGATION AT BREAK		MD%	488	382	478	414	448	**442**	44.25
Lo = 2.0"		CD%	521	401	596	467	565	**510**	78.04

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CONFORMANCE TEST RESULTS

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INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-03
LAB ID NO.: L09101-03-04
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
SAMPLE I.D. 4
ROLL NO: 339568

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	70	68	62	65	65		
			64	65	63	62	63	**64.7**	2.58
DENSITY	D 1505	g/cc	0.9474	0.9474	0.9471			**0.9473**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.46	2.43				**2.45**	0.017
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	150.1	148.2	146.9	144.0	146.8		
			150.0	156.6	151.8	154.7	162.3		
			163.9	164.9	147.2	148.7	145.5	**152.1**	6.85
TEAR RESISTANCE	D 1004	MD-lbs	59.7	57.1	58.1	55.9	57.1		
			62.5	56.2	59.6	64.9	66.0	**59.7**	3.61
		CD-lbs	59.4	58.8	56.1	59.2	55.8		
			55.3	55.4	54.2	54.9	55.1	**56.4**	1.94
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	161	157	174	169	164	**165**	6.63
		CD-ppi	172	194	176	169	170	**176**	10.10
STRENGTH AT BREAK		MD-ppi	201	196	219	203	210	**206**	8.89
		CD-ppi	194	232	176	196	179	**195**	22.33
ELONGATION AT YIELD		MD%	19.4	21.0	20.5	18.8	20.2	**20.0**	0.88
Lo = 1.3"		CD%	14.4	13.6	14.7	14.4	14.4	**14.3**	0.41
ELONGATION AT BREAK		MD%	466	430	414	471	456	**447**	24.47
Lo = 2.0"		CD%	550	630	485	566	518	**550**	54.55

CHECKED BY: BF DATE: 11-12-09

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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-03
LAB ID NO.: L09101-03-05
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
SAMPLE I.D. 5
ROLL NO: 339574

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	63	64	63	62	68		
			70	64	65	65	62	**64.6**	2.59
DENSITY	D 1505	g/cc	0.9470	0.9469	0.9468			**0.9469**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.44	2.45				**2.45**	0.002
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	149.9	148.9	148.5	154.6	153.3		
			150.9	159.9	163.0	161.6	147.3		
			147.3	144.7	146.2	140.7	140.3	**150.5**	6.93
TEAR RESISTANCE	D 1004	MD-lbs	65.9	61.9	58.4	57.4	60.9		
			56.5	60.8	61.3	60.7	67.4	**61.1**	3.43
		CD-lbs	58.7	58.3	54.9	57.8	53.6		
			54.7	55.8	59.9	56.9	60.6	**57.1**	2.34
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	158	156	163	180	163	**164**	9.16
		CD-ppi	190	168	167	177	166	**174**	10.22
STRENGTH AT BREAK		MD-ppi	205	187	209	223	163	**197**	23.03
		CD-ppi	196	168	167	189	186	**181**	12.96
ELONGATION AT YIELD		MD%	21.4	21.1	21.1	21.4	19.0	**20.8**	1.02
Lo = 1.3"		CD%	15.4	16.8	17.9	15.4	15.2	**16.1**	1.17
ELONGATION AT BREAK		MD%	387	355	367	341	374	**365**	17.64
Lo = 2.0"		CD%	504	433	201	534	541	**443**	141.66

CHECKED BY: BF DATE: 11-12-09

\\GEOSERVER\Data Drive\Synthetics\2009 SYNTHETICS\[L09101-03-05 THDPE WHITI L09101-03-05 11/12/2009

CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-04
LAB ID NO.: L09101-04-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: 244346-09

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	66	64	66	68	64		
			61	65	66	63	63	**64.6**	2.01
DENSITY	D 1505	g/cc	0.9474	0.9474	0.9473			**0.9473**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.47	2.49				**2.48**	0.017
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	148.7	149.4	149.4	139.8	137.0		
			137.0	138.8	150.5	146.1	149.6		
			148.7	150.2	138.4	141.8	143.8	**144.6**	5.29
TEAR RESISTANCE	D 1004	MD-lbs	63.7	62.2	61.3	61.0	56.2		
			59.4	60.7	62.8	56.8	56.1	**60.0**	2.78
		CD-lbs	54.3	56.5	57.5	53.3	55.0		
			51.2	51.8	57.1	55.5	55.9	**54.8**	2.15
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	167	162	162	163	170	**165**	3.62
		CD-ppi	167	182	169	182	186	**177**	8.26
STRENGTH AT BREAK		MD-ppi	209	191	207	239	234	**216**	19.92
		CD-ppi	170	182	176	182	194	**181**	9.01
ELONGATION AT YIELD		MD%	20.5	18.5	19.0	20.2	19.3	**19.5**	0.83
Lo = 1.3"		CD%	14.8	13.7	15.0	13.4	15.0	**14.4**	0.77
ELONGATION AT BREAK		MD%	411	485	480	484	484	**469**	32.37
Lo = 2.0"		CD%	482	428	531	466	543	**490**	47.37

CHECKED BY: BF DATE: 11-24-09

\\GEOSERVER\Data Drive\Synthetics\2009 SYNTHETICS\[L09101-04-01 THDPE WHITI L09101-04-01 11/24/2009

Appendix III C – Installation Records

WHITE OAK MSW LANDFILL
PHASE 3 CONSTRUCTION
HAYWOOD COUNTY, NC.

Submittal #7C

Section 02620 HDPE Geomembrane Liner

Close-Out Submittals

- **Field QC Documentation – Phase 3 Construction**
  - Subgrade Acceptance Forms
  - Panel Placement Log
  - Repair Log
  - Geomembrane Field Trial Seam Log
  - Geomembrane Seam Destructive Test Log
  - Seaming and Non-Destructive Test Log
- **Field QC Documentation – Leachate Lagoon**
  - Panel Placement Log
  - Repair Log
  - Geomembrane Field Trial Seam Log
  - Geomembrane Seam Destructive Test Log
  - Seaming and Non-Destructive Test Log
- **Hallaton's Geomembrane As-Built Drawing**

PREPARED BY:
Hallaton, Inc.
1206 Sparks Rd.
Sparks, MD 21152
May 28, 2010

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Certificate of Subgrade Acceptance

Project Name White Oak Landfill
Project no. 0932-8009
Location Waynesville, NC

Area to be Accepted Panel 1 to Panel 7, 60 mil HDPE, GCL
55,822.5 square feet

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

	signature	title	date
INSTALLER:	[signature]	QC	11-7-09
THIRD PARTY QA/QC:	[signature]	QA/QC	11-7-09

File: HALLATON subgrade approval v1-3

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Certificate of Subgrade Acceptance

Project Name White Oak Landfill
Project no. 0932-8009
Location Waynesville, NC

Area to be Accepted Panel 8 to Panel 17, 60 mil HDPE, GCL
43,132.5 square feet

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

	signature	title	date
INSTALLER:	[illegible]	QC	11-8-09
THIRD PARTY QA/QC:	[illegible]	QA/QC	11-8-09

File: HALLATON subgrade approval v1-3

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Certificate of Subgrade Acceptance

Project Name White Oak Landfill
Project no. 0932-2009
Location Waynesville, NC

Area to be Accepted Panel 18 to Panel 31, 60 mil HDPE, GCL
32,489.5 square feet

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

	signature	title	date
INSTALLER:	[illegible]	QC	11-17-09
THIRD PARTY QA/QC:	[illegible]	QA/QC	11-17-09

File: HALLATON subgrade approval v1-3

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Certificate of Subgrade Acceptance

Project Name White Oak Landfill
Project no. 0932-8009
Location Waynesville, NC

Area to be Accepted Panel 32 to Panel 44, 60 mil HDPE Tex, GCL
605,452.5 Square feet

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

	signature	title	date
INSTALLER:	[illegible]	QC	11-20-09
THIRD PARTY QA/QC:	[illegible]	QA/QC	11-20-09

File: HALLATON subgrade approval v1-3

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Certificate of Subgrade Acceptance

Project Name White Oak Landfill
Project no. 0932-8009
Location Waynesville, NC

Area to be Accepted Panel 45 to Panel 71, 60 mil HDPE tex, GCL
117,922 S^2 Square feet

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

	signature	title	date
INSTALLER:	[illegible]	QC	11-21-09
THIRD PARTY QA/QC:	[illegible]	QA/QC	11-21-09

File: HALLATON subgrade approval v1-3

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Certificate of Subgrade Acceptance

Project Name: White Oak Landfill
Project no.: 0932-8009
Location: Waynesville, NC

Area to be Accepted: Panel 72 to Panel 113, 60 mil HDPE Tex, GCL
102,482.5 Square feet

I, the undersigned, duly authorized representative of the installer, do hereby accept the soil subgrade surface conditions. I do not accept any responsibility for the conditions or character of the subsurface soil, or any effect the subsurface soil might have on the liner system.

	signature	title	date
INSTALLER:	[illegible]	QC	11-25-09
THIRD PARTY QA/QC:	[illegible]	QA/QC	11-25-09

File: HALLATON subgrade approval v1-3

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Panel Placement Log

Project No.: 0932-8009
Project Name: White Oak LF
Project Start Date: 10/31/09
Project Location: Waynesville, NC
Page: 1 of 3

Material: HDPE
Thickness: 60 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
11/7/2009	1	2:58	Eastern Slope/Floor	9330	22.5	400	9000
11/7/2009	2	3:08	Eastern Slope/Floor	9333	22.5	410	9225
11/7/2009	3	3:31	Eastern Slope/Floor	9335	22.5	410	9225
11/7/2009	4	3:59	Eastern Slope/Floor	9334	22.5	410	9225
11/7/2009	5	4:24	Eastern Slope/Floor	9227	22.5	410	9225
11/7/2009	6	4:52	Eastern Slope/Floor	9446	22.5	410	9225
11/7/2009	7	5:28	Western Slope	9569	22.5	31	697.5
11/8/2009	8	12:50	Western Slope	9336	22.5	262	5895
11/8/2009	9	1:12	Western Slope/Floor	9226	22.5	350	7875
11/8/2009	10	1:35	Western Slope/Floor	9451	22.5	340	7650
11/8/2009	11	2:46	Western Slope/Floor	9338	22.5	304	6840
11/8/2009	12	2:30	Eastern Slope/Floor	9338	22.5	118	2655
11/8/2009	13	2:33	Eastern Slope	9687	22.5	144	3240
11/8/2009	14	2:48	Eastern Slope	9687	22.5	168	3780
11/8/2009	15	2:53	Floor	9226	22.5	45	1012.5
11/8/2009	16	3:43	Eastern Slope/Floor	9687	22.5	92	2070
11/8/2009	17	3:47	Eastern Slope	9696	22.5	94	2115
11/17/2009	18	6:14	Eastern Slope	9567	22.5	175	3937.5
11/17/2009	19	6:45	Eastern Slope	9567	12	170	2040
11/17/2009	20	6:57	Western Slope	9458	22.5	243	5467.5
11/17/2009	21	7:07	Southern Slope	9458	22.5	162	3645
11/17/2009	22	7:13	Western Slope	9337	22.5	84	1890
11/17/2009	23	7:49	West/South Slopes	9337	22.5	210	4725
11/17/2009	24	8:34	South Trench	9564	20	167	3340
11/17/2009	25	8:46	South Slope	9564	15	92	1380
11/17/2009	26	9:04	West/South Slopes	9569	22.5	85	1912.5
11/17/2009	27	9:06	South Slope	9564	6	30	180
11/17/2009	28	9:08	West Slope	9569	12	28	336
11/17/2009	29	9:18	South Trench	9564	20	121	2420
11/17/2009	30	9:23	South Trench	9337	22	28	616
11/17/2009	31	9:26	South Trench	9337	20	30	600
11/20/2009	32	2:38	Eastern Slope	9569	22.5	161	3622.5
11/20/2009	33	2:43	Eastern Slope	9684	22.5	116	2610
11/20/2009	34	2:51	Eastern Slope	9684	22.5	284	6390
11/20/2009	35	4:04	Eastern Slope	9568	22.5	304	6840
11/20/2009	36	4:08	Eastern Slope	9568	22.5	92	2070
11/20/2009	37	4:18	Eastern Slope	9675	22.5	204	4590
11/20/2009	38	5;15	Eastern Slope	9675	22.5	176	3960
11/20/2009	39	5:23	Eastern Slope	9676	22.5	142	3195
11/20/2009	40	5:28	Eastern Slope	9676	22.5	228	5130
11/20/2009	41	5:44	Eastern Slope	9336	22.5	120	2700
11/20/2009	42	7:41	Eastern Slope	9218	22.5	368	8280
11/20/2009	43	7:56	Eastern Slope	9454	22.5	362	8145
11/20/2009	44	8:09	Eastern Slope	9332	22.5	352	7920
11/21/2009	45	9:57	Western Slope	9457	22.5	190	4275
11/21/2009	46	10:05	Western Slope	9457	22.5	185	4162.5
11/21/2009	47	10:17	Western Slope	9562	22.5	192	4320
11/21/2009	48	10:23	Western Slope	9562	22.5	190	4275
					Total This Page		213929.5

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Panel Placement Log

Project No.: 0932-8009
Project Name: White Oak LF
Project Start Date: 10/31/09
Project Location: Waynesville, NC
Page: 2 of 3

Material: HDPE
Thickness: 60 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
11/21/2009	49	10:35	Western Slope	9685	22.5	213	4792.5
11/21/2009	50	10:37	Western Slope	9685	22.5	13	292.5
11/21/2009	51	10:15	Eastern Slope	9563	22.5	342	7695
11/21/2009	52	10:28	Eastern Slope	9339	22.5	346	7785
11/21/2009	53	10:55	Eastern Slope	9345	22.5	315	7087.5
11/21/2009	54	11:15	Eastern Slope	9447	22.5	308	6930
11/21/2009	55	11:30	Eastern Slope	9573	22.5	310	6975
11/21/2009	56	12:00	Western Slope	9685	22.5	165	3712.5
11/21/2009	57	12:05	Western Slope	9573	22.5	56	1260
11/21/2009	58	12:15	Western Slope	9687	22.5	230	5175
11/21/2009	59	12:23	Western Slope	9687	22.5	58	1305
11/21/2009	60	12:30	Western Slope	9565	22.5	164	3690
11/21/2009	61	1:45	Western Slope	9565	22.5	230	5175
11/21/2009	62	2:28	Western Slope	9331	22.5	260	5850
11/21/2009	63	2:35	Western Slope	9331	22.5	165	3712.5
11/21/2009	64	3:00	Western Slope	9342	22.5	71	1597.5
11/21/2009	65	3:07	Western Slope	9342	22.5	243	5467.5
11/21/2009	66	3:20	Western Slope	9342	22.5	98	2205
11/21/2009	67	3:30	Western Slope	9450	22.5	154	3465
11/21/2009	68	3:55	Western Slope	9450	22.5	250	5625
11/21/2009	69	4:45	Western Slope	9566	22.5	246	5535
11/21/2009	70	4:52	Western Slope	9566	22.5	157	3532.5
11/21/2009	71	4:58	Western Slope	9449	22.5	90	2025
11/25/2009	72	9:38	Eastern Slope	9450	22.5	295	6637.5
11/25/2009	73	9:42	Eastern Slope	9574	22.5	22	495
11/25/2009	74	9:49	Eastern Slope	9574	22.5	323	7267.5
11/25/2009	75	10:14	Eastern Slope	4351	22.5	316	7110
11/25/2009	76	12:00	Eastern Slope	4348	22.5	158	3555
11/25/2009	77	12:10	Eastern Slope	4348	22.5	148	3330
11/25/2009	78	12:18	Eastern Slope	9219	22.5	88	1980
11/25/2009	79	12:25	Northern Slope	9219	22.5	126	2835
11/25/2009	80	12:36	Eastern Slope	9219	12	58	696
11/25/2009	81	1:24	Northern Slope	9219	22.5	138	3105
11/25/2009	82	1:28	Northern Slope	9224	22.5	83	1867.5
11/25/2009	83	1:34	Northern Slope	9224	13.5	58	783
11/25/2009	84	2:29	Northern Slope	9224	22.5	128	2880
11/25/2009	85	2:37	Northern Slope	9224	22.5	128	2880
11/25/2009	86	2:41	Northern Slope	9220	22.5	132	2970
11/25/2009	87	2:45	Northern Slope	9220	22.5	134	3015
11/25/2009	88	2:53	Northern Slope	9220	22.5	135	3037.5
11/25/2009	89	4:19	Western Slope	9448	22.5	252	5670
11/25/2009	90	4:21	Western Slope	9448	22.5	154	3465
11/25/2009	91	4:27	Western Slope	4349	22.5	92	2070
11/25/2009	92	4:31	Western Slope	4349	22.5	238	5355
11/25/2009	93	4:35	Western Slope	4349	22.5	58	1305
11/25/2009	94	4:39	Western Slope	9221	22.5	194	4365
11/25/2009	95	5:38	Northern Slope	9221	22.5	138	3105
11/25/2009	96	5:46	Northern Slope	9221	22.5	72	1620
					Total This Page		182289

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Panel Placement Log

Project No.: 0932-8009
Project Name: White Oak LF
Project Start Date: 10/31/09
Project Location: Waynesville, NC
Page: 3 of 3

Material: HDPE
Thickness: 60 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
11/25/2009	97	5:52	Northern Slope	4348	22.5	58	1305
11/25/2009	98	6:03	Northern Slope	9222	22.5	44	990
11/25/2009	99	6:11	Northern Slope	4348	22.5	29	652.5
11/25/2009	100	7:37	Northern Slope	9222	22.5	125	2812.5
11/25/2009	101	7:42	Northern Slope	9222	18	62	1116
11/25/2009	102	7:43	Northern Slope	9222	5	44	220
11/25/2009	103	7:48	Northern Slope	9222	22.5	112	2520
11/25/2009	104	7:49	Northern Slope	9222	22.5	12	270
11/25/2009	105	7:52	Northern Slope	4350	22.5	94	2115
11/25/2009	106	7:55	Northern Slope	4350	22.5	93	2092.5
11/25/2009	107	7:57	Northern Slope	4350	22.5	12	270
11/25/2009	108	8:02	Northern Slope	9225	22.5	74	1665
11/25/2009	109	8:05	Northern Slope	9225	22.5	75	1687.5
11/25/2009	110	8:11	Northern Slope	9225	22.5	64	1440
11/25/2009	111	8:16	Northern Slope	9225	22.5	51	1147.5
11/25/2009	112	8:19	Northern Slope	9225	20	24	480
11/25/2009	113	8:24	Northern Slope	9225	15	20	300
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HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 1 of 6

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
1	MS	P-7/2/3	11/9/2009	7:50	P	12X22.5	M14	RG	N/A	11/9/09
2	AT	P-7/2/R-1	11/9/2009	9:12	P	2X2	X10	JM	P	11/9/09
3	AT	R-1/P-2/3	11/9/2009	9:23	P	2X2	X10	JM	P	11/9/09
4	AT	P-7/1/2	11/9/2009	9:30	P	2X2	X10	JM	P	11/9/09
5	DT-1	P-1/2 100'> BOS	11/9/2009	10:17	P	2X4	X10	JM	P	11/9/09
6	DT-2	P-2/3 100'> BOS	11/9/2009	10:08	P	2X4	X10	JM	P	11/9/09
7	DT-3	P-3/4 100'>BOS	11/9/2009	10:24	P	2X4	X10	JM	P	11/9/09
8	WS	P-3/4 6'>BOS	11/9/2009	10:50	P	2X3	X10	JM	P	11/9/09
9	BO	P-5/6 2'> BOS	11/9/2009	11:38	P	2X2	X10	JM	P	11/9/09
10	DT-5	P-5/6 130'> BOS	11/9/2009	10:32	P	2X4	X10	JM	P	11/9/09
11	DT-6	P-6/9 100'> BOS	11/9/2009	10:40	P	2X4	X10	JM	P	11/9/09
12	DT-7	P-9/10 50'> BOS	11/9/2009	11:46	P	2X4	X10	JM	P	11/9/09
13	DT-8	P-10/11 120'> BOS	11/9/2009	10:50	P	2X4	X10	JM	P	11/9/09
14	AT	P-11/13/12	11/9/2009	10:56	P	2X2	X10	JM	P	11/9/09
15	AT	P-13/14/12	11/9/2009	11:03	P	2X2	X10	JM	P	11/9/09
16	AT	P-12/14/15	11/9/2009	11:52	P	2X2	X10	JM	P	11/9/09
17	AT	P-14/16/15	11/9/2009	11:58	P	2X2	X10	JM	P	11/9/09
18	AT	P-14/17/16	11/9/2009	11:10	P	2X2	X10	JM	P	11/9/09
19	DT-10	P-17/16 8'> BOS	11/9/2009	11:18	P	2X4	X10	JM	P	11/9/09
20	DT-9	P-14/17 20'> BOS	11/9/2009	11:26	P	2X4	X10	JM	P	11/9/09
21	AT	P-8/16/15	11/9/2009	12:11	P	2X2	X10	JM	P	11/9/09
22	AT	P-8/15/12	11/9/2009	12:17	P	2X2	X10	JM	P	11/9/09
23	WR	P-8/12 30'> BOS	11/9/2009	12:27	P	2X11	X10	JM	P	11/9/09
24	AT	P-8/12/11	11/9/2009	12:22	P	2X2	X11	LV	P	11/9/09
25	AT	P-8/11/10	11/9/2009	11:39	P	2X2	X11	LV	P	11/9/09
26	AT	P-8/10/9	11/9/2009	11:34	P	2X2	X11	LV	P	11/9/09
27	AT	P-8/9/6	11/9/2009	11:25	P	2X2	X11	LV	P	11/9/09
28	MS	P-9/6 @ EOS 80'> EOS	11/9/2009	11:13	P	1X80	X11	LV	P	11/9/09
29	DT-4	P-5/4 300'> BOS	11/9/2009	12:02	P	2X4	X11	LV	P	11/9/09
30	WS	P-3/4 260'> BOS	11/9/2009	12:16	P	2X18	X11	LV	P	11/9/09
31	WR	P-3/4 5'> EOS	11/9/2009	11:14	P	2X2	X11	LV	P	11/9/09
32	AT	P-20/7/1	11/19/2009	1:58	P	2X2	X11	JM	P	11/19/09
33	MD	P-1 14'> BOS 8'> P-20	11/19/2009	3:27	P	1X1	X11	JM	P	11/19/09
34	BO/AT	P-22/23 @ BOS	11/19/2009	1:43	P	2X3	X11	JM	P	11/19/09
35	WR	P-1/20 45'> BOS	11/19/2009	3:24	P	2X2	X11	JM	P	11/19/09
36	AT	P-20/21/22	11/19/2009	3:18	P	2X4	X11	JM	P	11/19/09
37	FT	P-21/22 12'> BOS	11/19/2009	3:14	P	2X3	X11	JM	P	11/19/09
38	AT	P-22/21/23	11/19/2009	3:10	P	2X2	X11	JM	P	11/19/09
39	WR	P-21/23 20'> BOS	11/19/2009	3:34	P	2X2	X11	JM	P	11/19/09
40	AT	P-30/31/28	11/19/2009	2:22	P	2X2	X11	JM	P	11/19/09

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS- Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip, P- Patch, B-Extrudate Bead, GB-Grind & Bead, BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 2 of 6

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
41	AT	P-31/28/27	11/19/2009	2:10	P	2X2	X11	JM	P	11/19/09
42	AT	P-28/27/26	11/19/2009	2:05	P	2X2	X11	JM	P	11/19/09
43	BO	P-27/26 6'> EOS	11/19/2009	2:46	P	2X2	X11	JM	P	11/19/09
44	WS/AT	P-29/27/26	11/19/2009	2:43	P	2X11	X11	JM	P	11/19/09
45	AT	P-29/26/25	11/19/2009	2:52	P	2X2	X11	JM	P	11/19/09
46	AT	P-26/25/23	11/19/2009	2:59	P	2X2	X11	JM	P	11/19/09
47	WS/BO	P-1/20 138'> BOS	11/19/2009	3:40	P	2X3	X11	JM	P	11/19/09
48	WS/AT	P-29/25/23	11/19/2009	3:56	P	3X9	X11	JM	P	11/19/09
49	WR	P-29/23 16'> BOS	11/19/2009	4:03	P	2X4	X11	JM	P	11/19/09
50	WR/AT	P-24/29/23	11/19/2009	4:13	P	2X8	X11	JM	P	11/19/09
51	WR	P-24/23 24'> BOS	11/19/2009	4:24	P	2X3	X11	JM	P	11/21/09
52	WR	P-24/23 36'> BOS	11/19/2009	4:33	P	2X7	X11	JM	P	11/21/09
53	WR/AT	P-24/23/19	11/19/2009	4:49	P	2X13	X11	JM	P	11/21/09
54	AT	P-23/21/19	11/19/2009	4:41	P	2X2	X11	JM	P	11/21/09
55	AT	P-21/19/18/20	11/19/2009	5:14	P	3X4	X11	JM	P	11/21/09
56	AT	P-1/20/18	11/19/2009	5:24	P	2X2	X11	JM	P	11/21/09
57	BO	P-1/18 6'> BOS	11/19/2009	5:30	P	2X2	X11	JM	P	11/21/09
58	WR	P-24/19 24'> BOS	11/19/2009	5:48	P	2X2	X11	JM	P	11/21/09
59	WR	P-24/19 33'> BOS	11/19/2009	5:58	P	2X2	X11	JM	P	11/21/09
60	AT	P-24/29 11'> BOS	11/20/2009	8:55	P	2X3	X11	JM	P	11/21/09
61	SI	P-1/18 24'> BOS	11/21/2009	3:24	P	4X8	X11	PG	P	11/21/09
62	WR	P-19/24 26'> EOS	11/19/2009	5:36	P	2X2	X12	LV	P	11/21/09
63	AT	P-18/19/24	11/20/2009	12:35	P	2X5	X11	JM	P	11/21/09
64	WR/AT	P-18/19 @ EOS EXT. Trench	11/20/2009	12:38	P	2X3	X11	JM	P	11/21/09
65	DT-11	P-18/TI 8'> P-1	11/21/2009	3:32	P	2X4	X11	PG	P	11/21/09
66	DT-12	P-24/TI 10'> P-29	11/21/2009	3:39	P	2X4	X11	PG	P	11/21/09
67	DT-13	P-23/25 46'> BOS	11/21/2009	3:46	P	2X4	X11	PG	P	11/21/09
68	DT-14	P-26/29 2'> BOS	11/21/2009	4:02	P	2X4	X11	PG	P	11/21/09
69	BO	P-17/45 2'> BOS	11/23/2009	4:24	P	2X2	X11	JM	P	11/24/09
70	AT	P-17/16/45	11/23/2009	4:34	P	2X2	X11	JM	P	11/24/09
71	DT-15	P-45/46 50'> BOS	11/24/2009	9:56	P	2X4	X11	JM	P	11/24/09
72	DT-16	P-47/48 50'> BOS	11/24/2009	9:41	P	2X4	X11	JM	P	11/24/09
73	AT	P-47/50/48	11/23/2009	9:18	P	2X2	X11	JM	P	11/24/09
74	AT	P-50/48/49	11/23/2009	4:13	P	2X2	X11	JM	P	11/24/09
75	BO	P-47/48 70'> BOS	11/23/2009	4:29	P	2X2	X11	JM	P	11/24/09
76	DT-17	P-48/49 100'> BOS	11/24/2009	9:30	P	2X4	X11	JM	P	11/24/09
77	AT	P-49/57/56	11/23/2009	4:08	P	2X2	X11	JM	P	11/24/09
78	BO	P-57/56 12'> BOS	11/23/2009	4:03	P	2X2	X11	JM	P	11/24/09
79	AT	P-57/56/58	11/23/2009	4:00	P	2X2	X11	JM	P	11/24/09
80	DT-18	P-56/58 20'> BOS	11/24/2009	10:06	P	2X4	X11	JM	P	11/24/09

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS- Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip, P- Patch, B-Extrudate Bead, GB-Grind & Bead, BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 3 of 6

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
81	WR	P-58/60 1'> BOS	11/23/2009	3:51	P	2X3	X11	JM	P	11/24/09
82	WR	P-60/61 2'> BOS	11/23/2009	3:46	P	2X3	X11	JM	P	11/24/09
83	AT	P-58/60/59	11/23/2009	12:19	P	2X2	X11	JM	P	11/24/09
84	AT	P-60/59/61	11/23/2009	12:25	P	2X2	X11	JM	P	11/24/09
85	DT-19	P-59/61 20'> BOS	11/24/2009	11:30	P	2X4	X11	JM	P	11/24/09
86	DT-20	P-61/62 60'> BOS	11/24/2009	10:13	P	2X4	X11	JM	P	11/24/09
87	WR	P-62/64 3'> BOS	11/23/2009	3:40	P	2X3	X11	JM	P	11/24/09
88	AT	P-62/63/64	11/23/2009	3:07	P	2X2	X11	JM	P	11/24/09
89	DT-21	P-64/63 11'> BOS	11/24/2009	10:21	P	2X4	X11	JM	P	11/24/09
90	AT	P-64/63/65	11/23/2009	3:03	P	2X2	X11	JM	P	11/24/09
91	DT-22	P-65/67 80'> BOS	11/24/2009	10:38	P	2X4	X11	JM	P	11/24/09
92	DD	P-65/67 144'> BOS	11/23/2009	2:42	P	2X2	X11	JM	P	11/24/09
93	AT	P-65/66/67	11/23/2009	2:38	P	2X2	X11	JM	P	11/24/09
94	AT	P-67/66/68	11/23/2009	2:45	P	2X2	X11	JM	P	11/24/09
95	DT-23	P-67/68 54'> BOS	11/24/2009	10:41	P	2X4	X11	JM	P	11/24/09
96	DT-24	P-68/69 100'> BOS	11/24/2009	10:54	P	2X4	X11	JM	P	11/24/09
97	DT-25	P-69/70 30'> BOS	11/24/2009	11:10	P	2X4	X11	JM	P	11/24/09
98	AT	P-69/70/71	11/23/2009	2:52	P	2X2	X11	JM	P	11/24/09
99	AT	P-66/53/54	11/23/2009	2:25	P	2X2	X11	JM	P	11/24/09
100	AT	P-65/66/53	11/23/2009	2:10	P	3X4	X11	JM	P	11/24/09
101	AT	P-65/53/52	11/23/2009	2:00	P	2X2	X11	JM	P	11/24/09
102	AT	P-63/65/52	11/23/2009	2:04	P	2X2	X11	JM	P	11/24/09
103	AT	P-63/52/51	11/23/2009	1:59	P	2X2	X11	JM	P	11/24/09
104	AT	P-62/63/51	11/23/2009	1:42	P	2X3	X11	JM	P	11/24/09
105	EE	P-62 7'> EOS 9'> P-63	11/23/2009	1:54	P	2X2	X11	JM	P	11/24/09
106	EE	P-62 14'> EOS 9'> P-63	11/23/2009	1:51	P	2X2	X11	JM	P	11/24/09
107	AT	P-62/51/44	11/23/2009	1:42	P	2X2	X11	JM	P	11/24/09
108	AT	P-61/62/44	11/23/2009	12:40	P	2X4	X11	JM	P	11/24/09
109	DT-26	P-61/44 10'> BOS	11/24/2009	11:40	P	2X4	X11	JM	P	11/24/09
110	AT	P-61/44/43	11/23/2009	12:35	P	2X2	X11	JM	P	11/24/09
111	AT	P-59/61/43	11/23/2009	12:30	P	2X2	X11	JM	P	11/24/09
112	AT	P-59/43/42	11/23/2009	12:14	P	2X2	X11	JM	P	11/24/09
113	AT	P-58/59/42	11/23/2009	12:08	P	2X2	X11	JM	P	11/24/09
114	AT	P-58/42/40	11/23/2009	12:02	P	2X2	X11	JM	P	11/24/09
115	AT	P-56/58/40	11/23/2009	11:59	P	2X3	X11	JM	P	11/24/09
116	AT	P-56/40/38	11/23/2009	11:52	P	2X2	X11	JM	P	11/24/09
117	AT	P-49/56/38	11/23/2009	11:48	P	2X2	X11	JM	P	11/24/09
118	AT	P-49/38/36	11/23/2009	11:44	P	2X2	X11	JM	P	11/24/09
119	AT	P-48/49/36	11/23/2009	11:40	P	2X2	X11	JM	P	11/24/09
120	AT	P-48/36/35	11/23/2009	11:34	P	2X2	X11	JM	P	11/24/09

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS- Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip, P- Patch, B-Extrudate Bead, GB-Grind & Bead, BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 4 of 6

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
121	AT	P-47/48/35	11/23/2009	11:27	P	2X2	X11	JM	P	11/24/09
122	AT	P-47/35/34	11/23/2009	11:21	P	2X2	X11	JM	P	11/24/09
123	AT	P-46/47/34	11/23/2009	11:18	P	2X2	X11	JM	P	11/24/09
124	AT	P-46/34/32	11/23/2009	11:16	P	2X2	X11	JM	P	11/24/09
125	AT	P-45/46/32	11/23/2009	11:12	P	2X2	X11	JM	P	11/24/09
126	BO	P-45/46 12'> EOS	11/23/2009	11:08	P	2X2	X11	JM	P	11/24/09
127	AT	P-45/32/8	11/23/2009	11:05	P	2X2	X11	JM	P	11/24/09
128	FM/AT	P-16/45/8	11/23/2009	10:57	P	2X11	X11	JM	P	11/24/09
129	CR	P-16 14'> EOS 10'> P-45	11/23/2009	10:44	P	2X3	X11	JM	P	11/24/09
130	AT	P-33/32/8	11/23/2009	4:55	P	2X2	X11	JM	P	11/24/09
131	AT	P-34/33/32	11/23/2009	5:02	P	2X2	X11	JM	P	11/24/09
132	BO	P-34/33 54'> EOS	11/23/2009	5:08	P	2X2	X11	JM	P	11/24/09
133	DT-27	P-34/35 80'> BOS	11/24/2009	12:47	P	2X4	X11	JM	P	11/24/09
134	WR	P-34/35 65'> BOS	11/23/2009	4:46	P	2X5	X11	JM	P	11/24/09
135	AT	P-37/36/35	11/23/2009	5:29	P	2X2	X11	JM	P	11/24/09
136	AT	P-37/36/38	11/23/2009	5:39	P	2X2	X11	JM	P	11/24/09
137	DT-28	P-38/37 20'> BOS	11/24/2009	12:36	P	2X4	X11	JM	P	11/24/09
138	WR	P-38/37 80'> BOS	11/24/2009	12:32	P	2X5	X11	JM	P	11/24/09
139	AT	P-39/37/38	11/23/2009	5:16	P	2X2	X11	JM	P	11/24/09
140	AT	P-40/39/38	11/23/2009	5:24	P	2X3	X11	JM	P	11/24/09
141	WS	P-40/39 17'> BOS	11/23/2009	5:18	P	2X3	X11	JM	P	11/24/09
142	AT	P-41/39/40	11/23/2009	5:27	P	2X2	X11	JM	P	11/24/09
143	AT	P-42/41/40	11/23/2009	5:32	P	2X2	X12	LV	P	11/24/09
144	WR	P-42/40 123'> BOS	11/23/2009	5:55	P	3X11	X11	JM	P	11/24/09
145	WR	P-42 124'> BOS	11/23/2009	5:59	GB	21	X11	JM	P	11/24/09
146	DT-29	P-42 12'> BOS GB	11/24/2009	12:15	P	2X4	X11	JM	P	11/24/09
147	BO	P-44/43 224'> BOS	11/23/2009	5:20	P	2X3	X12	LV	P	11/24/09
148	BO	P-44/43 262'> BOS	11/23/2009	5:11	P	2X2	X12	LV	P	11/24/09
149	DT-30	P-52/51 150'> BOS	11/24/2009	12:04	P	2X4	X11	JM	P	11/24/09
150	DT-31	P-54/53 160'> BOS	11/24/2009	11:52	P	2X4	X11	JM	P	11/24/09
151	MS	P-90/92/93/95	11/25/2009	6:02	P	22X12	M17	MY	N//A	11/25/09
152	AT	P-66/68/54	11/25/2009	7:26	P	3X11	X11	PG	P	11/28/09
153	FT	P-68/54 4'> EOS	11/27/2009	1:45	P	2X2	X11	JM	P	11/28/09
154	AT	P-68/54/55	11/25/2009	7:30	P	2X3	X11	PG	P	11/28/09
155	AT	P-68/69/55	11/25/2009	7:34	P	2X3	X11	PG	P	11/28/09
156	EE	P-69 9'> EOS 4'> P-68	11/27/2009	8:52	P	2X2	X11	JM	P	11/28/09
157	AT	P-69/72/55	11/25/2009	7:38	P	2X2	X11	PG	P	11/28/09
158	AT	P-69/70/72	11/25/2009	7:42	P	2X2	X11	PG	P	11/28/09
159	AT	P-70/74/72	11/25/2009	7:45	P	2X3	X11	PG	P	11/28/09
160	AT	P-70/89/74	11/25/2009	7:48	P	2X2	X11	PG	P	11/28/09

Defect Code:
BO - Burn Out
CR - Crease
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EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS- Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip
P- Patch
B-Extrudate Bead
GB-Grind & Bead
BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 5 of 6

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
161	AT	P-71/89/70	11/27/2009	8:27	P	2X2	X11	JM	P	11/28/09
162	DT-32	P-89/91 70'> BOS	11/28/2009	10:40	P	2X4	X11	MY	P	11/28/09
163	AT	P-89/91/90	11/27/2009	8:20	P	2X2	X11	JM	P	11/28/09
164	AT	P-91/92/90	11/27/2009	8:10	P	2X2	X11	JM	P	11/28/09
165	DT-33	P-90/92 35'> BOS	11/28/2009	10:54	P	2X4	X11	MY	P	11/28/09
166	DT-34	P-92/94 100'> BOS	11/28/2009	11:02	P	2X4	X11	MY	P	11/28/09
167	MS/AT	P-94/112 @ BOS	11/27/2009	12:09	P	8X14	X11	JM	P	11/28/09
168	AT	P-112/111/94	11/27/2009	11:59	P	2X2	X11	JM	P	11/28/09
169	AT	P-111/110/94	11/27/2009	11:53	P	2X2	X11	JM	P	11/28/09
170	AT	P-110/109/94	11/27/2009	11:46	P	3X2	X11	JM	P	11/28/09
171	DT-35	P-109/108 35'> BOS	11/28/2009	11:12	P	2X4	X11	MY	P	11/28/09
172	AT	P-109/108/107/94	11/27/2009	11:40	P	2X5	X11	JM	P	11/28/09
173	AT	P-108/106/107	11/27/2009	11:31	P	2X2	X11	JM	P	11/28/09
174	AT	P-107/106/94	11/27/2009	11:27	P	2X2	X11	JM	P	11/28/09
175	AT	P-106/105/104/94	11/27/2009	11:23	P	3X3	X11	JM	P	11/28/09
176	AT	P-92/94/93	11/27/2009	11:16	P	2X2	X11	JM	P	11/28/09
177	AT	P-104/94/93	11/27/2009	11:13	P	2X3	X11	JM	P	11/28/09
178	AT	P-105/104/103	11/27/2009	11:00	P	2X2	X11	JM	P	11/28/09
179	AT	P-104/103/93	11/27/2009	11:04	P	2X2	X11	JM	P	11/28/09
180	DT-36	P-103/100	11/28/2009	11:29	P	2X4	X11	MY	P	11/28/09
181	AT	P-103/100/93	11/27/2009	9:08	P	2X2	X11	JM	P	11/28/09
182	AT	P-89/75/74	11/25/2009	7:52	P	2X2	X11	PG	P	11/28/09
183	AT	P-89/90/75	11/25/2009	7:56	P	2X3	X11	PG	P	11/28/09
184	AT	P-90/95/75	11/25/2009	7:58	P	2X3	X11	PG	P	11/28/09
185	AT	P-90/92/R-151/95	11/25/2009	8:00	P	4X3	X11	PG	P	11/28/09
186	AT	P-92/93/R-151	11/25/2009	8:05	P	2X2	X11	PG	P	11/28/09
187	AT	R-151/P-93/95	11/25/2009	8:10	P	2X2	X11	PG	P	11/28/09
188	AT	P-93/100/96/95	11/27/2009	9:03	P	3X3	X11	JM	P	11/28/09
189	AT	P-100/102/96	11/27/2009	9:15	P	2X2	X11	JM	P	11/28/09
190	AT	P-102/97/96	11/27/2009	9:27	P	3X2	X11	JM	P	11/28/09
191	AT	P-102/98/97	11/27/2009	9:35	P	2X2	X11	JM	P	11/28/09
192	AT	P-100/101/102	11/27/2009	10:09	P	2X2	X11	JM	P	11/28/09
193	AT	P-101/98/102	11/27/2009	10:00	P	2X2	X11	JM	P	11/28/09
194	WR/AT	P-101/99/98	11/27/2009	10:10	P	2X6	X11	JM	P	11/28/09
195	AT	P-101/113/99	11/27/2009	10:39	P	2X2	X11	JM	P	11/28/09
196	DT-37	P-95/88 45'> BOS	11/28/2009	11:42	P	2X4	X11	MY	P	11/28/09
197	AT	P-95/88/75	11/25/2009	7:10	P	2X2	X11	PG	P	11/28/09
198	AT	P-88/87/75	11/25/2009	7:05	P	2X2	X11	PG	P	11/28/09
199	AT	P-87/86/75	11/25/2009	6:50	P	2X2	X11	PG	P	11/28/09
200	AT	P-86/85/75	11/25/2009	6:35	P	2X2	X11	PG	P	11/28/09

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS- Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip, P- Patch, B-Extrudate Bead, GB-Grind & Bead, BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 6 of 6

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
201	BO	P-85/84_3'> EOS	11/28/2009	11:50	P	2X2	X11	MY	P	11/28/09
202	DT-38	P-85/84_68'> BOS	11/28/2009	12:03	P	2X4	X11	MY	P	11/28/09
203	AT	P-85/84/75	11/25/2009	6:30	P	2X2	X11	PG	P	11/28/09
204	AT	P-84/79/75	11/25/2009	5:50	P	2X2	X11	PG	P	11/28/09
205	AT	P-79/76/75	11/25/2009	6:00	P	3X3	X11	PG	P	11/28/09
206	AT	P-79/77/76	11/25/2009	6:05	P	2X2	X11	PG	P	11/28/09
207	AT	P-79/81/77	11/25/2009	6:10	P	4X3	X11	PG	P	11/28/09
208	AT	P-79/82/81	11/25/2009	5:15	P	2X2	X11	PG	P	11/28/09
209	AT	P-79/83/82	11/25/2009	6:20	P	2X2	X11	PG	P	11/28/09
210	AT	P-81/78/77	11/25/2009	5:26	P	2X3	X11	PG	P	11/28/09
211	DT-39	P-81/78_27'> BOS	11/28/2009	1:00	P	2X4	X11	MY	P	11/28/09
212	AT	P-81/80/78	11/27/2009	11:30	P	2X2	X11	MY	P	11/28/09
213	DT-40	P-75/74_166'> BOS	11/28/2009	1:11	P	2X4	X11	MY	P	11/28/09
214	DT-41	P-74/72_170'> BOS	11/28/2009	1:15	P	2X4	X11	MY	P	11/28/09
215	AT	P-74/73/72	11/27/2009	10:24	P	2X2	X11	MY	P	11/28/09
216	AT	P-73/72/55	11/27/2009	10:18	P	2X2	X11	MY	P	11/28/09
217	DT-42	P-75/TL_10'> BOS	11/28/2009	2:07	P	2X4	X11	MY	P	11/28/09
218	DT-22 A/B	P-65/67_65' to 95'> BOS	12/1/2009	3:16	C	3X36	X11	JM	P	12/1/09
219	DT-25 A/B	P-69/70_20' to 40'> BOS	12/1/2009	3:49	C	3X28	X11	JM	P	12/1/09
220	MD	P-29_65'> BOS_12'> P-25	12/7/2009	4:34	P	4X8	X11	MY	P	12/7/09
221	CAP	Ph.1 Tie-In/P-41/42	1/20/2010	10:30	P	4X15	X11	MY	P	1/20/10
222	CAP	P-18/19/Ph.1/2 Tie-In	1/20/2010	1:30	P	5X8	X11	MY	P	1/20/10
223	FLAP	N. End of Tie-in/P-81/80	4/15/2010	9:00	C	47X20	X10	RO	P	4/15/10
224	FLAP	South Ph.2/3 Tie-In	4/19/2010	9:00	C	22X203	X10	RO	P	4/19/10

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS- Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip, P- Patch, B-Extrudate Bead, GB-Grind & Bead, BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Geomembrane Field Trial Seam Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 1 of 3

Material: HDPE
60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
1	11/7/2009	2:09	67	M32	JM	850/650		131	145	142			147	134	138			P	CH	TX/TX
								141	141	163										
2	11/7/2009	2:10	67	M14	RG	850/650		163	137	144			154	136	141			P	CH	TX/TX
								141	124	151										
3	11/7/2009	2:14	67	M32	JM	850/650		144	134	146			161	139	136			P	CH	SM/SM
								141	124	129										
4	11/7/2009	2:16	67	M14	RG	850/650		124	134	147			153	133	131			P	CH	SM/SM
								126	131	126										
5	11/7/2009	2:45	67	M19	LV	860/650		134	129	143			161	140	136			P	CH	SM/SM
								136	131	138										
6	11/8/2009	12:55	72	M14	RG	860/650		145	139	144			159	138	140			P	AS	SM/SM
								138	141	160										
7	11/8/2009	12:50	72	M32	JM	860/650		145	139	151			151	133	136			P	AS	SM/SM
								163	149	156										
8	11/8/2009	12:56	72	M32	JM	860/650		129	121	132			160	134	141			P	AS	SM/TX
								130	126	122										
9	11/8/2009	12:58	72	M14	RG	860/650		144	139	155			158	136	138			P	AS	TX/TX
								140	146	141										
10	11/9/2009	8:55	54	X11	LV		550/500	138	136	121			133	136	141			P	CH	TX/TX (old cell)
11	11/9/2009	8:18	54	X10	JM		550/500	136	96	102			126	131	129			P	CH	TX/TX
12	11/17/2009	5:15	61	M32	JM	850/600		121	116	134			140	136	129			P	CH	SM/SM
								134	126	138										
13	11/17/2009	5:15	61	M14	RG	850/600		148	138	136			134	141	137			P	CH	SM/SM
								156	143	141										
14	11/17/2009	5:19	61	M14	RG	850/500		134	129	131			156	134	141			P	CH	TX/TX
								136	129	146										

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
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Geomembrane Field Trial Seam Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 2 of 3

Material: HDPE
60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
15	11/19/2009	8:35	46	M14	RG	850/600		124	167	138			146	134	133			P	CH	SM/SM
								127	149	143										
16	11/19/2009	8:38	46	M32	JM	850/600		134	133	129			129	138	136			P	CH	SM/SM
								136	134	131										
17	11/19/2009	1:28	58	X12	LV		550/500	89	92	96			123	121	129			P	CH	TX/TX (old cell)
18	11/19/2009	1:31	58	X11	JM		550/550	116	121	109			131	144	136			P	CH	TX/TX
19	11/20/2009	8:01	42	X11	JM		550/550	123	126	117			146	138	140			P	CH	TX/TX
20	11/20/2009	12:25	62	M32	MY	860/600		124	131	143			127	134	138			P	CH	SM/SM
								162	129	137										
21	11/20/2009	12:30	62	M32	MY	860/600		131	137	144			147	154	161			P	CH	TX/TX
								141	124	151										
22	11/20/2009	12:50	62	M19	AR	850/600		144	134	139			153	133	134			P	CH	SM/SM
								141	136	147										
23	11/20/2009	12:55	62	M19	AR	850/500		124	134	129			160	134	143			P	CH	TX/TX
								126	131	119										
24	11/21/2009	1:40	65	M17	JM	860/600		146	141	153			133	136	154			P	CH	SM/SM
								139	154	156										
25	11/21/2009	8:24	54	M20	AR	850/500		124	129	121			156	171	166			P	CH	SM/SM
								127	134	124										
26	11/21/2009	8:27	54	M20	AR	850/500		134	146	128			198	186	176			P	CH	TX/TX
								157	144	146										
27	11/21/2009	8:06	54	M32	MY	850/600		129	136	139			147	138	140			P	CH	SM/SM
								134	132	147										
28	11/21/2009	8:31	54	M32	MY	850/500		147	136	156			159	167	164			P	CH	TX/TX
								152	143	166										

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
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Geomembrane Field Trial Seam Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 3 of 3

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
								Peel (ppi) IN / OUT					Shear (ppi)							
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	1	2	3	4	5	1	2	3	4	5			
29	11/23/2009	8:27	38	X12	LV		550/500	83	91	89			124	134	127			P	CH	TX/TX
30	11/23/2009	8:32	38	X11	JM		550/550	116	124	134			134	137	143			P	CH	TX/TX (old cell)
31	11/25/2009	8:16	46	M32	JM	850/600		129	134	124			156	147	139			P	CH	SM/SM
								132	137	127										
32	11/25/2009	8:21	46	M17	MY	860/600		135	154	140			134	146	138			P	CH	SM/SM
								136	143	136										
33	11/25/2009	5:06	46	M14	RO	860/600		116	119	121			164	179	157			P	CH	SM/SM
								124	134	129										
34	11/25/2009	4:54	46	X11	PG		550/550	121	116	129			133	137	127			P	CH	TX/TX
35	4/15/2010	8:00	65	X10	RO		550/500	135	133	141	135	128	150	143	141	143	152	P	MS	TX/TX
36	4/19/2010	8:00	65	X10	RO		550/500	117	109	110	106	122	131	134	154	147	142	P	MS	TX/TX

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Geomembrane Seam Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 1 of 4

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed ºF/fpm	Temp/ Preheat ºF/ºF	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
1	P-1/2	11/8/2009	M32	JM	860/650		151	147	139	141	138	156	147	151	158	160	P	CH	SM/SM
							157	156	144	149	144								
2	P-2/3	11/8/2009	M14	RG	860/650		178	133	145	157	134	136	134	129	141	137	P	CH	SM/SM
							128	145	177	166	156								
3	P-3/4	11/8/2009	M19	LV	860/650		143	177	171	165	155	140	129	127	131	138	P	CH	SM/SM
							185	169	162	161	160								
4	P-4/5	11/8/2009	M32	JM	860/650		147	141	138	133	121	133	143	137	134	135	P	CH	SM/SM
							142	123	142	136	127								
5	P-5/6	11/8/2009	M14	RG	860/650		136	156	125	134	120	147	134	133	130	139	P	CH	SM/SM
							124	147	125	129	123								
6	P-6/9	11/8/2009	M14	RG	860/650		125	131	135	129	136	131	133	132	134	139	P	CH	SM/SM
							141	136	142	141	129								
7	P-9/10	11/8/2009	M14	RG	860/650		123	139	139	124	134	141	142	132	126	134	P	CH	SM/SM
							141	114	120	126	128								
8	P-10/11	11/8/2009	M32	JM	860/650		132	139	137	133	134	143	138	131	139	126	P	CH	SM/SM
							147	138	134	138	136								
9	P-14/17	11/8/2009	M14	RG	860/650		144	142	146	156	143	136	140	128	131	146	P	CH	SM/SM
							155	155	160	161	147								
10	P-16/17	11/8/2009	M32	JM	860/650		129	142	147	138	144	137	133	131	140	143	P	CH	SM/SM
							167	169	170	147	152								
11	P-18/TI	11/24/2009	X11	JM		550/500	80	85	90	83	89	148	147	176	137	143	P	AE	TX/Old TX
12	P-24/TI	11/24/2009	X12	LV		550/500	120	84	87	96	101	186	151	160	146	154	P	AE	TX/Old TX
13	P-23/25	11/24/2009	M14	RG	860/600		125	139	134	125	146	141	138	136	140	160	P	AE	SM/SM
							123	141	137	130	130								

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410-583-7700 Fax 410-583-7720

Geomembrane Seam Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 2 of 4

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed ºF/fpm	Temp/ Preheat ºF/ºF	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
14	P-26/29	11/24/2009	M32	JM	860/600		119	127	123	130	152	157	143	144	140	155	P	AE	SM/SM
							129	131	116	142	160								
15	P-45/46	11/24/2009	M19	AR	850/600		112	130	100	117	111	200	201	180	171	186	P	CH	SM/SM
							108	120	109	121	113								
16	P-47/48	11/24/2009	M19	AR	850/600		159	151	147	157	127	190	216	210	191	203	P	CH	SM/SM
							146	118	108	163	132								
17	P-48/49	11/24/2009	M19	AR	850/600		132	133	140	134	129	218	211	225	216	209	P	CH	SM/SM
							165	148	135	135	140								
18	P-56/58	11/24/2009	M19	AR	850/600		134	132	156	134	127	201	195	209	196	205	P	AE	SM/SM
							118	123	124	123	149								
19	P-59/61	11/24/2009	M32	MY	860/600		133	117	145	112	126	182	177	197	187	180	P	AE	SM/SM
							119	110	163	121	119								
20	P-61/62	11/24/2009	M32	MY	860/600		152	140	128	127	133	139	209	211	156	173	P	AE	SM/SM
							136	106	100	117	136								
21	P-64/63	11/24/2009	M32	MY	860/600		162	150	121	120	119	175	200	188	214	178	P	AE	TX/TX
							129	120	109	126	131								
22	P-65/67	11/24/2009	M19	AR	850/600		118	134	132	133	137	203	195	205	189	193	P	AE	SM/SM
							145	135	136	142	128								
23	P-67/68	11/24/2009	M32	MY	860/600		129	154	146	133	147	198	199	200	180	195	P	AE	SM/SM
							143	157	116	123	139								
24	P-68/69	11/24/2009	M32	MY	860/600		119	149	146	146	127	206	200	140	167	174	P	AE	SM/SM
							154	125	110	151	134								
25	P-69/70	11/24/2009	M19	AR	850/600		119	145	138	139	131	159	165	200	183	187	P	AE	SM/SM
							100	110	140	138	124								
26	P-61/44	11/24/2009	M17	JM	860/500		177	132	133	133	127	179	175	152	183	167	P	AE	TX/TX
							141	137	111	144	134								

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Geomembrane Seam Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 3 of 4

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed ºF/fpm	Temp/ Preheat ºF/ºF	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
27	P-35/34	11/24/2009	M32	MY	860/60		142	131	117	127	133	159	189	139	164	147	P	AE	SM/SM
							110	137	141	142	127								
28	P-38/37	11/24/2009	M32	MY	860/600		110	130	140	124	139	200	190	160	159	173	P	AE	SM/SM
							115	120	110	141	146								
29	P-40/42	11/24/2009	X11	JM		550/550	130	125	132	128	130	200	190	160	175	161	P	AE	TX/TX
30	P-52/51	11/24/2009	M32	MY	860/600		100	125	133	113	124	204	151	190	166	179	P	AE	SM/SM
							118	130	120	119	126								
31	P-54/53	11/24/2009	M32	MY	860/600		120	140	121	136	133	200	198	200	199	189	P	AE	SM/SM
							153	149	121	141	140								
32	P-89/91	11/28/2009	M17	MY	860/600		149	163	183	152	149	200	220	180	187	193	P	AE	SM/SM
							169	120	152	163	164								
33	P-90/92	11/28/2009	M32	JM	850/600		140	124	131	140	124	142	177	213	156	176	P	AE	SM/SM
							158	129	103	131	119								
34	P-92/94	11/28/2009	M17	MY	860/600		140	156	168	128	147	207	215	233	197	201	P	AE	SM/SM
							119	127	117	141	129								
35	P-109/108	11/28/2009	M14	RO	860/600		120	115	146	121	134	199	217	222	196	207	P	AE	SM/SM
							128	147	120	116	129								
36	P-103/100	11/28/2009	M32	JM	860/600		153	140	149	144	139	146	159	236	177	181	P	AE	SM/SM
							146	148	154	145	156								
37	P-95/88	11/28/2009	M32	JM	850/600		120	112	125	123	119	243	205	239	197	206	P	AE	SM/SM
							130	120	157	133	127								
38	P-85/84	11/28/2009	M17	MY	860/600		128	128	116	121	127	229	200	229	204	211	P	AE	SM/SM
							120	116	110	117	128								
39	P-78/81	11/28/2009	M17	MY	860/500		171	180	164	147	186	182	205	218	193	201	P	AE	SM/TX
							145	162	140	162	171								

HALLATON, INC.

1206 SPARKS ROAD, SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Geomembrane Seam Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Start Date: 10/31/2009
Project Location: Waynesville, NC
Page: 4 of 4

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed ºF/fpm	Temp/ Preheat ºF/ºF	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
40	P-75/74	11/28/2009	M17	MY	860/600		144	121	130	141	131	200	150	200	177	183	P	AE	SM/SM
							145	124	157	133	154								
41	P-74/72	11/28/2009	M32	JM	850/600		224	108	129	117	129	162	180	216	179	183	P	AE	SM/SM
							131	120	117	126	131								
42	P-75/TI	11/28/2009	X12	MY		550/500	139	142	138	132	134	118	120	126	121	124	P	AE	TX/Old TX
22A	P-65/67	12/1/2009	M19	AR	850/600		142	139	157	123	142	179	164	139	166	143	P	CH	SM/SM
							133	126	145	126	139								
22B	P-65/67	12/1/2009	M19	AR	850/600		137	122	134	143	132	141	157	154	167	138	P	CH	SM/SM
							130	124	129	136	143								
25A	P-69/70	12/1/2009	M19	AR	850/600		144	130	134	119	142	166	142	187	172	167	P	CH	SM/SM
							139	117	136	121	137								
25B	P-69/70	12/1/2009	M19	AR	850/600		146	130	136	144	128	175	153	138	156	166	P	CH	SM/SM
							142	133	143	157	149								
11A	P-18/TI	12/1/2009	X11	JM		550/500	108	116	124	143	111	134	140	136	128	131	P	CH	TX/Old TX
12A	P-24/TI	12/1/2009	X12	LV		550/500	126	119	130	104	113	130	128	134	135	129	P	CH	TX/Old TX

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/7/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test					Vac Test Tech	Test Date	Pass / Fail
									PSI		Time		Tech			
									Start	Finish	Start	Finish				
P-7/1	5:35	JM	M32	850	650	BOS	EOS	22.5	30	30	7:56	8:01	CH		11/8/2009	P
P-7/2	5:38	JM	M32	850	650	BOS	EOS	31	30	30	7:57	8:02	CH		11/8/2009	P
P-1/2	3:18	JM	M32	850	650	BOS	EOS	400	30	28	8:36	8:41	CH		11/8/2009	P
P-2/3	3:40	RG	M14	850	650	BOS	EOS	410	30	29	8:51	8:56	CH		11/8/2009	P
P-3/4	4:04	LV	M19	850	650	BOS	250'> BOS	250	30	30	9:04	9:09	CH		11/8/2009	P
P-3/4	4:04	LV	M19	850	650	140'> EOS	EOS	140	30	29	9:00	9:05	CH		11/8/2009	P
P-4/5	4:28	JM	M32	850	650	BOS	EOS	410	30	30	9:12	9:17	CH		11/8/2009	P
P-5/6	5:07	RG	M14	850	650	BOS	EOS	410	30	30	9:14	9:19	CH		11/8/2009	P
								2073.5								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/8/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-6/9	4:31	RG	M14	860	650	BOS	80'> EOS	270	30	29	5:30	5:35	FL		11/8/2009	P
P-9/10	1:45	RG	M14	860	650	BOS	EOS	345	30	30	3:15	3:20	FL		11/8/2009	P
P-10/11	2:14	JM	M32	860	650	BOS	EOS	309	30	30	3:19	3:24	FL		11/8/2009	P
P-11/13	2:46	RG	M14	860	650	BOS	EOS	144	30	29	3:32	3:37	FL		11/8/2009	P
P-11/12	2:58	RG	M14	860	650	BOS	EOS	118	30	30	3:33	3:38	FL		11/8/2009	P
P-13/12	2:39	RG	M14	860	650	BOS	EOS	22.5	30	28	3:33	3:38	FL		11/8/2009	P
P-13/14	3:06	JM	M32	860	650	BOS	EOS	144	30	30	3:40	3:45	FL		11/8/2009	P
P-12/14	3:18	JM	M32	860	650	BOS	EOS	32	30	29	3:42	3:47	FL		11/8/2009	P
P-12/15	3:22	JM	M32	860	650	BOS	EOS	45	30	30	3:43	3:48	FL		11/8/2009	P
P-14/15	2:54	JM	M32	860	650	BOS	EOS	22.5	30	28	3:49	3:54	FL		11/8/2009	P
P-14/17	3:51	RG	M14	860	650	BOS	EOS	94	30	30	4:17	4:22	FL		11/8/2009	P
P-14/16	3:57	RG	M14	860	650	BOS	EOS	76	30	30	4:18	4:23	FL		11/8/2009	P
P-15/16	4:05	RG	M14	860	650	BOS	EOS	25	30	30	4:20	4:25	FL		11/8/2009	P
P-16/17	3:48	JM	M32	860	650	BOS	EOS	22.5	30	28	4:17	4:22	FL		11/8/2009	P
P-6/9	4:52	RG	M14	860	650	80'> EOS	EOS	80	30	30	5:31	5:36	FL		11/8/2009	P
P-8/6	4:22	JM	M32	860	650	BOS	EOS	34	30	29	4:40	4:45	FL		11/8/2009	P
P-8/9	4:26	JM	M32	860	650	BOS	EOS	42	30	30	4:41	4:46	FL		11/8/2009	P
P-8/10	4:32	JM	M32	860	650	BOS	EOS	42	30	30	4:48	4:53	FL		11/8/2009	P
P-8/11	4:38	JM	M32	860	650	BOS	EOS	42	30	28	4:48	4:53	FL		11/8/2009	P
P-8/12	4:44	JM	M32	860	650	BOS	EOS	42	30	29	4:55	5:00	FL		11/8/2009	P
P-8/15	4:50	JM	M32	860	650	BOS	EOS	42	30	30	4:57	5:02	FL		11/8/2009	P
P-8/16	4:56	JM	M32	860	650	BOS	EOS	21	30	30	4:59	5:04	FL		11/8/2009	P
								2014.5								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/9/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-2/R-1	7:50	RG	M14	860	650	BOS	EOS	22.5	30	29	8:20	8:25	FL		11/9/2009	P
P-2/TI	10:31	LV	X11	500	550	BOS	EOS	22.5	EXTRUDED					FA	11/9/2009	P
P-3/TI	9:50	LV	X11	500	550	BOS	EOS	22.5	EXTRUDED					FA	11/9/2009	P
P-4/TI	9:23	LV	X11	500	550	BOS	EOS	22.5	EXTRUDED					FA	11/9/2009	P
P-5/TI	9:04	LV	X11	500	550	BOS	EOS	22.5	EXTRUDED					FA	11/9/2009	P
P-6/TI	8:33	LV	X11	500	550	BOS	EOS	9	EXTRUDED					FA	11/9/2009	P
P-8/TI	7:51	LV	X11	500	550	BOS	EOS	23	EXTRUDED					FA	11/9/2009	P
P-1/TI	10:45	LV	X11	500	550	BOS	EOS	22.5	EXTRUDED					FA	11/9/2009	P
								167								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/17/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test					Vac Test Tech	Test Date	Pass / Fail
									PSI		Time		Tech			
									Start	Finish	Start	Finish				
P-7/20	7:37	JM	M32	850	600	BOS	EOS	31	30	29	8:33	8:38	ML		11/19/2009	P
P-1/20	7:40	JM	M32	850	600	BOS	45'> BOS	45	30	30	8:47	8:52	ML		11/19/2009	P
P-1/20	7:45	JM	M32	850	600	45'> BOS	EOS	166	30	30	9:18	9:23	ML		11/19/2009	P
P-1/18	7:58	JM	M32	850	600	BOS	18'> BOS	18	30	30	10:11	10:16	ML		11/19/2009	P
P-1/18	8:40	JM	M32	850	600	31'> BOS	EOS	138	30	29	10:12	10:17	ML		11/19/2009	P
P-20/18	7:17	JM	M32	850	600	BOS	EOS	22.5	30	30	10:00	10:05	ML		11/19/2009	P
P-20/22	7:48	RG	M14	850	600	BOS	EOS	84	30	30	8:35	8:40	ML		11/19/2009	P
P-22/21	7:44	RG	M14	850	600	BOS	EOS	22.5	30	30	9:09	9:14	ML		11/19/2009	P
P-20/21	7:54	RG	M14	850	600	BOS	EOS	162	30	29	9:19	9:24	ML		11/19/2009	P
P-21/19	8:30	RG	M14	850	600	BOS	EOS	22.5	30	30	9:58	10:03	ML		11/19/2009	P
P-18/19	8:33	RG	M14	850	600	BOS	EOS	148	30	30	10:26	10:31	ML		11/19/2009	P
P-22/23	9:31	JM	M32	850	600	BOS	EOS	84	30	30	8:36	8:41	ML		11/19/2009	P
P-21/23	9:36	JM	M32	850	600	BOS	20'> BOS	20	30	30	9:26	9:31	ML		11/19/2009	P
P-23/26	9:30	RG	M14	850	600	BOS	EOS	85	30	29	8:37	8:42	ML		11/19/2009	P
								1048.5								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/19/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-21/23	9:06	JM	M32	850	600	22'> BOS	EOS	139	30	30	9:45	9:50	ML		11/19/2009	P
P-25/26	9:27	RG	M14	850	600	BOS	EOS	22.5	30	30	9:31	9:36	ML		11/19/2009	P
P-23/25	9:30	RG	M14	850	600	BOS	46'> BOS	46	30	30	9:32	9:37	ML		11/19/2009	P
P-23/25	9:38	RG	M14	850	600	48'> BOS	EOS	44	30	30	9:50	9:55	ML		11/19/2009	P
P-26/28	9:45	RG	M14	850	600	BOS	EOS	28	30	29	10:56	11:01	ML		11/19/2009	P
P-26/27	9:49	RG	M14	850	600	BOS	EOS	30	30	30	11:02	11:07	ML		11/19/2009	P
P-28/27	9:33	RG	M14	850	600	BOS	EOS	9	30	30	10:57	11:02	ML		11/19/2009	P
P-28/30	10:14	JM	M32	850	600	BOS	EOS	8	30	30	10:43	10:48	ML		11/19/2009	P
P-30/31	9:53	JM	M32	850	600	BOS	EOS	20	30	30	10:45	10:50	ML		11/19/2009	P
P-29/31	10:17	JM	M32	850	600	BOS	EOS	40	30	30	10:54	10:59	ML		11/19/2009	P
P-28/31	11:00	JM	M32	850	600	BOS	EOS	28	30	29	11:13	11:18	ML		11/19/2009	P
P-27/29	11:04	JM	M32	850	600	BOS	EOS	30	30	30	11:16	11:21	ML		11/19/2009	P
P-26/29	11:09	JM	M32	850	600	BOS	EOS	19	30	30	1:23	1:28	ML		11/19/2009	P
P-25/29	11:12	JM	M32	850	600	BOS	EOS	79	30	30	11:32	11:37	ML		11/19/2009	P
P-23/29	11:27	JM	M32	850	600	BOS	EOS	25	30	29	11:56	12:01	ML		11/19/2009	P
P-24/29	1:25	RG	M14	850	600	BOS	EOS	20	30	30	12:03	12:08	ML		11/19/2009	P
P-23/24	11:35	JM	M32	850	600	BOS	24'> BOS	24	30	30	12:16	12:21	ML		11/19/2009	P
P-23/24	11:38	JM	M32	850	600	24'> BOS	EOS	36	30	29	12:21	12:26	ML		11/19/2009	P
P-19/24	11:46	JM	M32	850	600	BOS	24'> BOS	24	30	30	1:10	1:15	ML		11/19/2009	P
P-19/24	11:51	JM	M32	850	600	24'> BOS	EOS	54	30	29	1:13	1:18	ML		11/19/2009	P
P-30/TI	2:06	LV	X12	550	500	BOS	EOS	24	EXTRUDED					FA	11/21/2009	P
P-31/TI	2:26	LV	X12	550	500	BOS	EOS	28	EXTRUDED					FA	11/21/2009	P
P-29/TI	3:03	LV	X12	550	500	BOS	EOS	164	EXTRUDED					FA	11/21/2009	P
P-24/TI	4:09	LV	X12	550	500	BOS	5'> BOS	5	EXTRUDED					FA	11/21/2009	P
P-24/TI	4:14	LV	X12	550	500	42'> BOS	EOS	136	EXTRUDED					FA	11/21/2009	P
								1082.5								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/20/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-19/TI	9:56	JM	X11	550	500	BOS	EOS	74	EXTRUDED					FA	11/21/2009	P
P-18/TI	11:34	JM	X11	550	500	BOS	EOS	24	EXTRUDED					FA	11/21/2009	P
P-18/19	12:38	JM	X11	550	500	BOS	EOS/R-64	24	EXTRUDED					FA	11/21/2009	P
P-24/TI	8:24	JM	X11	550	500	5'> BOS	42'> BOS	37	EXTRUDED					FA	11/21/2009	P
P-8/32	2:50	AR	M19	850	600	BOS	EOS	166	30	30	3:33	3:38	JB		11/21/2009	P
P-8/33	3:02	AR	M19	850	600	BOS	EOS	110	30	29	3:35	3:40	JB		11/21/2009	P
P-32/33	2:47	AR	M19	850	500	BOS	EOS	28	30	30	3:40	3:45	JB		11/21/2009	P
P-34/32	2:55	MY	M32	860	600	BOS	EOS	156	30	30	2:12	2:17	JB		11/21/2009	P
P-34/33	3:15	MY	M32	860	600	BOS	EOS	122	30	30	3:37	3:42	JB		11/21/2009	P
P-35/34	4:02	MY	M32	860	600	BOS	88'> BOS	88	30	30	12:45	12:50	JB		11/21/2009	P
P-35/34	4:13	MY	M32	860	600	90'> BOS	EOS	194	30	30	3:50	3:55	JB		11/21/2009	P
P-36/35	4:30	AR	M19	850	600	BOS	EOS	97	30	30	12:41	12:46	JB		11/21/2009	P
P-37/35	4:37	AR	M19	850	600	BOS	EOS	198	30	30	3:55	4:00	JB		11/21/2009	P
P-36/37	4:22	AR	M19	850	500	BOS	EOS	28	30	30	3:57	4:02	JB		11/21/2009	P
P-38/36	5:16	MY	M32	860	600	BOS	EOS	87	30	30	12:50	12:55	JB		11/21/2009	P
P-38/37	5:30	MY	M32	860	600	BOS	EOS	120	30	30	4:00	4:05	JB		11/21/2009	P
P-39/37	5:38	MY	M32	860	600	BOS	EOS	137	30	29	4:10	4:15	JB		11/21/2009	P
P-38/39	5:25	AR	M19	850	600	BOS	EOS	28	30	29	4:15	4:20	JB		11/21/2009	P
P-40/38	5:34	AR	M19	850	600	BOS	EOS	171	30	30	12:57	13:02	JB		11/21/2009	P
P-40/39	5:42	AR	M19	850	600	BOS	12'> BOS	12	30	30	4:17	4:22	JB		11/21/2009	P
P-40/39	5:44	AR	M19	850	600	12'> BOS	EOS	59	30	29	4:20	4:25	JB		11/21/2009	P
P-41/39	5:51	AR	M19	850	600	BOS	EOS	114	30	30	4:37	4:42	JB		11/21/2009	P
P-40/41	5:55	MY	M32	860	500	BOS	EOS	28	30	30	4:32	4:37	JB		11/21/2009	P
P-42/40	7:39	MY	M32	860	600	BOS	EOS	221	30	30	12:59	13:04	JB		11/21/2009	P
P-42/41	8:13	MY	M32	860	600	BOS	EOS	126	30	29	4:38	4:43	JB		11/21/2009	P
P-43/42	7:16	AR	M19	850	600	BOS	EOS	362	30	30	11:12	11:17	RO		11/23/2009	P
P-44/43	8:34	MY	M32	860	600	BOS	EOS	352	30	30	11:25	11:30	RO		11/23/2009	P
								3163								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/21/2009
Project Location: Waynesville, NC
Page: 1 of 2

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-51/44	10:20	MY	M32	860	600	BOS	EOS	342	30	30	11:28	11:33	RO		11/23/2009	P
P-52/51	11:03	MY	M32	860	600	BOS	EOS	346	30	30	11:30	11:35	RO		11/23/2009	P
P-53/52	11:56	MY	M32	860	600	BOS	EOS	315	30	30	11:31	11:36	RO		11/23/2009	P
P-54/53	12:34	MY	M32	860	600	BOS	EOS	308	30	30	11:33	11:38	RO		11/23/2009	P
P-55/54	1:49	MY	M32	860	600	BOS	EOS	310	30	30	11:35	11:40	RO		11/23/2009	P
P-17/45	11:32	AR	M19	850	600	BOS	EOS	94	30	30	8:04	8:09	RO		11/23/2009	P
P-16/45	11:45	AR	M19	850	600	BOS	EOS	92	30	30	7:54	7:59	RO		11/23/2009	P
P-45/46	10:30	AR	M19	850	600	BOS	EOS	185	30	30	8:20	8:25	RO		11/23/2009	P
P-46/47	11:00	AR	M19	850	600	BOS	EOS	192	30	29	9:07	9:12	RO		11/23/2009	P
P-47/50	12:10	AR	M19	850	600	BOS	EOS	13	30	30	9:18	9:23	RO		11/23/2009	P
P-47/48	12:12	AR	M19	850	600	BOS	EOS	190	30	30	9:09	9:14	RO		11/23/2009	P
P-48/50	12:04	AR	M19	850	500	BOS	EOS	22.5	30	30	9:14	9:19	RO		11/23/2009	P
P-50/49	12:38	AR	M19	850	600	BOS	EOS	13	30	30	9:20	9:25	RO		11/23/2009	P
P-48/49	12:40	AR	M19	850	600	BOS	EOS	190	30	30	9:10	9:15	RO		11/23/2009	P
P-49/57	1:49	AR	M19	850	600	BOS	EOS	56	30	30	9:59	10:04	RO		11/23/2009	P
P-49/56	1:57	AR	M19	850	600	BOS	EOS	165	30	30	9:51	9:56	RO		11/23/2009	P
P-56/57	1:43	AR	M19	850	500	BOS	EOS	22.5	30	30	10:02	10:07	RO		11/23/2009	P
P-57/58	2:26	AR	M19	850	600	BOS	EOS	56	30	30	10:04	10:09	RO		11/23/2009	P
P-56/58	2:35	AR	M19	850	600	BOS	EOS	165	30	30	9:52	9:57	RO		11/23/2009	P
P-58/60	3:08	AR	M19	850	600	BOS	EOS	164	30	30	10:50	10:55	RO		11/23/2009	P
P-58/59	3;37	AR	M19	850	600	BOS	EOS	58	30	30	9:53	9:58	RO		11/23/2009	P
P-59/60	2:59	AR	M19	850	500	BOS	EOS	22.5	30	30	10:48	10:53	RO		11/23/2009	P
P-60/61	2:31	MY	M32	860	600	BOS	EOS	164	30	30	10:51	10:56	RO		11/23/2009	P
P-59/61	2:53	MY	M32	860	600	BOS	EOS	58	30	30	10:15	10:20	RO		11/23/2009	P
P-61/62	3:07	MY	M32	860	600	BOS	EOS	230	30	30	10:52	10:57	RO		11/23/2009	P
P-62/64	3:49	AR	M19	850	600	BOS	EOS	71	30	29	10:53	10:58	RO		11/23/2009	P
P-62/63	3:59	AR	M19	850	600	BOS	EOS	165	30	30	10:53	10:58	RO		11/23/2009	P
P-63/64	3:42	MY	M32	860	500	BOS	EOS	22.5	30	30	10:54	10:59	RO		11/23/2009	P
P-64/65	3:50	MY	M32	860	600	BOS	EOS	71	30	30	10:56	11:01	RO		11/23/2009	P
P-63/65	4:00	MY	M32	860	600	BOS	EOS	165	30	30	10:55	11:00	RO		11/23/2009	P
P-65/67	4:36	AR	M19	850	600	BOS	EOS	154	30	30	11:00	11:05	RO		11/23/2009	P
P-65/66	4:59	AR	M19	850	600	BOS	EOS	98	30	29	10:56	11:01	RO		11/23/2009	P
P-66/67	4:27	MY	M32	860	500	BOS	EOS	22.5	30	30	10:59	11:04	RO		11/23/2009	P
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HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/21/2009
Project Location: Waynesville, NC
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HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-67/68	4:36	MY	M32	860	600	BOS	EOS	154	30	30	11:01	11:06	RO		11/23/2009	P
P-66/68	4:57	MY	M32	860	600	BOS	EOS	98	30	30	0.8035	19:22	RO		11/23/2009	P
P-68/69	5:13	MY	M32	860	600	BOS	EOS	246	30	30	11:06	11:11	RO		11/23/2009	P
P-69/71	5:29	AR	M19	850	600	BOS	EOS	90	30	30	11:08	11:13	RO		11/23/2009	P
P-69/70	5:47	AR	M19	850	600	BOS	EOS	157	30	30	11:02	11:07	RO		11/23/2009	P
P-54/66	3:51	JM	M17	860	500	BOS	EOS	17	30	30	10:35	10:40	RO		11/23/2009	P
P-53/66	3:54	JM	M17	860	500	BOS	EOS	13	30	30	10:34	10:39	RO		11/23/2009	P
P-53/65	3:56	JM	M17	860	500	BOS	EOS	15	30	30	10:32	10:37	RO		11/23/2009	P
P-52/65	3:59	JM	M17	860	500	BOS	EOS	12	30	29	10:31	10:36	RO		11/23/2009	P
P-52/63	4:02	JM	M17	860	500	BOS	EOS	15	30	30	10:30	10:35	RO		11/23/2009	P
P-51/63	4:04	JM	M17	860	500	BOS	EOS	9	30	30	10:29	10:34	RO		11/23/2009	P
P-51/62	4:05	JM	M17	860	500	BOS	EOS	24	30	30	10:28	10:33	RO		11/23/2009	P
P-44/62	4:08	JM	M17	860	500	BOS	EOS	10	30	30	10:26	10:31	RO		11/23/2009	P
P-44/61	4:10	JM	M17	860	500	BOS	EOS	19	30	30	10:25	10:30	RO		11/23/2009	P
P-43/61	4:13	JM	M17	860	500	BOS	EOS	10	30	30	10:14	10:19	RO		11/23/2009	P
P-43/59	4:14	JM	M17	860	500	BOS	EOS	17.5	30	29	9:50	9:55	RO		11/23/2009	P
P-42/59	4:16	JM	M17	860	500	BOS	EOS	6	30	30	9:46	9:51	RO		11/23/2009	P
P-42/58	4:17	JM	M17	860	500	BOS	EOS	28.5	30	29	9:45	9:50	RO		11/23/2009	P
P-40/58	4:20	JM	M17	860	500	BOS	EOS	8	30	30	9:43	9:48	RO		11/23/2009	P
P-40/56	2:26	JM	M17	860	500	BOS	EOS	20	30	30	9:41	9:46	RO		11/23/2009	P
P-38/56	2:29	JM	M17	860	500	BOS	EOS	8	30	30	9:40	9:45	RO		11/23/2009	P
P-38/49	2:30	JM	M17	860	500	BOS	EOS	19	30	30	9:05	9:10	RO		11/23/2009	P
P-36/49	2:33	JM	M17	860	500	BOS	EOS	9	30	30	9:02	9:07	RO		11/23/2009	P
P-36/48	2:34	JM	M17	860	500	BOS	EOS	16.5	30	30	9:00	9:05	RO		11/23/2009	P
P-35/48	2:37	JM	M17	860	500	BOS	EOS	13	30	30	8:50	8:55	RO		11/23/2009	P
P-35/47	2:38	JM	M17	860	500	BOS	EOS	15	30	29	8:48	8:53	RO		11/23/2009	P
P-34/47	2:40	JM	M17	860	500	BOS	EOS	12	30	30	8:42	8:47	RO		11/23/2009	P
P-34/46	2:42	JM	M17	860	500	BOS	EOS	14	30	30	8:40	8:45	RO		11/23/2009	P
P-32/46	2:44	JM	M17	860	500	BOS	EOS	9	30	30	8:15	8:20	RO		11/23/2009	P
P-32/45	2:45	JM	M17	860	500	BOS	EOS	22.5	30	30	8:13	8:18	RO		11/23/2009	P
P-8/45	2:49	JM	M17	860	500	BOS	EOS	12	30	29	8:02	8:07	RO		11/23/2009	P
P-8/16	2:53	JM	M17	860	500	BOS	EOS	24	30	30	8:10	8:15	RO		11/23/2009	P
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HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/23/2009
Project Location: Waynesville, NC
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HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-33/TI	11:08	LV	X12	550	500	BOS	EOS	24	EXTRUDED					LB	11/24/2009	P
P-34/TI	12:23	LV	X12	550	500	BOS	EOS	23	EXTRUDED					LB	11/24/2009	P
P-35/TI	1:14	LV	X12	550	500	BOS	EOS	26	EXTRUDED					LB	11/24/2009	P
P-37/TI	2:19	LV	X12	550	500	BOS	EOS	32	EXTRUDED					LB	11/24/2009	P
P-39/TI	2:24	LV	X12	550	500	BOS	EOS	34.5	EXTRUDED					LB	11/24/2009	P
P-41/TI	2:41	LV	X12	550	500	BOS	EOS	30	EXTRUDED					LB	11/24/2009	P
P-42/TI	2:58	LV	X12	550	500	BOS	EOS	32	EXTRUDED					LB	11/24/2009	P
P-43/TI	3:22	LV	X12	550	500	BOS	EOS	29	EXTRUDED					LB	11/24/2009	P
P-44/TI	3:36	LV	X12	550	500	BOS	EOS	29.5	EXTRUDED					LB	11/24/2009	P
P-51/TI	3:54	LV	X12	550	500	BOS	EOS	27	EXTRUDED					LB	11/24/2009	P
P-52/TI	4:08	LV	X12	550	500	BOS	EOS	25	EXTRUDED					LB	11/24/2009	P
								312								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
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Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/24/2009
Project Location: Waynesville, NC
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HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test					Vac Test Tech	Test Date	Pass / Fail
									PSI		Time		Tech			
									Start	Finish	Start	Finish				
P-53/TI	9:12	LV	X12	550	500	BOS	EOS	28	EXTRUDED					LB	11/24/2009	P
P-54/TI	9:25	LV	X12	550	500	BOS	EOS	26	EXTRUDED					LB	11/24/2009	P
P-55/TI	9:40	LV	X12	550	500	BOS	EOS	25	EXTRUDED					LB	11/24/2009	P
								79								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/25/2009
Project Location: Waynesville, NC
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HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-71/89	4:24	JM	M32	850	600	BOS	EOS	90	30	29	6:21	6:06	VS		11/25/2009	P
P-70/89	4:36	JM	M32	850	600	BOS	EOS	157	30	29	6:01	6:06	VS		11/25/2009	P
P-89/91	4:38	MY	M17	860	600	BOS	EOS	92	30	30	6:16	6:21	VS		11/25/2009	P
P-89/90	4:50	MY	M17	860	600	BOS	68'> BOS	68	30	29	6:30	6:35	VS		11/25/2009	P
P-89/90	5:01	MY	M17	860	600	68'> BOS	EOS	86	30	30	6:02	6:07	VS		11/25/2009	P
P-91/92	5:07	JM	M32	850	600	BOS	EOS	92	30	30	6:18	6:23	VS		11/25/2009	P
P-90/92	5:19	JM	M32	850	600	BOS	EOS	154	30	30	6:05	6:10	VS		11/25/2009	P
P-90/91	4:30	MY	M17	860	500	BOS	EOS	22.5	30	30	6:15	6:20	VS		11/25/2009	P
P-92/94	5:30	MY	M17	860	600	BOS	EOS	194	30	29	6:11	6:16	VS		11/25/2009	P
P-92/93	5:56	MY	M17	860	600	BOS	EOS	52	30	30	6:10	6:15	VS		11/25/2009	P
P-94/93	5:20	MY	M17	860	500	BOS	EOS	22.5	30	30	6:13	6:18	VS		11/25/2009	P
P-112/111	9:05	JM	M32	850	600	BOS	EOS	24	30	30	8:53	8:58	VS		11/25/2009	P
P-111/110	9:04	RO	M14	850	600	BOS	EOS	54	30	29	8:47	8:52	VS		11/25/2009	P
P-110/109	8:56	RO	M14	850	600	BOS	EOS	70	30	30	8:36	8:41	VS		11/25/2009	P
P-109/108	8:40	RO	M14	850	600	BOS	EOS	74	30	30	8:27	8:32	VS		11/25/2009	P
P-108/106	8:55	MY	M17	860	600	BOS	EOS	74	30	28	8:23	8:28	VS		11/25/2009	P
P-106/105	8:35	MY	M17	860	600	BOS	EOS	93	30	30	7:57	8:02	VS		11/25/2009	P
P-105/103	8:15	MY	M17	860	600	BOS	EOS	94	30	29	7:43	7:48	VS		11/25/2009	P
P-103/100	8:44	JM	M32	850	600	BOS	EOS	114	30	29	7:35	7:40	VS		11/25/2009	P
P-93/100	9:21	MY	M17	860	500	BOS	EOS	24	30	30	9:30	9:35	VS		11/25/2009	P
P-93/103	9:24	MY	M17	860	500	BOS	EOS	24	30	30	7:37	7:42	VS		11/25/2009	P
P-93/104	9:27	MY	M17	860	500	BOS	EOS	13	30	30	7:46	7:51	VS		11/25/2009	P
P-103/104	8:30	MY	M17	860	600	BOS	EOS	16	30	29	7:40	7:45	VS		11/25/2009	P
P-104/105	8:09	MY	M17	860	500	BOS	EOS	22.5	30	30	7:54	7:59	VS		11/25/2009	P
P-94/104	9:30	MY	M17	860	500	BOS	EOS	13	30	30	7:50	7:55	VS		11/25/2009	P
P-94/106	9:21	RO	M14	860	500	BOS	EOS	26	30	30	8:05	8:10	VS		11/25/2009	P
P-94/107	9:27	RO	M14	860	500	BOS	EOS	26	30	30	8:17	8:22	VS		11/25/2009	P
P-106/107	9:03	MY	M17	860	600	BOS	EOS	16	30	30	8:20	8:25	VS		11/25/2009	P
P-107/108	8:32	RO	M14	860	500	BOS	EOS	22.5	30	30	8:26	8:31	VS		11/25/2009	P
P-94/109	9:32	RO	M14	860	500	BOS	EOS	26	30	29	8:30	8:35	VS		11/25/2009	P
P-94/110	9:24	JM	M32	850	500	BOS	EOS	26	30	30	8:40	8:45	VS		11/25/2009	P
P-94/111	9:31	JM	M32	850	500	BOS	EOS	26	30	30	8:46	8:51	VS		11/25/2009	P
P-94/112	9:37	JM	M32	850	500	BOS	EOS	25	30	30	8:51	8:56	VS		11/25/2009	P
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HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
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Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/25/2009
Project Location: Waynesville, NC
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HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-100/101	7:50	MY	M17	860	600	BOS	EOS	62	30	30	7:36	7:41	VS		11/25/2009	P
P-100/102	8:00	MY	M17	860	600	BOS	EOS	44	30	29	7:20	7:25	VS		11/25/2009	P
P-101/113	7:52	JM	M32	850	500	BOS	EOS	20	30	30	7:42	7:47	VS		11/25/2009	P
P-101/99	7:55	JM	M32	850	500	BOS	EOS	28	30	30	7:01	7:06	VS		11/25/2009	P
P-101/98	7:59	JM	M32	850	500	BOS	EOS	16	30	30	7:03	7:08	VS		11/25/2009	P
P-98/102	8:01	JM	M32	850	500	BOS	EOS	13	30	30	7:06	7:11	VS		11/25/2009	P
P-97/102	8:04	JM	M32	850	500	BOS	EOS	26	30	29	7:17	7:22	VS		11/25/2009	P
P-96/100	8:10	JM	M32	850	500	BOS	EOS	14	30	30	9:23	9:28	VS		11/25/2009	P
P-95/93	6:24	MY	M17	860	500	BOS	EOS	24	30	30	6:50	6:55	VS		11/25/2009	P
P-95/R-151	6:27	MY	M17	860	500	BOS	EOS	24	30	29	6:46	6:51	VS		11/25/2009	P
P-92/R-151	6:02	MY	M17	860	500	BOS	EOS	22.5	30	29	6:47	6:52	VS		11/25/2009	P
R-151/P-93	6:05	MY	M17	860	600	BOS	EOS	12	30	30	6:50	6:55	VS		11/25/2009	P
P-90/95	6:35	MY	M17	860	500	BOS	EOS	10	30	30	6:44	6:49	VS		11/25/2009	P
P-75/90	6:50	MY	M17	860	500	BOS	EOS	18	30	30	6:41	6:46	VS		11/25/2009	P
P-75/89	6:52	MY	M17	860	500	BOS	EOS	9	30	29	6:40	6:45	VS		11/25/2009	P
P-74/89	6:53	MY	M17	860	500	BOS	EOS	21	30	30	6:39	6:44	VS		11/25/2009	P
P-74/70	6:56	MY	M17	860	500	BOS	EOS	7	30	30	6:37	6:42	VS		11/25/2009	P
P-72/70	6:57	MY	M17	860	500	BOS	EOS	17	30	30	6:36	6:41	VS		11/25/2009	P
P-72/69	7:00	MY	M17	860	500	BOS	EOS	11	30	30	6:35	6:40	VS		11/25/2009	P
P-55/69	7:01	MY	M17	860	500	BOS	EOS	12	30	30	6:34	6:39	VS		11/25/2009	P
P-55/68	7:04	MY	M17	860	500	BOS	EOS	15	30	30	6:33	6:38	VS		11/25/2009	P
P-54/68	7:00	MY	M17	860	500	BOS	EOS	10	30	30	6:32	6:37	VS		11/25/2009	P
P-113/99	8:14	JM	M32	850	550	BOS	EOS	20	30	30	7:40	7:45	VS		11/25/2009	P
P-99/98	6:43	JM	M32	850	600	BOS	EOS	34	30	30	7:00	7:05	VS		11/25/2009	P
P-98/97	6:30	JM	M32	850	600	BOS	EOS	52	30	29	7:10	7:15	VS		11/25/2009	P
P-97/96	6:15	JM	M32	850	600	BOS	EOS	64	30	30	7:18	7:23	VS		11/25/2009	P
P-96/95	6:09	MY	M17	860	600	BOS	EOS	78	30	29	7:22	7:27	VS		11/25/2009	P
P-95/88	5:46	JM	M32	850	600	BOS	EOS	136	30	29	7:25	7:30	VS		11/25/2009	P
P-88/87	3:14	JM	M32	850	600	BOS	EOS	134	30	30	3:22	3:27	VS		11/25/2009	P
P-87/86	2:53	MY	M17	860	600	BOS	EOS	132	30	29	3:23	3:28	VS		11/25/2009	P
P-86/85	2:51	JM	M32	850	600	BOS	EOS	128	30	30	3:24	3:29	VS		11/25/2009	P
P-85/84	2:35	MY	M17	860	600	BOS	EOS	128	30	30	3:25	3:30	VS		11/25/2009	P
P-84/79	2:32	JM	M32	850	600	BOS	EOS	126	30	30	3:26	3:31	VS		11/25/2009	P
								1467.5								

HALLATON, INC.

1206 SPARKS RD., SPARKS, MD 21152
410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/25/2009
Project Location: Waynesville, NC
Page: 3 of 3

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-95/75	3:26	MY	M17	860	500	BOS	EOS	18	30	30	6:42	6:47	VS		11/25/2009	P
P-88/75	3:30	MY	M17	860	500	BOS	EOS	22.5	30	30	4:04	4:09	VS		11/25/2009	P
P-87/75	3:33	MY	M17	860	500	BOS	EOS	22.5	30	30	4:02	4:07	VS		11/25/2009	P
P-86/75	3:36	MY	M17	860	500	BOS	EOS	22.5	30	29	3:59	4:04	VS		11/25/2009	P
P-85/75	3:39	MY	M17	860	500	BOS	EOS	22.5	30	29	3:57	4:02	VS		11/25/2009	P
P-84/75	3:42	MY	M17	860	500	BOS	EOS	22.5	30	30	3:56	4:01	VS		11/25/2009	P
P-79/75	3:45	MY	M17	860	500	BOS	EOS	22.5	30	29	3:55	4:00	VS		11/25/2009	P
P-79/76	1:56	MY	M17	860	500	BOS	EOS	22.5	30	30	3:20	3:25	VS		11/25/2009	P
P-79/77	1:58	MY	M17	860	500	BOS	EOS	13	30	30	3:15	3:20	VS		11/25/2009	P
P-79/81	2:01	MY	M17	860	500	BOS	EOS	22.5	30	29	3:12	3:17	VS		11/25/2009	P
P-79/82	2:04	MY	M17	860	500	BOS	EOS	22.5	30	30	3:11	3:16	VS		11/25/2009	P
P-79/83	2:08	MY	M17	860	500	BOS	EOS	22.5	30	30	3:10	3:15	VS		11/25/2009	P
P-83/82	1:42	MY	M17	860	600	BOS	EOS	58	30	29	3:07	3:12	VS		11/25/2009	P
P-82/81	1:33	JM	M32	850	600	BOS	EOS	138	30	29	3:06	3:11	VS		11/25/2009	P
P-81/77	1:23	MY	M17	860	500	BOS	EOS	21	30	30	2:50	2:55	VS		11/25/2009	P
P-81/78	1:24	MY	M17	860	500	BOS	EOS	68	30	30	2:56	3:01	VS		11/25/2009	P
P-81/80	1:32	MY	M17	860	500	BOS	EOS	56	30	30	3:04	3:09	VS		11/25/2009	P
P-80/78	1:15	JM	M32	850	600	BOS	EOS	58	30	29	3:03	3:08	VS		11/25/2009	P
P-78/77	12:30	JM	M32	850	600	BOS	EOS	126	30	30	2:48	2:53	VS		11/25/2009	P
P-77/76	12:10	MY	M17	860	600	BOS	EOS	158	30	29	2:46	2:51	VS		11/25/2009	P
P-76/75	12:09	JM	M32	850	600	BOS	EOS	158	30	30	2:45	2:50	VS		11/25/2009	P
P-75/74	10:48	MY	M17	860	600	BOS	EOS	295	30	29	4:15	4:20	VS		11/25/2009	P
P-74/72	10:00	JM	M32	850	600	BOS	EOS	323	30	30	4:12	4:17	VS		11/25/2009	P
P-72/55	9:55	MY	M17	860	600	BOS	EOS	316	30	29	4:10	4:15	VS		11/25/2009	P
P-74/73	10:23	JM	M32	850	600	BOS	EOS	22	30	30	4:33	4:38	VS		11/25/2009	P
P-73/72	10:41	MY	M17	860	500	BOS	EOS	22.5	30	30	4:24	4:29	VS		11/25/2009	P
P-73/55	10:37	MY	M17	860	600	BOS	EOS	22	30	30	4:30	4:35	VS		11/25/2009	P
P-70/71	4:28	JM	M32	850	600	BOS	EOS	22.5	30	30	6:04	6:09	VS		11/25/2009	P
								2120								

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Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF
Weld Date: 11/26/2009
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-73/TI	10:04	JM	X11	550	500	BOS	EOS	24	EXTRUDED				LB	N/A	11/26/2009	P
P-74/TI	10:26	JM	X11	550	500	BOS	EOS	23.5	EXTRUDED				LB	N/A	11/26/2009	P
P-75/TI	10:49	JM	X11	550	500	BOS	EOS	23.5	EXTRUDED				LB	N/A	11/26/2009	P
P-76/TI	11:12	JM	X11	550	500	BOS	EOS	23	EXTRUDED				LB	N/A	11/26/2009	P
P-77/TI	11:42	JM	X11	550	500	BOS	EOS	23	EXTRUDED				LB	N/A	11/26/2009	P
P-79/TI	1:16	JM	X11	550	500	BOS	EOS	22.5	EXTRUDED				LB	N/A	11/26/2009	P
P-80/TI	1:13	JM	X11	550	500	BOS	EOS	22.5	EXTRUDED				LB	N/A	11/26/2009	P
								162								

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Panel Placement Log

Project No.: 0932-8009
Project Name: White Oak LF-Pond Primary Liner
Project Start Date: 12/31/09
Project Location: Waynesville, NC
Page: 1 of 1

Material: HDPE
Thickness: 60 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
1/22/2010	1	4:26	Lecha Pond	0340	22.5	166	3735
1/22/2010	2	4:49	Lecha Pond	9239	22.5	164	3690
1/22/2010	3	4:54	Lecha Pond	9239	22.5	72	1620
1/22/2010	4	4:57	Lecha Pond	9239	22.5	76	1710
1/22/2010	5	5:02	Lecha Pond	9239	13	70	910
1/22/2010	6	5:05	Lecha Pond	9239	12	66	792
1/22/2010	7	5:21	Lecha Pond	9357	13.5	66	891
1/22/2010	8	5:23	Lecha Pond	9357	13	50	650
1/23/2010	9	7:46	Lecha Pond	9357	22.5	51	1147.5
1/23/2010	10	7:51	Lecha Pond	9357	17.5	46	805
1/23/2010	11	7:57	Lecha Pond	9357	21	45	945
1/23/2010	12	8:14	Lecha Pond	9357	22.5	78	1755
1/23/2010	13	8:29	Lecha Pond	9357	22.5	77	1732.5
1/23/2010	14	8:49	Lecha Pond	9223	22.5	62	1395
1/23/2010	15	8:53	Lecha Pond	9223	22.5	36	810
1/23/2010	16	9:09	Lecha Pond	9223	22.5	59	1327.5
1/23/2010	17	9:19	Lecha Pond	9223	22.5	43	967.5
1/23/2010	18	9:28	Lecha Pond	0340	22.5	28	630
1/23/2010	19	9:39	Lecha Pond	9357	22.5	33	742.5
					Total This Page		26255.5

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Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF Pond- Primary Liner
Project Start Date: 12/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 1 of 2

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
1	MS	P-11/10 @ BOS	1/23/2010	8:22	P	10X15	M18	MY		
2	MS	P-15/18 @ EOS	1/23/2010	9:39	P	9X14	M18	MY		
3	MS	P-17/19	1/23/2010	11:01	P	15X16	M18	MY		
4	MS	P-1/8/7	1/23/2010	11:45	P	21X12	M18	MY		
5	BT	P-12/13/1	1/23/2010	12:30	BT	15X20	X1	JM	P	1/23/10
6	AT	P-11/10/R-1	1/23/2010	3:09	P	2X2	X13	MY	P	1/23/10
7	DT-2	P-11/10 12'> BOS	1/23/2010	3:14	P	2X4	X13	MY	P	1/23/10
8	AT	P-3/11/10/9	1/23/2010	3:20	P	2X3	X13	MY	P	1/23/10
9	AT	P-3/9/2	1/23/2010	3:25	P	2X2	X13	MY	P	1/23/10
10	AT	P-4/3/2	1/23/2010	3:30	P	2X2	X13	MY	P	1/23/10
11	AT	P-2/8/7/6/5/4	1/23/2010	3:47	P	6X6	X13	MY	P	1/23/10
12	BO/WR	P-1/2 100'> BOS	1/23/2010	3:51	P	2X11	X13	MY	P	1/23/10
13	MD	P-13 12'> P-16 2'> EOS	1/23/2010	3:37	P	6X7	X1	JM	P	1/23/10
14	AT	P-13/16/1	1/23/2010	3:22	P	2X2	X1	JM	P	1/23/10
15	WR/AT	P-1/14/12	1/23/2010	4:00	P	2X3	X13	MY	P	1/23/10
16	AT	P-14/15/18/12	1/23/2010	4:49	P	4X4	X13	MY	P	1/23/10
17	DT-3	P-14/15 32'> EOS	1/23/2010	4:16	P	2X4	X13	MY	P	1/23/10
18	AT	P-15/18/R-2	1/23/2010	4:26	P	2X3	X13	MY	P	1/23/10
19	BO/AT	P-4/5 @ BOS	1/23/2010	4:46	P	2X3	X13	MY	P	1/23/10
20	AT	P-7/8/R-4	1/23/2010	5:02	P	2X2	X13	MY	P	1/23/10
21	AT	P-2/8/R-4	1/23/2010	5:08	P	2X2	X13	MY	P	1/23/10
22	DT-1	P-1/2 145'> BOS	1/23/2010	5:20	P	2X4	X13	MY	P	1/23/10
23	BT	P-19/17/R-3	1/23/2010	4:58	BT	8X17	X1	JM	P	1/23/10
24	BO	P-13/19 8'> BOS	1/23/2010	5:10	P	2X2	X1	JM	P	1/23/10
25	AT	P-13/19/17/16	1/23/2010	5:28	P	4X14	X1	JM	P	1/23/10
26	BO/AT	P-12/13 @ BOS	1/23/2010	5:43	P	2X5	X1	JM	P	1/23/10
V-27	Vent	P-18 1'> P-12 4'> Trench	1/23/2010	4:28	P	1X1	X13	MY	P	1/23/10
V-28	Vent	P-15 9'> P-14 4'> Trench	1/23/2010	4:18	P	1X1	X13	MY	P	1/23/10
V-29	Vent	P-1 8'> P-14 4'> Trench	1/23/2010	4:09	P	1X2	X13	MY	P	1/23/10
V-30	Vent	P-9 2'> P-2 4'> Trench	1/23/2010	5:30	P	1X3	X13	MY	P	1/23/10
V-31	Vent	P-10 1'> R-1 4'> Trench	1/23/2010	5:35	P	1X4	X13	MY	P	1/23/10
V-32	Vent	P-3 12'> P-11 4'> Trench	1/23/2010	4:47	P	1X5	X13	MY	P	1/23/10
V-33	Vent	P-5 6'> P-4 4'> Trench	1/23/2010	4:50	P	1X6	X13	MY	P	1/23/10
V-34	Vent	P-7 7'> P-6 4'> Trench	1/23/2010	4:53	P	1X7	X13	MY	P	1/23/10
V-35	Vent	P-2 11'> P-8 4'> Trench	1/23/2010	5:10	P	1X8	X13	MY	P	1/23/10
V-36	Vent	P-16 5'> P-1 4'> Trench	1/23/2010	5:55	P	1X9	X13	MY	P	1/23/10
V-37	Vent	P-17 1'> R-3 4'> Trench	1/23/2010	5:26	P	1X10	X13	MY	P	1/23/10
V-38	Vent	P-13 6'> P-19 4'> Trench	1/23/2010	5:34	P	1X11	X13	MY	P	1/23/10
39	SI	P-13	4/14/2010	11:30	P	4X5	X10	RO	P	4/14/10
40	SI	P-15	4/14/2010	12:00	P	2X2	X10	RO	P	4/14/10

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS-Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip
P- Patch
B-Extrudate Bead
GB-Grind & Bead
BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

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Repair Log

Project No.: 0932-8009
Project Name: White Oak LF Pond- Primary Liner
Project Start Date: 12/31/2009
Project Location: Waynesville, NC
Page: 2 of 2

Material: HDPE
Thickness: 60 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
41	SI	P-12/13/18 @ Wet Well	4/14/2010	2:00	P	19X23	X10	RO	P	4/14/10

Defect Code:
BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
MS-Material Short
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip
P- Patch
B-Extrudate Bead
GB-Grind & Bead
BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

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Repair Log

Project No.: 0932-8009 Material: HDPE
Project Name: White Oak LF Pond- Bottom (Existing) Pond Layer
Project Start Date: 10/31/2009 Thickness: 60 mil
Project Location: Waynesville, NC
Page: 1 of 1

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test	
									P/F	Date
1	BT	FX-17 1'> FX-5 15'> BOS	12/31/2009	8:43	BT	4X12	X1	JM	P	12/31/09
2	AT	EX-6/8/7	12/31/2009	9:03	P	2X2	X1	JM	P	12/31/09
3	BO	FX-9/10 25'> BOS	12/31/2009	9:11	P	2X2	X1	JM	P	12/31/09
4	BO	EX-12/13 22'> BOS	12/31/2009	9:17	P	2X3	X1	JM	P	12/31/09
5	BO	FX-13/14 3'> BOS	12/31/2009	9:22	P	2X2	X1	JM	P	12/31/09
6	BO	EX-21/22 26'> BOS	12/31/2009	9:27	P	1X2	X1	JM	P	12/31/09
7	BO	FX-24/25 26'> BOS	12/31/2009	9:32	P	1X1	X1	JM	P	12/31/09

Defect Code:

BO - Burn Out
CR - Crease
DT - Destructive Test Number
EE - Earthwork Equipment Damage
FM – Fishmouth
FT – Pressure Test Cut
T – Joint
SI - Soil Surface Irregularity
DD - Deployment Damage
MD - Material Damage
WR - Wrinkle
WS - Welder restart
FD - Factory Defect
AT - Air Test

Repair Type: C-Cap Strip, P- Patch, B-Extrudate Bead, GB-Grind & Bead, BT-Boot

Test Result: P-Pass, F-Fail

Notations: BOS or 0-Beginning of Seam/ EOS-End of Seam/ --to an area/ >from an area/ NOAT-No AT

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Geomembrane Field Trial Seam Log

Project No.: 0932-8009
Project Name: White Oak LF Pond- Primary Liner
Start Date: 12/31/2009
Project Location: Waynesville, NC
Page: 1 of 1

Material: HDPE
60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

Sample #	Date	Time	Ambient Temp.	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
				Machine	Operator	Temp/ Speed °F/fpm (or %max)	Barrel/ Preheat °F/°F	Peel (ppi) IN / OUT					Shear (ppi)							
								1	2	3	4	5	1	2	3	4	5			
1	1/22/2010	4:33	60	M18	MY	860/500		116	123	132			147	127	136			P	CH	SM/SM
								121	119	128										
2	1/22/2010	4:35	60	M18	MY	860/450		109	118	116			156	139	134			P	CH	TX/TX
								112	121	117										
3	1/23/2010	7:50	41	M18	MY	860/500		127	131	142			167	143	136			P	CH	SM/SM
								124	133	127										
4	1/23/2010	7:55	41	M18	MY	860/450		119	127	123			147	133	139			P	CH	TX/TX
								126	131	129										
5	1/23/2010	10:15	46	X1	JM		550/550	97	104	103			134	127	136			P	CH	TX/TX
6	1/23/2010	2:40	47	X13	MY		550/550	101	99	106			156	131	143			P	CH	TX/TX
7	4/14/2010	11:10	70	X10	RO		550/500	121	123	123	123	120	146	148	147	148	145	P	ER	TX/TX

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Geomembrane Seam Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF Pond- Primary Liner
Start Date: 12/31/2009
Project Location: Waynesville, NC
Page: 1 of 1

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	91	Peel:	78
Shear:	120	Shear:	120

DT#	Location	Date Removed	Welder ID		Wedge	Extruder	Seam Strength										Pass Fail	Tech ID	Remarks
			Machine	Operator	Temp/ Speed ºF/fpm	Temp/ Preheat ºF/ºF	Peel (ppi) IN / OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
1	P-1/2	1/23/2010	M18	MY	860/500		168	127	170	139		167	139	143			P	CH	SM/SM
							148	125	136	134									
2	P-10/11	1/23/2010	M18	MY	860/450		130	146	152	145		189	153	140			P	CH	TX/TX
							117	129	147	125									
3	P-14/15	1/23/2010	M18	MY	860/500		162	147	159	132		163	149	137			P	CH	SM/SM
							175	139	184	156									

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Seaming and Non Destructive Test Log

Project No.: 0932-8009
Project Name: White Oak LF Pond- Primary Liner
Weld Date: 1/22/2010
Project Location: Waynesville, NC
Page: 1 of 1

HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test					Vac Test Tech	Test Date	Pass / Fail
									PSI		Time		Tech			
									Start	Finish	Start	Finish				
P-1/2	4:50	MY	M18	860	500	BOS	100'> BOS	100	30	30	5:50	5:55	FJ		1/22/2010	P
P-1/2	4:50	MY	M18	860	500	100'> BOS	EOS	64	30	30	5:57	6:02	FJ		1/22/2010	P
P-3/4	5:16	MY	M18	860	500	BOS	EOS	72	30	29	6:02	6:07	FJ		1/22/2010	P
P-4/5	5:30	MY	M18	860	500	BOS	EOS	70	30	29	6:03	6:08	FJ		1/22/2010	P
P-5/6	5:37	MY	M18	860	500	BOS	EOS	66	30	30	10:44	10:49	JO		1/23/2010	P
P-6/7	5:49	MY	M18	860	500	BOS	EOS	66	30	30	10:44	10:49	JO		1/23/2010	P
P-7/8	6:00	MY	M18	860	500	BOS	EOS	50	30	30	10:45	10:50	JO		1/23/2010	P
								488								

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410-583-7700 Fax 410-583-7720

Seaming and Non Destructive Test Log

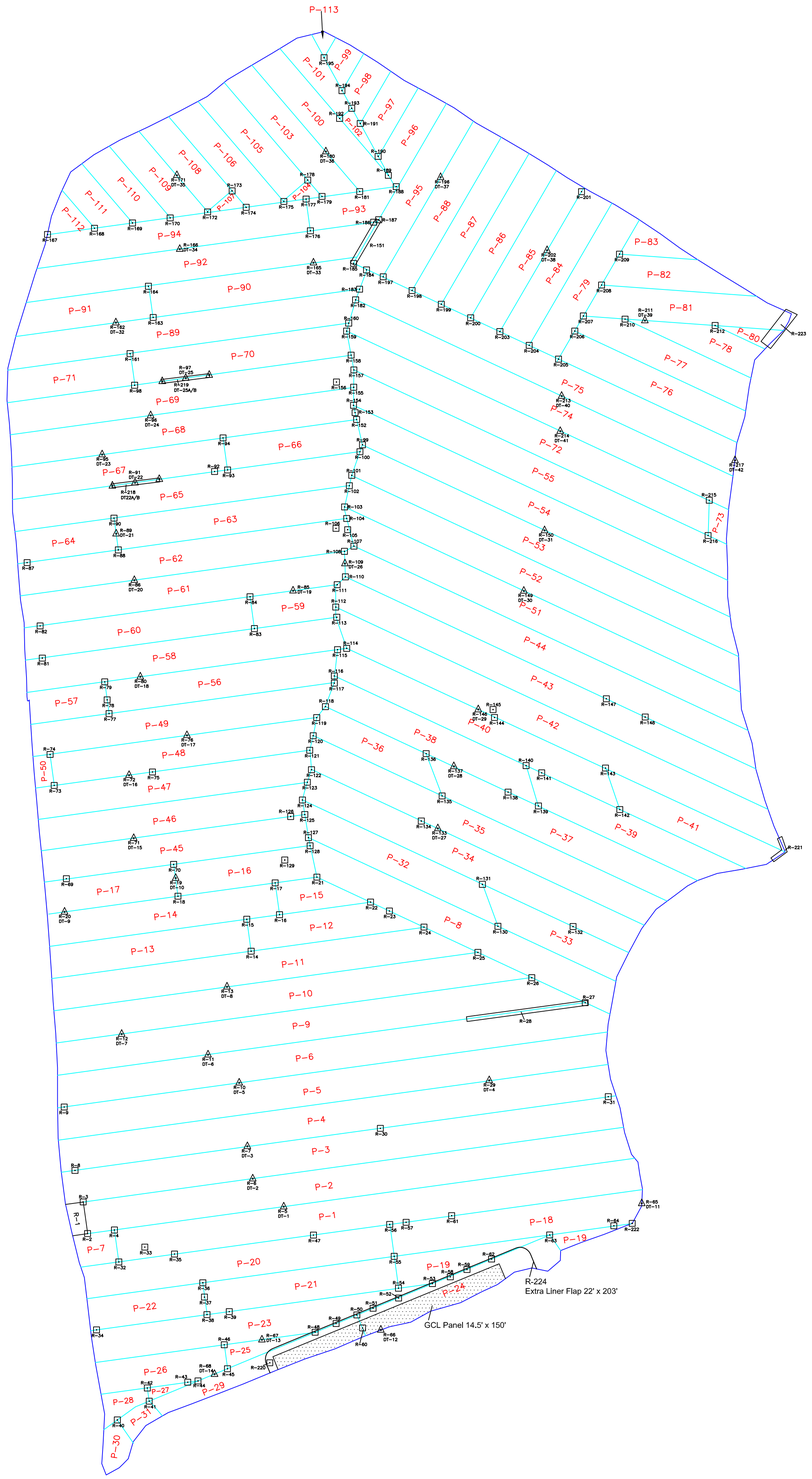
Project No.: 0932-8009
Project Name: White Oak LF Pond- Primary Liner
Weld Date: 1/23/2010
Project Location: Waynesville, NC
Page: 1 of 1

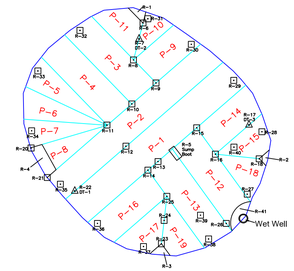
HDPE

60 mil.

SEAM # (P#/P#)	WELD TIME	TECH ID	Machine ID	Machine Temp	Machine Speed or Preheat	Start Point	End Point	Seam Length (Feet)	Air Pressure Test PSI Start	Air Pressure Test PSI Finish	Air Pressure Test Time Start	Air Pressure Test Time Finish	Air Pressure Test Tech	Vac Test Tech	Test Date	Pass / Fail
P-3/9	8:30	MY	M18	860	500	BOS	EOS	22.5	30	30	10:26	10:31	JO		1/23/2010	P
P-3/11	8:34	MY	M18	860	500	BOS	EOS	45	30	29	10:35	10:40	JO		1/23/2010	P
P-10/11	8:23	MY	M18	860	500	BOS	EOS	30	30	30	10:23	10:28	JO		1/23/2010	P
P-9/10	8:00	MY	M18	860	500	BOS	EOS	46	30	29	10:24	10:29	JO		1/23/2010	P
P-2/9	8:54	MY	M18	860	500	BOS	EOS	51	30	30	10:28	10:33	JO		1/23/2010	P
P-2/3	9:02	MY	M18	860	500	BOS	EOS	22.5	30	30	10:37	10:42	JO		1/23/2010	P
P-2/4	9:05	MY	M18	860	500	BOS	EOS	22.5	30	30	10:43	10:48	JO		1/23/2010	P
P-2/8	9:09	MY	M18	860	500	BOS	EOS	50	30	29	10:47	10:52	JO		1/23/2010	P
P-14/15	9:29	MY	M18	860	500	BOS	EOS	59	30	30	11:00	11:05	JO		1/23/2010	P
P-15/18	9:49	MY	M18	860	500	BOS	EOS	32	30	30	11:00	11:05	JO		1/23/2010	P
P-12/18	9:57	MY	M18	860	500	BOS	EOS	56	30	30	11:13	11:18	JO		1/23/2010	P
P-12/14	10:04	MY	M18	860	500	BOS	EOS	22.5	30	30	10:54	10:59	JO		1/23/2010	P
P-12/13	10:16	MY	M18	860	500	BOS	EOS	67	30	29	11:19	11:24	JO		1/23/2010	P
P-13/19	10:26	MY	M18	860	500	BOS	EOS	46	30	29	11:26	11:31	JO		1/23/2010	P
P-19/17	10:50	MY	M18	860	500	BOS	EOS	26	30	30	11:27	11:32	JO		1/23/2010	P
P-17/16	10:36	MY	M18	860	500	BOS	EOS	59	30	30	11:34	11:39	JO		1/23/2010	P
P-1/16	11:07	MY	M18	860	500	BOS	EOS	59	30	30	11:41	11:46	JO		1/23/2010	P
P-1/12	11:30	MY	M18	860	500	BOS	EOS	13	30	30	11:47	11:52	JO		1/23/2010	P
P-1/14	11:32	MY	M18	860	500	BOS	EOS	62	30	30	11:48	11:53	JO		1/23/2010	P
								791								

N





= Limit of Liner

= Liner Panel Seams

P-00 = Liner Panel Numbers

= Destructive Test Location

= Liner Repair Location

*This is not a Surveyed As-Built Drawing is for Reference Only

50 0 50 100 200

Graphic Scale in Feet
1" = 50'

REVISIONS			
NO.	Date.	By:	Description:
A	1/5/10	KHG	Corrections made to repair locations

WHITE OAK MSW LANDFILL PHASE 3 CONSTRUCTOIN

HAYWOOD COUNTY, NC

Geomembrane As-Built Drawing

Hallaton, Inc.
Containment Linings
1206 Sparks Road - Sparks, MD 21152
(410) 583-7700 - (410) 583-7720 Fax

Drawn by:	KHG
Date:	12/15/09
Scale:	1" = 50'
Job Number:	0932-8009
Drawing Number:	002

Geotechnics
.....GEOTECHNICAL AND GEOSYNTHETIC SERVICES

November 11, 2009

Project No.: L09101-02

Mr. Hannu Kemppinen
Joyce Engineering
2211 W. Meadowview Rd.,
Suite 101
Greensboro, NC 27407

RECEIVED NOV 16 2009

Transmittal
Laboratory Test Results
White Oak MSW Landfill Phases 3 & 4

Please find attached the laboratory test results for the above referenced project. The tests were performed in general accordance with the procedures referenced on the data tables as well as industry practice. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to be of service and trust that our efforts have contributed to the success of your project. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

J.P. Kline, P.E.
Laboratory Director

GAI-LAP
Initials: JPK #: 14-96
Date: 11-11-09

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-1

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	146.0	FTB-SE1	<10
2	152.2	FTB-SE1	<10
3	151.8	FTB-SE1	<10
4	151.7	FTB-SE1	<10
5	152.4	FTB-SE1	<10
AVERAGE	**150.8**		
STD. DEV.	2.71		
INSIDE TRACK (WELD "B")			
1	167.0	FTB-SE1	<10
2	162.7	FTB-SE1	<10
3	163.4	FTB-SE1	<10
4	164.3	FTB-SE1	<10
5	162.8	FTB-SE1	<10
AVERAGE	**164.0**		
STD. DEV.	1.77		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	216.2	FTB-SE1
2	201.4	FTB-SE1
3	207.8	FTB-SE1
4	213.8	FTB-SE1
5	208.7	FTB-SE1
AVERAGE	**209.6**	
STD. DEV.	5.76	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-02
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-2

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	157.0	FTB-SE1	<10
2	152.9	FTB-SE1	<10
3	154.7	FTB-SE1	<10
4	147.4	FTB-SE1	<10
5	151.8	FTB-SE1	<10
AVERAGE	**152.8**		
STD. DEV.	3.59		
INSIDE TRACK (WELD "B")			
1	143.5	FTB-SE1	<10
2	169.8	FTB-SE1	<10
3	160.4	FTB-SE1	<10
4	169.1	FTB-SE1	<10
5	168.2	FTB-SE1	<10
AVERAGE	**162.2**		
STD. DEV.	11.12		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	210.5	FTB-SE1
2	208.5	FTB-SE1
3	209.3	FTB-SE1
4	211.3	FTB-SE1
5	214.4	FTB-SE1
AVERAGE	**210.8**	
STD. DEV.	2.28	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-03
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-3

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	128.3	FTB-SE1	<10
2	127.6	FTB-SE1	<10
3	148.2	FTB-SE1	<10
4	139.4	FTB-SE1	<10
5	153.6	FTB-SE1	<10
AVERAGE	**139.4**		
STD. DEV.	11.64		
INSIDE TRACK (WELD "B")			
1	159.6	FTB-SE1	<10
2	160.2	FTB-SE1	<10
3	158.2	FTB-SE1	<10
4	151.4	FTB-SE1	<10
5	154.2	FTB-SE1	<10
AVERAGE	**156.7**		
STD. DEV.	3.78		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	200.6	FTB-SE1
2	202.0	FTB-SE1
3	197.7	FTB-SE1
4	199.1	FTB-SE1
5	195.6	FTB-SE1
AVERAGE	**199.0**	
STD. DEV.	2.49	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-04
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-4

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	165.2	FTB-SE1	<10
2	156.6	FTB-SE1	<10
3	157.4	FTB-SE1	<10
4	160.2	FTB-SE1	<10
5	171.3	FTB-SE1	<10
AVERAGE	**162.1**		
STD. DEV.	6.13		
INSIDE TRACK (WELD "B")			
1	158.0	FTB-SE1	<10
2	157.8	FTB-SE1	<10
3	159.4	FTB-SE1	<10
4	160.2	FTB-SE1	<10
5	168.3	FTB-SE1	<10
AVERAGE	**160.7**		
STD. DEV.	4.34		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	228.6	FTB-SE1
2	225.0	FTB-SE1
3	227.5	FTB-SE1
4	227.4	FTB-SE1
5	224.9	FTB-SE1
AVERAGE	**226.7**	
STD. DEV.	1.65	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-05
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-5

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	158.8	FTB-SE1	<10
2	162.7	FTB-SE1	<10
3	141.8	FTB-SE1	<10
4	160.4	FTB-SE1	<10
5	159.7	FTB-SE1	<10
AVERAGE	**156.7**		
STD. DEV.	8.44		
INSIDE TRACK (WELD "B")			
1	173.9	FTB-SE1	<10
2	158.8	FTB-SE1	<10
3	161.8	FTB-SE1	<10
4	157.3	FTB-SE1	<10
5	150.5	FTB-SE1	<10
AVERAGE	**160.5**		
STD. DEV.	8.58		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	210.3	FTB-SE1
2	210.3	FTB-SE1
3	210.0	FTB-SE1
4	208.3	FTB-SE1
5	205.2	FTB-SE1
AVERAGE	**208.8**	
STD. DEV.	2.19	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

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INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-06
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-6

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	133.9	FTB-SE1	<10
2	134.6	FTB-SE1	<10
3	135.4	FTB-SE1	<10
4	136.1	FTB-SE1	<10
5	138.2	FTB-SE1	<10
AVERAGE	**135.6**		
STD. DEV.	1.65		
INSIDE TRACK (WELD "B")			
1	148.5	FTB-SE1	<10
2	148.3	FTB-SE1	<10
3	141.6	FTB-SE1	<10
4	144.7	FTB-SE1	<10
5	137.6	FTB-SE1	<10
AVERAGE	**144.1**		
STD. DEV.	4.63		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	213.1	FTB-SE1
2	209.8	FTB-SE1
3	208.9	FTB-SE1
4	209.3	FTB-SE1
5	210.6	FTB-SE1
AVERAGE	**210.3**	
STD. DEV.	1.67	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-07
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-7

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	132.9	FTB-SE1	<10
2	126.5	FTB-SE1	<10
3	130.5	FTB-SE1	<10
4	128.5	FTB-SE1	<10
5	126.8	FTB-SE1	<10
AVERAGE	**129.0**		
STD. DEV.	2.68		
INSIDE TRACK (WELD "B")			
1	143.0	FTB-SE1	<10
2	163.0	FTB-SE1	<10
3	148.8	FTB-SE1	<10
4	145.7	FTB-SE1	<10
5	138.8	FTB-SE1	<10
AVERAGE	**147.9**		
STD. DEV.	9.23		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	199.1	FTB-SE1
2	194.3	FTB-SE1
3	193.5	FTB-SE1
4	198.3	FTB-SE1
5	195.7	FTB-SE1
AVERAGE	**196.2**	
STD. DEV.	2.45	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-08
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-8

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	129.1	FTB-SE1	<10
2	125.9	FTB-SE1	<10
3	126.5	FTB-SE1	<10
4	126.1	FTB-SE1	<10
5	132.3	FTB-SE1	<10
AVERAGE	**128.0**		
STD. DEV.	2.74		
INSIDE TRACK (WELD "B")			
1	119.3	FTB-SE1	<10
2	118.6	FTB-SE1	<10
3	127.2	FTB-SE1	<10
4	119.4	FTB-SE1	<10
5	127.6	FTB-SE1	<10
AVERAGE	**122.4**		
STD. DEV.	4.56		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	187.5	FTB-SE1
2	183.5	FTB-SE1
3	184.9	FTB-SE1
4	187.9	FTB-SE1
5	193.7	FTB-SE1
AVERAGE	**187.5**	
STD. DEV.	3.92	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-09
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-9

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	132.4	FTB-SE1	<10
2	129.3	FTB-SE1	<10
3	154.1	FTB-SE1	<10
4	128.4	FTB-SE1	<10
5	128.8	FTB-SE1	<10
AVERAGE	**134.6**		
STD. DEV.	11.01		
INSIDE TRACK (WELD "B")			
1	146.7	FTB-SE1	<10
2	144.8	FTB-SE1	<10
3	148.6	FTB-SE1	<10
4	144.2	FTB-SE1	<10
5	150.9	FTB-SE1	<10
AVERAGE	**147.0**		
STD. DEV.	2.76		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	207.8	FTB-SE1
2	203.7	FTB-SE1
3	201.6	FTB-SE1
4	203.2	FTB-SE1
5	200.6	FTB-SE1
AVERAGE	**203.4**	
STD. DEV.	2.76	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-02
LAB ID NO.: L09101-02-10
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-10

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	151.5	FTB-SE1	<10
2	155.1	FTB-SE1	<10
3	157.6	FTB-SE1	<10
4	167.9	FTB-SE1	<10
5	163.7	FTB-SE1	<10
AVERAGE	**159.2**		
STD. DEV.	6.61		
INSIDE TRACK (WELD "B")			
1	152.8	FTB-SE1	<10
2	153.9	FTB-SE1	<10
3	157.6	FTB-SE1	<10
4	162.0	FTB-SE1	<10
5	159.4	FTB-SE1	<10
AVERAGE	**157.1**		
STD. DEV.	3.82		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	180.0	FTB-SE1
2	178.5	FTB-SE1
3	182.0	FTB-SE1
4	182.6	FTB-SE1
5	184.8	FTB-SE1
AVERAGE	**181.6**	
STD. DEV.	2.43	

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Geotechnics
.....GEOTECHNICAL AND GEOSYNTHETIC SERVICES

December 3, 2009

Project No.: L09101-05

Mr. Hannu Kemppinen
Joyce Engineering
2211 W. Meadowview Rd.,
Suite 101
Greensboro, NC 27407

Transmittal
Laboratory Test Results
White Oak MSW Landfill Phases 3 & 4

Please find attached the laboratory test results for the above referenced project. The tests were performed in general accordance with the procedures referenced on the data tables as well as industry practice. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to be of service and trust that our efforts have contributed to the success of your project. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

J.P. Kline, P.E.
Laboratory Director

GAI-LAP
Initials: JPL #: 14-96
Date: 12-3-09

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DT-11

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	129.3	FTB-SE3	<10
2	143.8	FTB-SE3	<10
3	118.0	FTB-AD-1	100
4	140.5	FTB-SE3	<10
5	124.2	FTB-AD-1	100
AVERAGE	**131.2**		
STD. DEV.	10.86		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	187.3	FTB-SE1
2	191.5	FTB-SE1
3	186.0	FTB-SE1
4	187.5	FTB-SE1
5	188.5	FTB-SE1
AVERAGE	**188.2**	
STD. DEV.	2.07	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-08
LAB ID NO.: L09101-08-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DT-11A

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	116.5	FTB-SE3	<10
2	133.4	FTB-SE3	<10
3	109.7	FTB-SE3	<10
4	130.8	FTB-SE3	<10
5	116.2	FTB-SE3	<10
AVERAGE	**121.3**		
STD. DEV.	10.25		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	191.8	FTB-SE1
2	197.0	FTB-SE1
3	194.1	FTB-SE1
4	194.7	FTB-SE1
5	185.8	FTB-SE1
AVERAGE	**192.7**	
STD. DEV.	4.27	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

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CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-02
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DT-12

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	103.1	FTB-AD-1	100
2	102.3	FTB-AD-1	100
3	117.6	FTB-SE3	<10
4	101.2	FTB-AD-1	100
5	88.1	FTB-AD-1	100
AVERAGE	**102.5**		
STD. DEV.	10.46		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	186.6	FTB-SE2
2	183.2	FTB-SE2
3	183.4	FTB-SE2
4	186.9	FTB-SE2
5	180.1	FTB-SE2
AVERAGE	**184.0**	
STD. DEV.	2.80	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-08
LAB ID NO.: L09101-08-02
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DT-12A

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	116.7	FTB-SE3	<10
2	114.0	FTB-SE3	<10
3	107.0	FTB-SE3	<10
4	109.6	FTB-SE3	<10
5	119.2	FTB-SE3	<10
AVERAGE	**113.3**		
STD. DEV.	5.01		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	178.6	FTB-SE1
2	193.3	FTB-SE1
3	191.5	FTB-SE1
4	192.5	FTB-SE1
5	192.1	FTB-SE1
AVERAGE	**189.6**	
STD. DEV.	6.18	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-03
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-13

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	147.2	FTB-SE1	<10
2	144.7	FTB-SE1	<10
3	139.1	FTB-SE1	<10
4	141.7	FTB-SE1	<10
5	148.8	FTB-SE1	<10
AVERAGE	**144.3**		
STD. DEV.	3.96		
INSIDE TRACK (WELD "B")			
1	150.4	FTB-SE1	<10
2	147.1	FTB-SE1	<10
3	145.9	FTB-SE1	<10
4	145.0	FTB-SE1	<10
5	152.3	FTB-SE1	<10
AVERAGE	**148.1**		
STD. DEV.	3.10		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	210.1	FTB-SE1
2	203.2	FTB-SE1
3	172.4	FTB-SE1
4	210.6	FTB-SE1
5	211.2	FTB-SE1
AVERAGE	**201.5**	
STD. DEV.	16.59	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

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CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-04
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-14

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	142.2	FTB-SE1	<10
2	144.5	FTB-SE1	<10
3	139.7	FTB-SE1	<10
4	135.2	FTB-SE1	<10
5	143.4	FTB-SE1	<10
AVERAGE	**141.0**		
STD. DEV.	3.70		
INSIDE TRACK (WELD "B")			
1	139.4	FTB-SE1	<10
2	139.8	FTB-SE1	<10
3	144.3	FTB-SE1	<10
4	145.5	FTB-SE1	<10
5	130.0	FTB-SE1	<10
AVERAGE	**139.8**		
STD. DEV.	6.10		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	210.7	FTB-SE1
2	209.7	FTB-SE1
3	207.6	FTB-SE1
4	206.8	FTB-SE1
5	211.5	FTB-SE1
AVERAGE	**209.3**	
STD. DEV.	2.01	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-05
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-15

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	160.5	FTB-SE1	<10
2	167.0	FTB-SE1	<10
3	133.0	FTB-SE1	<10
4	128.9	FTB-SE1	<10
5	163.5	FTB-SE1	<10
AVERAGE	**150.6**		
STD. DEV.	18.12		
INSIDE TRACK (WELD "B")			
1	132.3	FTB-SE1	<10
2	122.6	FTB-SE1	<10
3	131.6	FTB-SE1	<10
4	133.3	FTB-SE1	<10
5	124.0	FTB-SE1	<10
AVERAGE	**128.8**		
STD. DEV.	5.05		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	195.2	FTB-SE1
2	199.3	FTB-SE1
3	194.3	FTB-SE1
4	192.5	FTB-SE1
5	192.7	FTB-SE1
AVERAGE	**194.8**	
STD. DEV.	2.75	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-06
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-16

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	140.0	FTB-SE1	<10
2	140.6	FTB-SE1	<10
3	145.3	FTB-SE1	<10
4	157.3	FTB-SE1	<10
5	139.9	FTB-SE1	<10
AVERAGE	**144.6**		
STD. DEV.	7.43		
INSIDE TRACK (WELD "B")			
1	154.1	FTB-SE1	<10
2	144.0	FTB-SE1	<10
3	145.1	FTB-SE1	<10
4	144.7	FTB-SE1	<10
5	143.8	FTB-SE1	<10
AVERAGE	**146.3**		
STD. DEV.	4.37		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	204.5	FTB-SE1
2	204.5	FTB-SE1
3	203.6	FTB-SE1
4	201.8	FTB-SE1
5	205.0	FTB-SE1
AVERAGE	**203.9**	
STD. DEV.	1.27	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-07
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-17

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	133.0	FTB-SE1	<10
2	132.5	FTB-SE1	<10
3	132.0	FTB-SE1	<10
4	132.9	FTB-SE1	<10
5	133.8	FTB-SE1	<10
AVERAGE	**132.8**		
STD. DEV.	0.67		
INSIDE TRACK (WELD "B")			
1	161.8	FTB-SE1	<10
2	157.3	FTB-SE1	<10
3	158.7	FTB-SE1	<10
4	161.0	FTB-SE1	<10
5	159.0	FTB-SE1	<10
AVERAGE	**159.6**		
STD. DEV.	1.82		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	191.2	FTB-SE1
2	179.0	FTB-SE1
3	171.1	FTB-SE1
4	199.3	FTB-SE1
5	200.6	FTB-SE1
AVERAGE	**188.2**	
STD. DEV.	12.87	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-08
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-18

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	143.2	FTB-SE1	<10
2	131.1	FTB-SE1	<10
3	126.8	FTB-SE1	<10
4	143.7	FTB-SE1	<10
5	130.9	FTB-SE1	<10
AVERAGE	**135.1**		
STD. DEV.	7.78		
INSIDE TRACK (WELD "B")			
1	147.0	FTB-SE1	<10
2	148.7	FTB-SE1	<10
3	152.7	FTB-SE1	<10
4	141.9	FTB-SE1	<10
5	150.2	FTB-SE1	<10
AVERAGE	**148.1**		
STD. DEV.	4.05		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	202.6	FTB-SE1
2	199.4	FTB-SE1
3	198.5	FTB-SE1
4	197.9	FTB-SE1
5	199.0	FTB-SE1
AVERAGE	**199.5**	
STD. DEV.	1.83	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-09
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-19

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	147.4	FTB-SE1	<10
2	151.9	FTB-SE1	<10
3	152.8	FTB-SE1	<10
4	137.0	FTB-SE1	<10
5	148.8	FTB-SE1	<10
AVERAGE	**147.6**		
STD. DEV.	6.31		
INSIDE TRACK (WELD "B")			
1	144.0	FTB-SE1	<10
2	143.4	FTB-SE1	<10
3	144.3	FTB-SE1	<10
4	143.2	FTB-SE1	<10
5	141.1	FTB-SE1	<10
AVERAGE	**143.2**		
STD. DEV.	1.25		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	198.0	FTB-SE1
2	196.2	FTB-SE1
3	191.9	FTB-SE1
4	192.6	FTB-SE1
5	189.3	FTB-SE1
AVERAGE	**193.6**	
STD. DEV.	3.48	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-10
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-20

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	155.7	FTB-SE1	<10
2	157.1	FTB-SE1	<10
3	124.2	FTB-SE1	<10
4	122.3	FTB-SE1	<10
5	120.0	FTB-SE1	<10
AVERAGE	**135.9**		
STD. DEV.	18.82		
INSIDE TRACK (WELD "B")			
1	152.9	FTB-SE1	<10
2	152.1	FTB-SE1	<10
3	153.9	FTB-SE1	<10
4	148.6	FTB-SE1	<10
5	151.0	FTB-SE1	<10
AVERAGE	**151.7**		
STD. DEV.	2.03		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	203.2	FTB-SE1
2	199.5	FTB-SE1
3	201.9	FTB-SE1
4	196.9	FTB-SE1
5	201.0	FTB-SE1
AVERAGE	**200.5**	
STD. DEV.	2.42	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-11
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-21

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	113.8	FTB-SE1	<10
2	130.0	FTB-SE1	<10
3	143.9	FTB-SE1	<10
4	135.9	FTB-SE1	<10
5	138.4	FTB-SE1	<10
AVERAGE	**132.4**		
STD. DEV.	11.53		
INSIDE TRACK (WELD "B")			
1	156.7	FTB-SE1	<10
2	159.9	FTB-SE1	<10
3	154.1	FTB-SE1	<10
4	156.9	FTB-SE1	<10
5	160.0	FTB-SE1	<10
AVERAGE	**157.5**		
STD. DEV.	2.48		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	176.4	FTB-SE1
2	179.0	FTB-SE1
3	173.3	FTB-SE1
4	172.2	FTB-SE1
5	171.9	FTB-SE1
AVERAGE	**174.6**	
STD. DEV.	3.05	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-12
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-22

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	119.7	FTB-AD-BRK	50
2	120.5	FTB-AD-BRK	50
3	138.7	FTB-AD-BRK	50
4	132.6	FTB-AD-BRK	50
5	130.1	FTB-AD-BRK	50
AVERAGE	**128.3**		
STD. DEV.	8.13		
INSIDE TRACK (WELD "B")			
1	135.8	FTB-SE1	<10
2	144.4	FTB-SE1	<10
3	138.9	FTB-SE1	<10
4	151.0	FTB-SE1	<10
5	140.9	FTB-SE1	<10
AVERAGE	**142.2**		
STD. DEV.	5.83		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	195.5	FTB-SE1
2	197.0	FTB-SE1
3	199.8	FTB-SE1
4	192.2	FTB-SE1
5	197.4	FTB-SE1
AVERAGE	**196.4**	
STD. DEV.	2.80	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-22A

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	163.8	FTB-SE1	<10
2	158.3	FTB-SE1	<10
3	168.5	FTB-SE1	<10
4	160.1	FTB-SE1	<10
5	165.6	FTB-SE1	<10
AVERAGE	**163.3**		
STD. DEV.	4.12		
INSIDE TRACK (WELD "B")			
1	142.5	FTB-SE1	<10
2	148.3	FTB-SE1	<10
3	141.0	FTB-SE1	<10
4	140.6	FTB-SE1	<10
5	138.2	FTB-SE1	<10
AVERAGE	**142.1**		
STD. DEV.	3.78		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	198.8	FTB-SE1
2	195.8	FTB-SE1
3	196.4	FTB-SE1
4	193.8	FTB-SE1
5	189.6	FTB-SE1
AVERAGE	**194.9**	
STD. DEV.	3.45	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-02
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-22B

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	152.1	FTB-SE1	<10
2	135.4	FTB-SE1	<10
3	142.0	FTB-SE1	<10
4	145.4	FTB-SE1	<10
5	146.6	FTB-SE1	<10
AVERAGE	**144.3**		
STD. DEV.	6.16		
INSIDE TRACK (WELD "B")			
1	151.2	FTB-SE1	<10
2	128.8	FTB-SE1	<10
3	140.9	FTB-SE1	<10
4	162.1	FTB-SE1	<10
5	162.4	FTB-SE1	<10
AVERAGE	**149.1**		
STD. DEV.	14.40		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	204.2	FTB-SE1
2	204.0	FTB-SE1
3	197.4	FTB-SE1
4	193.9	FTB-SE1
5	179.7	FTB-SE1
AVERAGE	**195.8**	
STD. DEV.	10.04	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-13
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-23

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	142.9	FTB-SE1	<10
2	144.7	FTB-SE1	<10
3	124.9	FTB-SE1	<10
4	151.2	FTB-SE1	<10
5	128.8	FTB-SE1	<10
AVERAGE	**138.5**		
STD. DEV.	11.16		
INSIDE TRACK (WELD "B")			
1	148.4	FTB-SE1	<10
2	141.8	FTB-SE1	<10
3	147.3	FTB-SE1	<10
4	149.4	FTB-SE1	<10
5	150.3	FTB-SE1	<10
AVERAGE	**147.4**		
STD. DEV.	3.35		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	197.2	FTB-SE1
2	195.7	FTB-SE1
3	197.6	FTB-SE1
4	193.8	FTB-SE1
5	196.0	FTB-SE1
AVERAGE	**196.1**	
STD. DEV.	1.49	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

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CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-14
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-24

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	149.9	FTB-SE1	<10
2	148.7	FTB-SE1	<10
3	146.3	FTB-SE1	<10
4	149.2	FTB-SE1	<10
5	139.3	FTB-SE1	<10
AVERAGE	**146.7**		
STD. DEV.	4.34		
INSIDE TRACK (WELD "B")			
1	150.0	FTB-SE1	<10
2	161.5	FTB-SE1	<10
3	150.0	FTB-SE1	<10
4	161.5	FTB-SE1	<10
5	153.6	FTB-SE1	<10
AVERAGE	**155.3**		
STD. DEV.	5.83		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	195.5	FTB-SE1
2	196.1	FTB-SE1
3	194.9	FTB-SE1
4	193.0	FTB-SE1
5	197.5	FTB-SE1
AVERAGE	**195.4**	
STD. DEV.	1.65	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-15
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-25

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	147.0	FTB-SE1	<10
2	126.1	FTB-AD-BRK	50
3	117.7	FTB-AD-BRK	50
4	152.0	FTB-SE1	<10
5	154.8	FTB-SE1	<10
AVERAGE	**139.5**		
STD. DEV.	16.59		
INSIDE TRACK (WELD "B")			
1	144.6	FTB-SE1	<10
2	149.0	FTB-SE1	<10
3	150.0	FTB-SE1	<10
4	141.6	FTB-SE1	<10
5	149.8	FTB-SE1	<10
AVERAGE	**147.0**		
STD. DEV.	3.73		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	199.0	FTB-SE1
2	195.0	FTB-SE1
3	197.1	FTB-SE1
4	195.2	FTB-SE1
5	193.8	FTB-SE1
AVERAGE	**196.0**	
STD. DEV.	2.04	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-03
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-25A

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	128.0	FTB-SE1	<10
2	124.9	FTB-SE1	<10
3	136.5	FTB-SE1	<10
4	128.1	FTB-SE1	<10
5	137.9	FTB-SE1	<10
AVERAGE	**131.1**		
STD. DEV.	5.75		
INSIDE TRACK (WELD "B")			
1	139.7	FTB-SE1	<10
2	139.3	FTB-SE1	<10
3	140.7	FTB-SE1	<10
4	134.2	FTB-SE1	<10
5	129.9	FTB-SE1	<10
AVERAGE	**136.8**		
STD. DEV.	4.59		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	192.6	FTB-SE1
2	193.7	FTB-SE1
3	190.6	FTB-SE1
4	196.3	FTB-SE1
5	197.6	FTB-SE1
AVERAGE	**194.2**	
STD. DEV.	2.82	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-04
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-25B

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	140.6	FTB-SE1	<10
2	133.9	FTB-SE1	<10
3	142.9	FTB-SE1	<10
4	144.7	FTB-SE1	<10
5	152.3	FTB-SE1	<10
AVERAGE	**142.9**		
STD. DEV.	6.67		
INSIDE TRACK (WELD "B")			
1	135.2	FTB-SE1	<10
2	139.0	FTB-SE1	<10
3	151.4	FTB-SE1	<10
4	135.2	FTB-SE1	<10
5	137.5	FTB-SE1	<10
AVERAGE	**139.7**		
STD. DEV.	6.76		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	184.5	FTB-SE1
2	196.6	FTB-SE1
3	198.2	FTB-SE1
4	192.1	FTB-SE1
5	195.9	FTB-SE1
AVERAGE	**193.5**	
STD. DEV.	5.49	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-16
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-26

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	154.0	FTB-SE1	<10
2	154.7	FTB-SE1	<10
3	154.6	FTB-SE1	<10
4	151.9	FTB-SE1	<10
5	156.1	FTB-SE1	<10
AVERAGE	**154.3**		
STD. DEV.	1.53		
INSIDE TRACK (WELD "B")			
1	152.2	FTB-SE1	<10
2	156.0	FTB-SE1	<10
3	150.5	FTB-SE1	<10
4	151.8	FTB-SE1	<10
5	123.7	FTB-SE1	<10
AVERAGE	**146.8**		
STD. DEV.	13.10		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	161.9	FTB-SE1
2	162.5	FTB-SE1
3	161.3	FTB-SE1
4	161.7	FTB-SE1
5	165.6	FTB-SE1
AVERAGE	**162.6**	
STD. DEV.	1.73	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-17
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-27

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	142.7	FTB-SE1	<10
2	123.6	FTB-SE1	<10
3	135.5	FTB-SE1	<10
4	146.2	FTB-SE1	<10
5	141.0	FTB-SE1	<10
AVERAGE	**137.8**		
STD. DEV.	8.83		
INSIDE TRACK (WELD "B")			
1	131.1	FTB-SE1	<10
2	157.0	FTB-SE1	<10
3	153.2	FTB-SE1	<10
4	155.9	FTB-SE1	<10
5	148.7	FTB-SE1	<10
AVERAGE	**149.2**		
STD. DEV.	10.60		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	195.1	FTB-SE1
2	195.3	FTB-SE1
3	187.2	FTB-SE1
4	196.7	FTB-SE1
5	194.3	FTB-SE1
AVERAGE	**193.7**	
STD. DEV.	3.75	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-18
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-28

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	119.4	FTB-SE1	<10
2	120.4	FTB-SE1	<10
3	130.6	FTB-SE1	<10
4	105.9	FTB-SE1	<10
5	117.4	FTB-SE1	<10
AVERAGE	**118.7**		
STD. DEV.	8.81		
INSIDE TRACK (WELD "B")			
1	144.6	FTB-SE1	<10
2	131.5	FTB-SE1	<10
3	129.0	FTB-SE1	<10
4	131.7	FTB-SE1	<10
5	125.9	FTB-SE1	<10
AVERAGE	**132.5**		
STD. DEV.	7.14		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	195.0	FTB-SE1
2	194.4	FTB-SE1
3	195.3	FTB-SE1
4	192.8	FTB-SE1
5	193.0	FTB-SE1
AVERAGE	**194.1**	
STD. DEV.	1.14	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-19
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DT-29

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	130.4	FTB-SE3	<10
2	159.3	FTB-SE3	<10
3	138.6	FTB-SE3	<10
4	121.6	FTB-SE3	<10
5	143.0	FTB-SE3	<10
AVERAGE	**138.6**		
STD. DEV.	14.18		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	177.5	FTB-SE2
2	183.4	FTB-SE2
3	180.9	FTB-SE2
4	179.7	FTB-SE2
5	174.4	FTB-SE2
AVERAGE	**179.2**	
STD. DEV.	3.42	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-20
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-30

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	133.1	FTB-SE1	<10
2	147.5	FTB-SE1	<10
3	128.9	FTB-SE1	<10
4	132.5	FTB-SE1	<10
5	157.6	FTB-SE1	<10
AVERAGE	**139.9**		
STD. DEV.	12.18		
INSIDE TRACK (WELD "B")			
1	160.3	FTB-SE1	<10
2	140.2	FTB-SE1	<10
3	143.8	FTB-SE1	<10
4	142.3	FTB-SE1	<10
5	141.7	FTB-SE1	<10
AVERAGE	**145.7**		
STD. DEV.	8.29		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	199.0	FTB-SE1
2	189.8	FTB-SE1
3	174.8	FTB-SE1
4	197.2	FTB-SE1
5	200.8	FTB-SE1
AVERAGE	**192.3**	
STD. DEV.	10.65	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-05
LAB ID NO.: L09101-05-21
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-31

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	130.8	FTB-SE1	<10
2	130.5	FTB-SE1	<10
3	125.9	FTB-SE1	<10
4	122.7	FTB-SE1	<10
5	132.0	FTB-SE1	<10
AVERAGE	**128.4**		
STD. DEV.	3.93		
INSIDE TRACK (WELD "B")			
1	149.8	FTB-SE1	<10
2	169.9	FTB-SE1	<10
3	156.1	FTB-SE1	<10
4	153.8	FTB-SE1	<10
5	162.0	FTB-SE1	<10
AVERAGE	**158.3**		
STD. DEV.	7.84		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	205.0	FTB-SE1
2	203.0	FTB-SE1
3	200.3	FTB-SE1
4	206.8	FTB-SE1
5	207.5	FTB-SE1
AVERAGE	**204.5**	
STD. DEV.	2.93	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-05
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-32

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	159.7	FTB-SE1	<10
2	159.5	FTB-SE1	<10
3	159.9	FTB-SE1	<10
4	154.8	FTB-SE1	<10
5	160.4	FTB-SE1	<10
AVERAGE	**158.9**		
STD. DEV.	2.29		
INSIDE TRACK (WELD "B")			
1	148.9	FTB-SE1	<10
2	147.9	FTB-SE1	<10
3	151.0	FTB-SE1	<10
4	145.0	FTB-SE1	<10
5	142.3	FTB-SE1	<10
AVERAGE	**147.0**		
STD. DEV.	3.41		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	203.7	FTB-SE1
2	192.8	FTB-SE1
3	197.7	FTB-SE1
4	200.0	FTB-SE1
5	191.4	FTB-SE1
AVERAGE	**197.1**	
STD. DEV.	5.08	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-06
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-33

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	125.8	FTB-SE1	<10
2	141.7	FTB-SE1	<10
3	132.6	FTB-SE1	<10
4	129.5	FTB-SE1	<10
5	131.0	FTB-SE1	<10
AVERAGE	**132.1**		
STD. DEV.	5.92		
INSIDE TRACK (WELD "B")			
1	149.8	FTB-SE1	<10
2	151.3	FTB-SE1	<10
3	141.8	FTB-SE1	<10
4	142.9	FTB-SE1	<10
5	151.7	FTB-SE1	<10
AVERAGE	**147.5**		
STD. DEV.	4.77		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	193.5	FTB-SE1
2	195.0	FTB-SE1
3	190.7	FTB-SE1
4	191.9	FTB-SE1
5	183.8	FTB-SE1
AVERAGE	**191.0**	
STD. DEV.	4.33	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-07
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-34

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	137.7	FTB-SE1	<10
2	148.5	FTB-SE1	<10
3	137.9	FTB-SE1	<10
4	141.4	FTB-SE1	<10
5	131.4	FTB-SE1	<10
AVERAGE	**139.4**		
STD. DEV.	6.24		
INSIDE TRACK (WELD "B")			
1	147.3	FTB-SE1	<10
2	139.0	FTB-SE1	<10
3	138.9	FTB-SE1	<10
4	140.1	FTB-SE1	<10
5	147.3	FTB-SE1	<10
AVERAGE	**142.5**		
STD. DEV.	4.39		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	197.1	FTB-SE1
2	194.6	FTB-SE1
3	201.2	FTB-SE1
4	192.3	FTB-SE1
5	197.5	FTB-SE1
AVERAGE	**196.5**	
STD. DEV.	3.34	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-08
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-35

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	143.1	FTB-SE1	<10
2	131.9	FTB-SE1	<10
3	130.2	FTB-SE1	<10
4	130.2	FTB-SE1	<10
5	138.2	FTB-SE1	<10
AVERAGE	**134.7**		
STD. DEV.	5.73		
INSIDE TRACK (WELD "B")			
1	151.7	FTB-SE1	<10
2	147.6	FTB-SE1	<10
3	150.9	FTB-SE1	<10
4	157.1	FTB-SE1	<10
5	143.2	FTB-SE1	<10
AVERAGE	**150.1**		
STD. DEV.	5.15		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	192.0	FTB-SE1
2	194.6	FTB-SE1
3	188.9	FTB-SE1
4	194.0	FTB-SE1
5	189.3	FTB-SE1
AVERAGE	**191.8**	
STD. DEV.	2.62	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-09
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-36

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	145.8	FTB-SE1	<10
2	142.6	FTB-SE1	<10
3	157.2	FTB-SE1	<10
4	147.2	FTB-SE1	<10
5	153.3	FTB-SE1	<10
AVERAGE	**149.2**		
STD. DEV.	5.91		
INSIDE TRACK (WELD "B")			
1	150.6	FTB-SE1	<10
2	161.5	FTB-SE1	<10
3	151.4	FTB-SE1	<10
4	147.9	FTB-SE1	<10
5	155.4	FTB-SE1	<10
AVERAGE	**153.4**		
STD. DEV.	5.28		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	200.1	FTB-SE1
2	211.8	FTB-SE1
3	180.2	FTB-SE1
4	211.1	FTB-SE1
5	181.5	FTB-SE1
AVERAGE	**196.9**	
STD. DEV.	15.41	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-10
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-37

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	168.1	FTB-SE1	<10
2	119.9	FTB-SE1	<10
3	131.8	FTB-SE1	<10
4	126.9	FTB-SE1	<10
5	126.5	FTB-SE1	<10
AVERAGE	**134.6**		
STD. DEV.	19.18		
INSIDE TRACK (WELD "B")			
1	162.3	FTB-SE1	<10
2	168.0	FTB-SE1	<10
3	165.0	FTB-SE1	<10
4	153.1	FTB-SE1	<10
5	169.0	FTB-SE1	<10
AVERAGE	**163.5**		
STD. DEV.	6.37		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	219.6	FTB-SE1
2	218.5	FTB-SE1
3	207.0	FTB-SE1
4	186.0	FTB-SE1
5	208.9	FTB-SE1
AVERAGE	**208.0**	
STD. DEV.	13.51	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-11
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-38

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	137.5	FTB-SE1	<10
2	133.4	FTB-SE1	<10
3	136.5	FTB-SE1	<10
4	134.5	FTB-SE1	<10
5	134.8	FTB-SE1	<10
AVERAGE	**135.3**		
STD. DEV.	1.64		
INSIDE TRACK (WELD "B")			
1	143.3	FTB-SE1	<10
2	144.1	FTB-SE1	<10
3	158.7	FTB-SE1	<10
4	153.8	FTB-SE1	<10
5	146.7	FTB-SE1	<10
AVERAGE	**149.3**		
STD. DEV.	6.68		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	203.9	FTB-SE1
2	190.8	FTB-SE1
3	196.8	FTB-SE1
4	199.4	FTB-SE1
5	201.0	FTB-SE1
AVERAGE	**198.4**	
STD. DEV.	4.96	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-12
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-39

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	159.4	FTB-SE1	<10
2	156.1	FTB-SE1	<10
3	154.0	FTB-SE1	<10
4	149.3	FTB-SE1	<10
5	148.8	FTB-SE1	<10
AVERAGE	**153.5**		
STD. DEV.	4.52		
INSIDE TRACK (WELD "B")			
1	136.7	FTB-SE1	<10
2	139.7	FTB-SE1	<10
3	149.1	FTB-SE1	<10
4	140.8	FTB-SE1	<10
5	145.4	FTB-SE1	<10
AVERAGE	**142.3**		
STD. DEV.	4.90		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	189.6	FTB-SE1
2	199.4	FTB-SE1
3	198.5	FTB-SE1
4	198.6	FTB-SE1
5	188.4	FTB-SE1
AVERAGE	**194.9**	
STD. DEV.	5.41	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-13
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-40

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	140.9	FTB-SE1	<10
2	137.8	FTB-SE1	<10
3	135.3	FTB-SE1	<10
4	138.1	FTB-SE1	<10
5	116.9	FTB-SE1	<10
AVERAGE	**133.8**		
STD. DEV.	9.65		
INSIDE TRACK (WELD "B")			
1	125.7	FTB-SE1	<10
2	125.0	FTB-SE1	<10
3	155.0	FTB-SE1	<10
4	122.2	FTB-SE1	<10
5	137.7	FTB-SE1	<10
AVERAGE	**133.1**		
STD. DEV.	13.60		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	193.6	FTB-SE1
2	186.7	FTB-SE1
3	193.6	FTB-SE1
4	173.7	FTB-SE1
5	180.0	FTB-SE1
AVERAGE	**185.5**	
STD. DEV.	8.69	

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INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-06
LAB ID NO.: L09101-06-14
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-41

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	158.5	FTB-SE1	<10
2	140.6	FTB-SE1	<10
3	141.1	FTB-SE1	<10
4	133.5	FTB-SE1	<10
5	146.5	FTB-SE1	<10
AVERAGE	**144.0**		
STD. DEV.	9.31		
INSIDE TRACK (WELD "B")			
1	121.3	FTB-SE1	<10
2	111.9	FTB-SE1	<10
3	116.7	FTB-SE1	<10
4	136.4	FTB-SE1	<10
5	128.8	FTB-SE1	<10
AVERAGE	**123.0**		
STD. DEV.	9.73		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	196.6	FTB-SE1
2	184.3	FTB-SE1
3	186.7	FTB-SE1
4	192.8	FTB-SE1
5	191.3	FTB-SE1
AVERAGE	**190.3**	
STD. DEV.	4.90	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-08
LAB ID NO.: L09101-08-03
MATERIAL: 60 MIL HDPE
SEAM TYPE: EXTRUSION

SAMPLE I.D.: DT-42

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
1	148.8	FTB-SE3	<10
2	134.3	FTB-SE3	<10
3	131.7	FTB-SE3	<10
4	124.9	FTB-SE3	<10
5	125.5	FTB-SE3	<10
AVERAGE	**133.0**		
STD. DEV.	9.68		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	194.2	FTB-SE1
2	187.8	FTB-SE1
3	188.7	FTB-SE1
4	183.0	FTB-SE1
5	184.0	FTB-SE1
AVERAGE	**187.5**	
STD. DEV.	4.44	

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geotechnics
.....GEOTECHNICAL AND GEOSYNTHETIC SERVICES

February 2, 2010

Project No.: L10006-01

Mr. Hannu Kemppinen
Joyce Engineering
2211 W. Meadowview Rd.,
Suite 101
Greensboro, NC 27407

LEACHATE LAGOON

Transmittal
Laboratory Test Results
White Oak MSW Landfill

Please find attached the laboratory test results for the above referenced project. The tests were performed in general accordance with the procedures referenced on the data tables as well as industry practice. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to be of service and trust that our efforts have contributed to the success of your project. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

J.P. Kline, P.E.
Laboratory Director

GAI-LAP
Initials: JPK #: 14-96
Date: 2-2-10

RECEIVED FEB 04 2010

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geotechnics
INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK LANDFILL
PROJECT NO.: L10006-01
LAB ID NO.: L10006-01-01
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-1

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	129.7	SE1	<10
2	139.4	SE1	<10
3	142.9	SE1	<10
4	140.0	SE1	<10
5	129.5	SE1	<10
AVERAGE	**136.3**		
STD. DEV.	6.26		
INSIDE TRACK (WELD "B")			
1	136.1	SE1	<10
2	138.8	SE1	<10
3	146.5	SE1	<10
4	139.4	SE1	<10
5	143.0	SE1	<10
AVERAGE	**140.8**		
STD. DEV.	4.04		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	186.0	SE1
2	184.5	SE1
3	184.8	SE1
4	179.3	SE1
5	176.0	SE1
AVERAGE	**182.1**	
STD. DEV.	4.28	

CHECKED BY: BF DATE: 1-26-10

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\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\006 - JOYCE ENG - WHITE O L10006-01-01 1/26/2010

geotechnics
INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK LANDFILL
PROJECT NO.: L10006-01
LAB ID NO.: L10006-01-02
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-2

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	130.7	SE1	<10
2	129.6	SE1	<10
3	133.2	SE1	<10
4	134.6	SE1	<10
5	135.6	SE1	<10
AVERAGE	**132.7**		
STD. DEV.	2.54		
INSIDE TRACK (WELD "B")			
1	127.9	SE1	<10
2	125.2	SE1	<10
3	129.8	SE1	<10
4	131.2	SE1	<10
5	136.3	SE1	<10
AVERAGE	**130.1**		
STD. DEV.	4.14		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	159.4	SE1
2	157.5	SE1
3	159.1	SE1
4	156.0	SE1
5	158.6	SE1
AVERAGE	**158.1**	
STD. DEV.	1.39	

CHECKED BY: BF DATE: 1-26-10

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geotechnics
INTEGRITY IN TESTING

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392 & 4437 w/NSF 54

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK LANDFILL
PROJECT NO.: L10006-01
LAB ID NO.: L10006-01-03
MATERIAL: 60 MIL HDPE
SEAM TYPE: DOUBLE FUSION

SAMPLE I.D.: DT-3

PEEL ADHESION

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE	PEEL INCURSION (%)
OUTSIDE TRACK (WELD "A")			
1	137.3	SE1	<10
2	143.7	SE1	<10
3	140.2	SE1	<10
4	149.2	SE1	<10
5	146.6	SE1	<10
AVERAGE	**143.4**		
STD. DEV.	4.78		
INSIDE TRACK (WELD "B")			
1	156.9	SE1	<10
2	166.6	SE1	<10
3	167.7	SE1	<10
4	174.3	SE1	<10
5	172.0	SE1	<10
AVERAGE	**167.5**		
STD. DEV.	6.70		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	213.6	SE1
2	210.8	SE1
3	210.0	SE1
4	201.1	SE1
5	212.9	SE1
AVERAGE	**209.7**	
STD. DEV.	5.02	

CHECKED BY: BF DATE: 1-26-10

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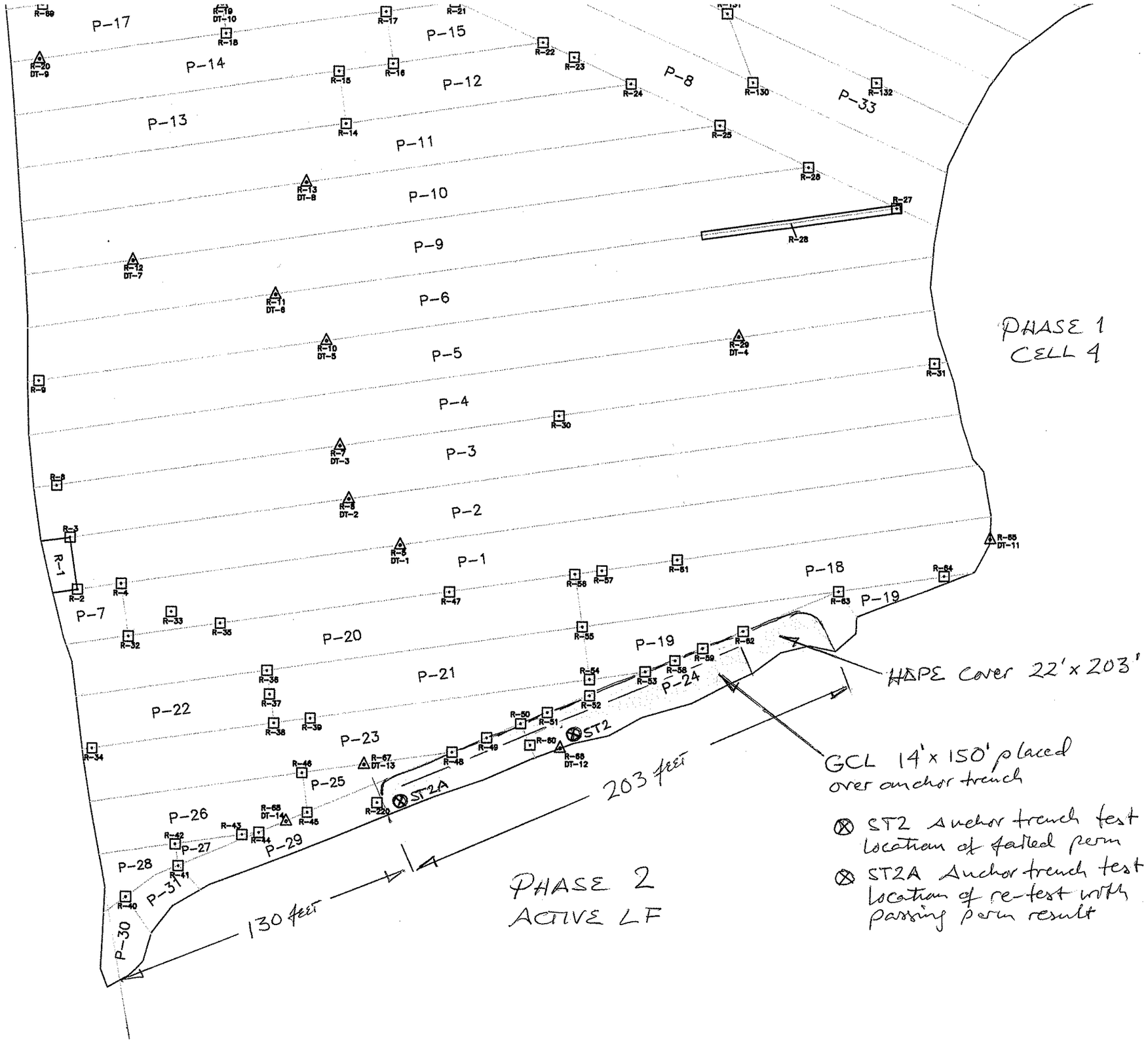
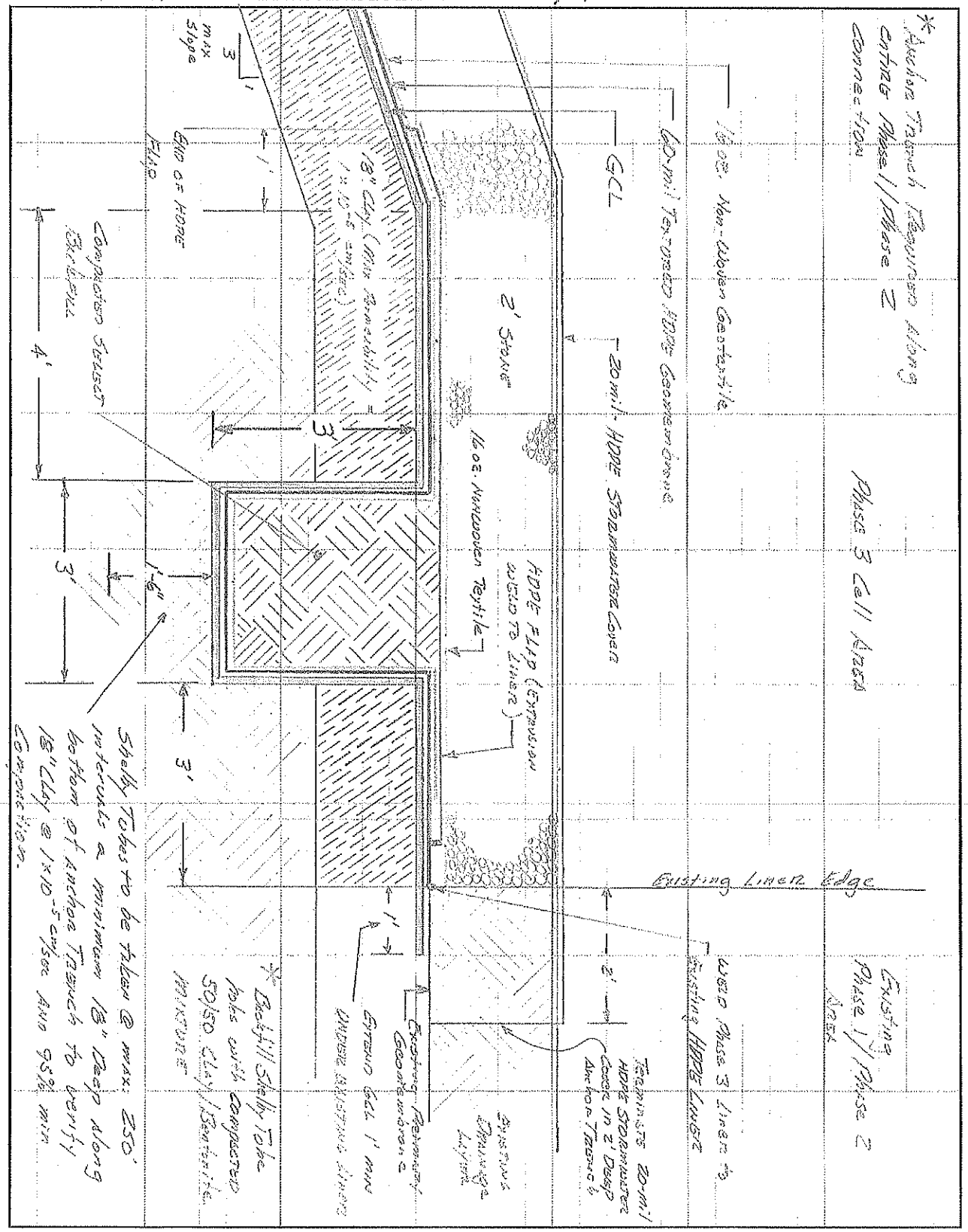
\\GEOSERVER\Data Drive\Synthetics\2010 SYNTHETICS\006 - JOYCE ENG - WHITE O L10006-01-03 1/26/2010


PHASE 1
CELL 4
HDPE Cover 22' x 203'
GCL 14' x 150' placed over anchor trench
ST2 Anchor trench test location of failed perm
ST2A Anchor trench test location of re-test with passing perm result
203 feet
130 feet
PHASE 2
ACTIVE LF
P-17
P-15
P-14
P-12
P-13
P-11
P-10
P-9
P-6
P-5
P-4
P-3
P-2
P-1
P-8
P-33
P-18
P-19
P-7
P-20
P-21
P-22
P-23
P-24
P-25
P-26
P-27
P-28
P-29
P-30
P-31
ST2
ST2A

McGill ASSOCIATES
Engineering • Planning • Finance
McGill Associates, P.A. P.O. Box 2259, Asheville, NC 28802
55 Broad Street, Asheville, NC 28801 828-252-0575 Fax 828-252-2518

PROJECT: White Oak MSW Landfill - Phase 3
PROJECT NO.: 07510
DESCRIPTION: Phase 3/Phase 1-2 Liner Connection
CALCULATED BY: WHS CHECKED BY:
DATE: 11/2/09 SHEET NO. 1 OF 1



Appendix IV

Appendix IV – Geotextile – Geocomposite

Appendix IV A – Manufacturer Certifications

Engineered Synthetic Products, Inc.
Tel (770) 564-1857
Fax (770) 564-1818
www.espgeosynthetics.com

SKAPS Nonwoven

ENVIRONMENTAL GEOTEXTILES

PROPERTY	UNIT	ASTM TEST METHOD	GE-140 4 oz	GE-160 6 oz	GE-170 7 oz	GE-180 8 oz	GE-110 10 oz	GE-112 12 oz	GE-114 14 oz	GE-116 16 oz
Weight	oz/yd^2 (g/m^2)	ASTM D 5261	4.0 (135)	6.0 (203)	7.0 (237)	8.0 (271)	10.0 (339)	12.0 (407)	14.0 (475)	16.0 (542)
Thickness*	mils (mm)	ASTM D 5199	70 (1.77)	85 (2.16)	90 (2.29)	100 (2.5)	110 (2.79)	120 (3.05)	135 (3.43)	175 (4.45)
Grab Tensile	lbs (kN)	ASTM D 4632	105 (0.467)	160 (0.711)	200 (0.889)	225 (1.0)	270 (1.20)	330 (1.47)	390 (1.73)	425 (1.89)
Grab Elongation	%	ASTM D 4632	50	50	50	50	50	50	50	50
Trapezoid Tear	lbs (kN)	ASTM D 4533	45 (0.20)	65 (0.29)	75 (0.33)	90 (0.40)	100 (0.44)	125 (0.556)	135 (0.60)	150 (0.667)
Puncture Resistance	lbs (kN)	ASTM D 4833	65 (0.289)	95 (0.42)	115 (0.511)	130 (0.578)	165 (0.733)	190 (0.844)	210 (0.930)	240 (1.07)
Mullen Burst	psi (kPa)	ASTM D 3786	230 (1585)	330 (2274)	370 (2549)	425 (2928)	525 (3617)	625 (4306)	700 (4823)	800 (5512)
Permittivity*	sec^{-1}	ASTM D 4491	2.00	1.63	1.41	1.26	0.94	0.90	0.64	0.57
Permeability*	cm/sec	ASTM D 4491	0.55	0.48	0.46	0.30	0.30	0.30	0.25	0.25
Water Flow*	gpm/ft^2 (1/min/m^2)	ASTM D 4491	160 (6518)	125 (5080)	110 (4470)	100 (4074)	75 (3055)	70 (2544)	50 (2037)	45 (1833)
A.O.S.*	U.S. Sieve (mm)	ASTM D 4751	70 (0.212)	70 (0.212)	70 (0.212)	80 (0.180)	100 (0.150)	100 (0.150)	100 (0.150)	100 (0.150)
U.V. Resistance	%/hrs	ASTM D 4355	70/500	70/500	70/500	70/500	70/500	70/500	70/500	70/500

*** At time of manufacturing. Handling, storage, and shipping may change these properties.**

PACKAGING								
Roll Dimensions (ft)	15 x 1350	15 x 900	15 x 780	15 x 690	15 x 570	15 x 480	15 x 390	15 x 360
Square Yards/Roll	2250	1500	1300	1150	950	800	650	600
Estimated Roll Weight (lbs)	620	620	620	620	620	620	620	620

SKAPS Industries (Nonwoven Division)
335, Athena Drive
Athens, GA 30601 (U.S.A.)
Phone (706) 354-3700 Fax (706) 354-3737
E-mail: info@skaps.com

Sales Office:
Engineered Synthetic Product Inc.
Phone: (770)564-1857
Fax: (770)564-1818

December 1, 2009
Hallaton, Inc
1206 Sparks Road
Sparks, Maryland 21152
PO : P6907

Dear Sir/Madam:

This is to certify that SKAPS GE116 is a high quality needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, randomly networked to form a high strength dimensionally stable fabric. SKAPS GE116 resists ultraviolet deterioration, rotting, biological degradation. The fabric is inert to commonly encountered soil chemicals. Polypropylene is stable within a pH range of 2 to 13. SKAPS GE116 conforms to the property values listed below:

PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight	ASTM D 5261	oz/sy (g/m^2)	16.00 (543)
Grab Tensile	ASTM D 4632	lbs (kN)	370 (1.65)
Grab Elongation	ASTM D 4632	%	50
Puncture Resistance	ASTM D 4833	lbs (kN)	170 (0.76)
AOS*	ASTM D 4751	US Sieve (mm)	100 (0.15)
UV Resistance	ASTM D 4355	%/hrs	70/500

Notes:
* At the time of manufacturing. Handling may change these properties.

ANURAG SHAH
QUALITY CONTROL MANAGER

Product : GE116-15

ROLL # ASTM METHOD UNITS TARGET	WEIGHT D5261 oz/sq yd 16.00	MD TENSILE D4632 lbs. 370	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 370	XMD ELONG D4632 % 50	PUNCTURE D4833 lbs. 170	AOS D4751 US Sieve 100
12287.01	16.12	432	76	455	83	242	100
12287.02	16.12	432	76	455	83	242	100
12287.03	16.12	432	76	455	83	242	100
12287.04	16.12	432	76	455	83	242	100
12287.05	16.69	436	78	461	89	242	100
12287.06	16.69	436	78	461	89	242	100
12287.07	16.69	436	78	461	89	242	100
12287.08	16.69	436	78	461	89	242	100
12287.09	16.69	436	78	461	89	242	100
12287.10	16.16	430	72	457	85	246	100
12287.11	16.16	430	72	457	85	246	100
12287.12	16.16	430	72	457	85	246	100
12287.13	16.16	430	72	457	85	246	100
12287.14	16.16	430	72	457	85	246	100
12287.15	16.65	438	74	463	87	246	100
12287.16	16.65	438	74	463	87	246	100
12287.17	16.65	438	74	463	87	246	100
12287.18	16.65	438	74	463	87	246	100
12287.19	16.65	438	74	463	87	246	100
12287.20	16.14	434	70	459	81	240	100
12287.21	16.14	434	70	459	81	240	100
12287.22	16.14	434	70	459	81	240	100
12287.23	16.14	434	70	459	81	240	100
12287.24	16.14	434	70	459	81	240	100
12287.25	16.67	440	80	465	89	240	100
12287.26	16.67	440	80	465	89	240	100
12287.27	16.67	440	80	465	89	240	100
12287.28	16.67	440	80	465	89	240	100
12287.29	16.67	440	80	465	89	240	100
12287.30	16.20	431	73	450	80	248	100
12287.31	16.20	431	73	450	80	248	100
12287.32	16.20	431	73	450	80	248	100
12287.33	16.20	431	73	450	80	248	100
12287.34	16.20	431	73	450	80	248	100
12287.35	16.63	437	77	458	86	248	100

*All values are MARV.

Product : GE116-15

ROLL # ASTM METHOD UNITS TARGET	WEIGHT D5261 oz/sq yd 16.00	MD TENSILE D4632 lbs. 370	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 370	XMD ELONG D4632 % 50	PUNCTURE D4833 lbs. 170	AOS D4751 US Sieve 100
12287.36	16.63	437	77	458	86	248	100
12287.37	16.63	437	77	458	86	248	100
12287.38	16.63	437	77	458	86	248	100
12287.39	16.63	437	77	458	86	248	100
12287.40	16.18	433	71	452	82	244	100
12287.41	16.18	433	71	452	82	244	100
12287.42	16.18	433	71	452	82	244	100
12287.43	16.18	433	71	452	82	244	100
12287.44	16.18	433	71	452	82	244	100
12287.45	16.59	439	79	456	88	244	100
12287.46	16.59	439	79	456	88	244	100
12287.47	16.59	439	79	456	88	244	100
12287.48	16.59	439	79	456	88	244	100
12287.49	16.59	439	79	456	88	244	100
12287.50	16.24	435	75	454	84	246	100
12287.51	16.24	435	75	454	84	246	100
12287.52	16.24	435	75	454	84	246	100
12287.53	16.24	435	75	454	84	246	100
12287.54	16.24	435	75	454	84	246	100
12287.55	16.61	437	77	460	90	246	100
12287.56	16.61	437	77	460	90	246	100
12287.57	16.61	437	77	460	90	246	100
12287.58	16.61	437	77	460	90	246	100
12287.59	16.61	437	77	460	90	246	100
12287.60	16.22	430	70	451	81	241	100
12287.61	16.22	430	70	451	81	241	100
12287.62	16.22	430	70	451	81	241	100
12287.63	16.22	430	70	451	81	241	100
12287.64	16.22	430	70	451	81	241	100
12287.65	16.55	434	74	464	87	241	100
12287.66	16.55	434	74	464	87	241	100
12287.67	16.55	434	74	464	87	241	100
12287.68	16.55	434	74	464	87	241	100
12287.69	16.55	434	74	464	87	241	100
12287.70	16.26	432	72	453	83	245	100

*All values are MARV.

Product : GE116-15

ROLL # ASTM METHOD UNITS TARGET	WEIGHT D5261 oz/sq yd 16.00	MD TENSILE D4632 lbs. 370	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 370	XMD ELONG D4632 % 50	PUNCTURE D4833 lbs. 170	AOS D4751 US Sieve 100
12287.71	16.26	432	72	453	83	245	100
12287.72	16.26	432	72	453	83	245	100
12287.73	16.26	432	72	453	83	245	100
12287.74	16.26	432	72	453	83	245	100
12287.75	16.57	438	78	462	85	245	100
12287.76	16.57	438	78	462	85	245	100
12287.77	16.57	438	78	462	85	245	100
12287.78	16.57	438	78	462	85	245	100
12287.79	16.57	438	78	462	85	245	100
12287.80	16.32	436	76	455	80	243	100
12287.81	16.32	436	76	455	80	243	100
12287.82	16.32	436	76	455	80	243	100
12287.83	16.32	436	76	455	80	243	100
12287.84	16.32	436	76	455	80	243	100
12287.85	16.45	430	79	457	84	244	100
12287.86	16.45	430	79	457	84	244	100
12287.87	16.45	430	79	457	84	244	100
12287.88	16.45	430	79	457	84	244	100
12287.89	16.45	430	79	457	84	244	100

*All values are MARV.

SKAPS Industries

Engineered Synthetic Products, Inc.

October 15, 2009
Hallaton, Inc
1206 Sparks Road
Sparks, Maryland 21152

Ref. : White Oak Landfill, NC
Customer P.O. # P6907
Transnet 220-2-8

We certify that the Transnet 220-2-8 drainage composite, meets the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Required Value	Qualifier
Geonet[4]				
Mass per Unit Area	ASTM D 5261	lbs/ft^2	0.162	Minimum
Thickness	ASTM D 5199	mil	200	Minimum
Carbon Black	ASTM D 4218	%	2.0 - 3.0	Range
Tensile Strength	ASTM D 5035	lbs/in	45	Minimum
Melt Flow	ASTM D 1238[3]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	Minimum
Transmissivity[1]	ASTM D 4716	m^2/sec	1.0×10^{-3}	MARV[6]
Composite				
Ply Adhesion	ASTM D 7005	lb/in	1.0	MARV
Transmissivity[2]	ASTM D 4716	m^2/sec	1.0×10^{-4}	MARV
Geotextile[4 & 5]				
Fabric Weight	ASTM D 5261	oz/yd^2	8.0	MARV
Grab Strength	ASTM D 4632	lbs	220	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Puncture Resistance	ASTM D 4833	lbs	120	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.3	MARV
AOS	ASTM D 4751	US Sieve	80	MARV
UV Resistance	ASTM D 4355	%/hrs	70/500	MARV

Notes:

1 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.1 and a confining pressure of 10000 psf between steel plates after 15 minutes.

2 Transmissivity measured using water at 21 ± 2 °C (70 ± 4 °F) with a gradient of 0.1 and a confining pressure of 10000 psf between steel plates after 15 minutes.

3 Condition 190/2.16

4 Geotextile and Geonet properties are prior to lamination.

5 Geotextile data is provided by the supplier.

6 MARV is statistically defined as mean minus two standard deviations and it is the value which is exceeded by 97.5% of all the test data.

Sincerely,

Nilay Patel

Nilay Patel
QA Manager

571 Industrial Parkway, Commerce, GA 30529 **Phone**: 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

Engineered Synthetic Products, Inc.

Product : **TN220-2-8**
Project : **White Oak Landfill, NC**

We, the Geocomposite manufacturer, hereby certify the following for the material delievered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity* (m^2/sec)
			Top	Bottom	Minimum	Average	
1	325410001	325410001 - N	3254.001	3254.004	1.29	2.06	2.06×10^{-4}
2	325410002	325410002 - N	3254.001	3254.004			
3	325410003	325410003 - N	3254.001	3254.004			
4	325410004	325410004 - N	3254.001	3254.004			
5	325410005	325410005 - N	3254.001	3254.004			
6	325410006	325410006 - N	3254.003	3254.002			
7	325410007	325410007 - N	3254.003	3254.002			
8	325410008	325410008 - N	3254.003	3254.002			
9	325410009	325410009 - N	3254.003	3254.002			
10	325410010	325410010 - N	3254.003	3254.002	1.48	2.15	

* Transmissivity measured using water at 21 $\pm$ 2 ^{o}C (70 $\pm$ 4 ^{o}F) with a gradient of 0.1 and a confining pressure of 10000 psf between steel plates after 15 minutes.

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

Engineered Synthetic Products, Inc.

Product : **TN220-2-8**
Project : **White Oak Landfill, NC**

We, the Geonet Manufacturer, hereby ceritify the following for the material sent to the above referenced project :

Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Mass Per Unit Area (lb/ft^2)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity* (m^2/sec)
325410001 - N	CEFX50261	0.9553	0.186	218	2.33	70	2.23×10^{-3}
325410002 - N	CEFX50261	0.9553					
325410003 - N	CEFX50261	0.9553					
325410004 - N	CEFX50261	0.9553					
325410005 - N	CEFX50261	0.9553					
325410006 - N	CEFX50261	0.9553					
325410007 - N	CEFX50261	0.9553					
325410008 - N	CEFX50261	0.9553					
325410009 - N	CEFX50261	0.9553					
325410010 - N	CEFX50261	0.9553	0.193	225	2.47	74	

* Transmissivity measured using water at 21 $\pm$ 2 ^{o}C (70 $\pm$ 4 ^{o}F) with a gradient of 0.1 and a confining pressure of 10000 psf between steel plates after 15 minutes.

APPROVED 5 QA

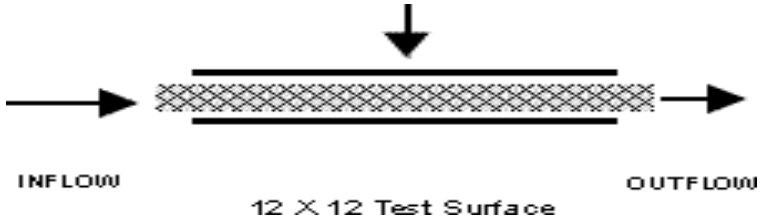
571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 Fax: 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

ASTM D 4716

Client:	Hallaton, Inc	**Job #**	3254
Project:	White Oak Landfill, NC		
Product:	TN220-2-8		
Roll #	325410001		

Test Configuration:



Test Information:

Boundary Conditions:	Steel Plate Geocomposite Steel Plate	**Normal Load:**	10000 psf
		Gradient:	0.1 ft
		Seating Time:	15 minutes
		Flow Direction:	MD

Test Results:

Pressure (psf)	Gradient, ft	Transmissivity, m^2/sec
		15 minutes
10000	0.1	2.06×10^{-4}

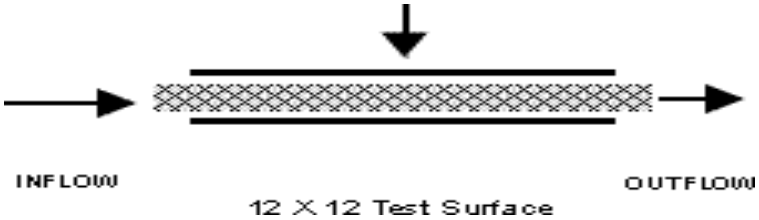
571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

ASTM D 4716

Client:	Hallaton, Inc	**Job #**	3254
Project:	White Oak Landfill, NC		
Product:	TN220-2-8		
Roll #	325410001 - N		

Test Configuration:



Test Information:

Boundary Conditions:	Steel Plate Geonet Steel Plate	**Normal Load:**	10000 psf
		Gradient:	0.1 ft
		Seating Time:	15 minutes
		Flow Direction:	MD

Test Results:

Pressure (psf)	Gradient, ft	Transmissivity, m^2/sec
		15 minutes
10000	0.1	2.23×10^{-3}

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

POLYETHYLENE RESIN CERTIFICATION

Customer Name : Hallaton, Inc
Project Name : White Oak Landfill, NC
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN220-2-8

We, the Geonet Manufacturer, hereby certify the following for the material delivered to the above referenced project:

Resin Supplier	Resin Production Plant	Resin Brand Name	Resin Lot Number	Property	Test Method	Units	Resin Supplier Value	Tested Value*
Trademark Plastics Corporation	Chevron, TX	HDPE	CEFX50261	Density	ASTM D 1505	gm/cc	0.955	0.951
				Melt Flow Index	ASTM D 1238[(a)]	gm/10 min	0.10	0.11

(a) Condition 190/2.16
* Data from SKAPS Quality Control

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

SKAPS Industries

Engineered Synthetic Products, Inc.

Product : TN220-2-8
Project : White Oak Landfill, NC

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

GEOCOMP ROLL#	FABRIC ROLL#	WEIGHT oz/sq yd	MD TENSILE lbs.	MD ELONG %	XMD TENSILE lbs.	XMD ELONG %	PUNCTURE lbs.	AOS us sieve	PERM-ITY sec^{-1}
325410001	3254.001	8.35	233	72	241	80	133	80	1.39
	3254.004	8.35	233	72	241	80	133	80	1.39

571 Industrial Parkway, Commerce, GA 30529 **Phone:** 706-336-7000 **Fax:** 706-336-7007 **Email:** skaps@skaps.com

Appendix IV B – Conformance Test Results

Geotechnics
.....GEOTECHNICAL AND GEOSYNTHETIC SERVICES

November 5, 2009

Project No.: L09101-01

Mr. Hannu Kemppinen
Joyce Engineering
1604 Ownby Lane
Richmond, VA 23220-1317

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Transmittal
Laboratory Test Results
White Oak MSW Landfill Phases 3 & 4

Please find attached the laboratory test results for the above referenced project. The tests were performed in general accordance with the procedures referenced on the data tables as well as industry practice. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to be of service and trust that our efforts have contributed to the success of your project. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

J.P. Kline, P.E.
Laboratory Director

GAI-LAP
Initials: JPK **#: 14-96**
Date: 11-5-09

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

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geotechnics
INTEGRITY IN TESTING

CONFORMANCE TEST RESULTS

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-01
LAB ID NO.: L09101-01-01
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.05

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	17.77	16.23	15.73	16.20	16.73	17.95	17.87	17.86	16.87	17.65	**17.09**	**0.834**
GRAB STRENGTH	D 4632	MD-lbs	551.9	558.1	655.1	587.7	646.5	559.4	536.1	523.7	562.1	620.0	**580.1**	**45.74**
		CD-lbs	549.5	536.1	565.2	547.1	581.7	620.5	617.6	572.8	563.9	544.6	**569.9**	**29.36**
GRAB ELONGATION	D 4632	MD-%	113.3	113.3	130.0	126.7	130.0	123.3	116.7	120.0	116.7	116.7	**120.7**	**6.44**
		CD-%	150.0	136.7	136.7	136.7	133.3	133.3	136.7	136.7	150.0	153.3	**140.3**	**7.61**
PUNCTURE	D 4833	lbs	283.7	241.7	312.9	312.7	267.7	265.6	280.1	267.0	267.7	291.8		
		lbs	281.9	275.6	277.4	298.9	270.9						**279.7**	**18.74**
A.O.S.	D 4751	mm	0.096	0.103	0.090	0.105	0.121						**0.103**	
								AVERAGE AOS, US STD.SIEVE SIZE =					**#140**	

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APPARENT OPENING SIZE
ASTM D 4751

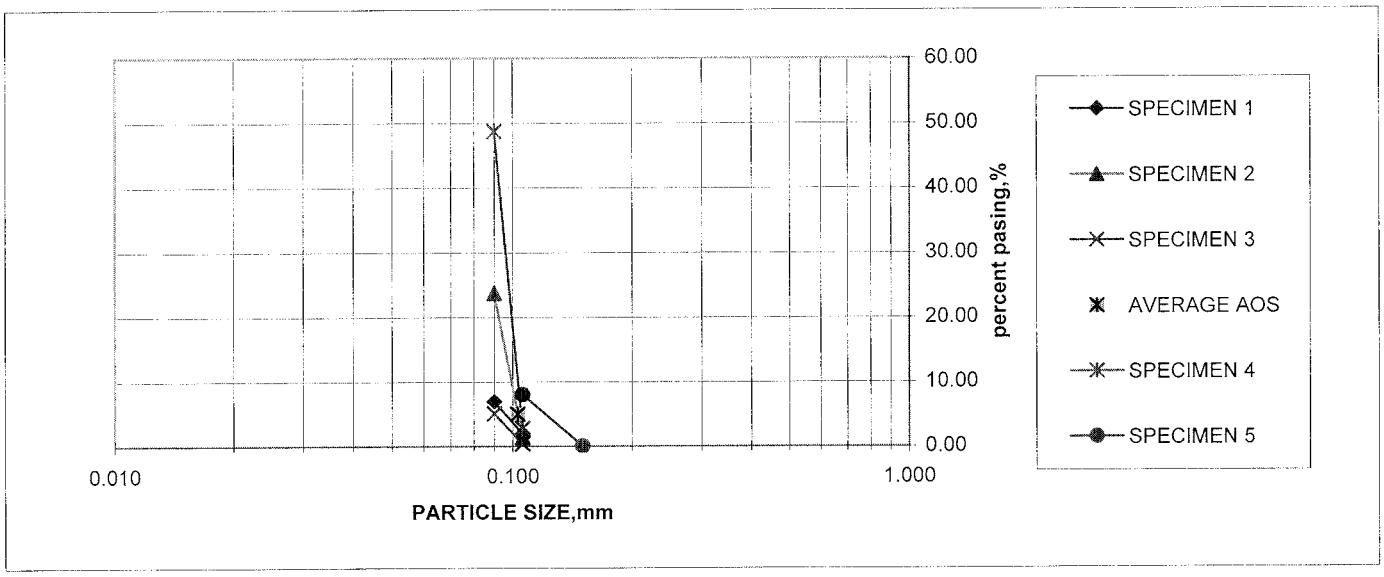
geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-01

LAB ID NO.: L09101-01
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.05

US STD. SIEVE SIZE	SIEVE OPENING (mm)	WT. FRAME & GEOTEXTILE & BEADS (gm)	WT. FRAME & GEOTEXTILE (gm)	WT. BEADS (gm)	WT. PAN & BEADS (gm)	WT. PAN (gm)	WT. BEADS PASSING (gm)	PERCENT PASSING (%)	AOS @ 5% PASSING (mm)
SPECIMEN 1									
#170	0.090	1176.50	1126.50	50.00	389.35	385.88	3.47	6.94	
#140	0.106	1178.84	1128.84	50.00	386.85	385.88	0.97	1.94	**0.096**
SPECIMEN 2									
#170	0.090	831.00	781.00	50.00	544.12	532.26	11.86	23.72	
#140	0.106	834.42	784.42	50.00	532.95	532.26	0.69	1.38	**0.103**
SPECIMEN 3									
#170	0.090	836.24	786.24	50.00	529.66	527.12	2.54	5.08	
#140	0.106	838.58	788.58	50.00	527.31	527.12	0.19	0.38	**0.090**
SPECIMEN 4									
#170	0.090	824.52	774.52	50.00	549.60	525.24	24.36	48.72	
#140	0.106	827.04	777.04	50.00	526.62	525.24	1.38	2.76	**0.105**
SPECIMEN 5									
#140	0.106	838.94	788.94	50.00	531.36	527.35	4.01	8.02	
#100	0.150	840.86	790.86	50.00	527.38	527.35	0.03	0.06	**0.121**

AVERAGE AOS @ 5% PASSING, mm 0.103
AVERAGE AOS, US STD. SIEVE SIZE **#140**



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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-01
LAB ID NO.: L09101-01-02
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.23

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	17.19	17.06	17.16	17.27	15.59	15.32	15.22	15.42	15.89	16.30	**16.24**	**0.857**
GRAB STRENGTH	D 4632	MD-lbs	574.0	537.3	477.4	546.3	506.4	513.0	568.7	593.0	560.3	564.8	**544.1**	**35.70**
		CD-lbs	513.0	575.8	644.1	654.8	581.4	555.3	567.4	584.8	531.7	546.9	**575.5**	**45.01**
GRAB ELONGATION	D 4632	MD-%	110.0	113.3	113.3	126.7	116.7	113.3	120.0	123.3	123.3	120.0	**118.0**	**5.49**
		CD-%	146.7	140.0	140.0	140.0	143.3	136.7	136.7	146.7	146.7	163.3	**144.0**	**7.83**
PUNCTURE	D 4833	lbs	277.4	293.5	257.2	287.4	274.0	287.8	313.5	249.0	284.7	279.2		
		lbs	267.0	281.8	296.3	279.6	281.4						**280.7**	**15.58**
A.O.S.	D 4751	mm	0.113	0.091	0.106	0.106	0.111						**0.105**	
								AVERAGE AOS, US STD.SIEVE SIZE =					**#140**	

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APPARENT OPENING SIZE
ASTM D 4751

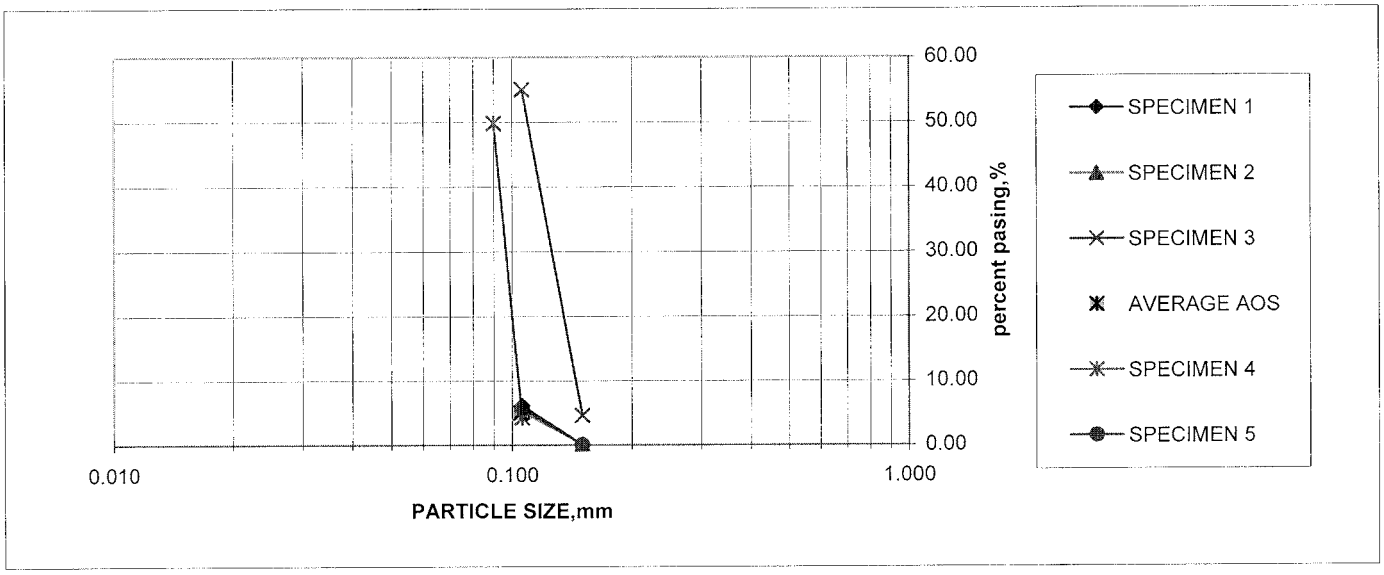
geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-01

LAB ID NO.: L09101-01-02
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.23

US STD. SIEVE SIZE	SIEVE OPENING (mm)	WT. FRAME & GEOTEXTILE & BEADS (gm)	WT. FRAME & GEOTEXTILE (gm)	WT. BEADS (gm)	WT. PAN & BEADS (gm)	WT. PAN (gm)	WT. BEADS PASSING (gm)	PERCENT PASSING (%)	AOS @ 5% PASSING (mm)
SPECIMEN 1									
#140	0.106	1176.80	1126.80	50.00	388.93	385.88	3.05	6.10	
#100	0.150	1180.06	1130.06	50.00	385.91	385.88	0.03	0.06	**0.113**
SPECIMEN 2									
#170	0.090	833.78	783.78	50.00	534.85	532.26	2.59	5.18	
#140	0.106	832.84	782.84	50.00	532.33	532.26	0.07	0.14	**0.091**
SPECIMEN 3									
#170	0.090	839.14	789.14	50.00	554.61	527.12	27.49	54.98	
#140	0.106	836.18	786.18	50.00	529.42	527.12	2.30	4.60	**0.106**
SPECIMEN 4									
#170	0.090	826.46	776.46	50.00	550.13	525.24	24.89	49.78	
#140	0.106	824.30	774.30	50.00	527.35	525.24	2.11	4.22	**0.106**
SPECIMEN 5									
#140	0.106	836.12	786.12	50.00	530.19	527.35	2.84	5.68	
#100	0.150	839.54	789.54	50.00	527.36	527.35	0.01	0.02	**0.111**

AVERAGE AOS @ 5% PASSING, mm 0.105
AVERAGE AOS, US STD. SIEVE SIZE **#140**



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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-01
LAB ID NO.: L09101-01-03
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.41

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	15.87	17.40	16.50	16.37	16.67	16.29	16.39	15.57	17.72	17.95	**16.67**	**0.777**
GRAB STRENGTH	D 4632	MD-lbs	599.9	588.0	494.2	497.4	521.4	543.1	500.9	557.7	616.7	505.0	**542.4**	**46.01**
		CD-lbs	573.9	502.3	544.6	617.7	609.0	636.7	557.2	616.5	526.9	493.6	**567.8**	**51.06**
GRAB ELONGATION	D 4632	MD-%	113.3	123.3	113.3	110.0	123.3	116.7	116.7	116.7	113.3	116.7	**116.3**	**4.29**
		CD-%	143.3	153.3	140.0	150.0	143.3	150.0	143.3	143.3	150.0	163.3	**148.0**	**6.89**
PUNCTURE	D 4833	lbs	265.7	270.9	306.2	246.8	272.8	254.7	260.8	231.1	258.5	309.2		
		lbs	234.6	261.2	251.3	273.5	252.0						**263.3**	**21.90**
A.O.S.	D 4751	mm	0.114	0.100	0.107	0.117	0.104						**0.108**	
								AVERAGE AOS, US STD.SIEVE SIZE =					**#120**	

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L09101-01-03

11/3/2009

APPARENT OPENING SIZE
ASTM D 4751

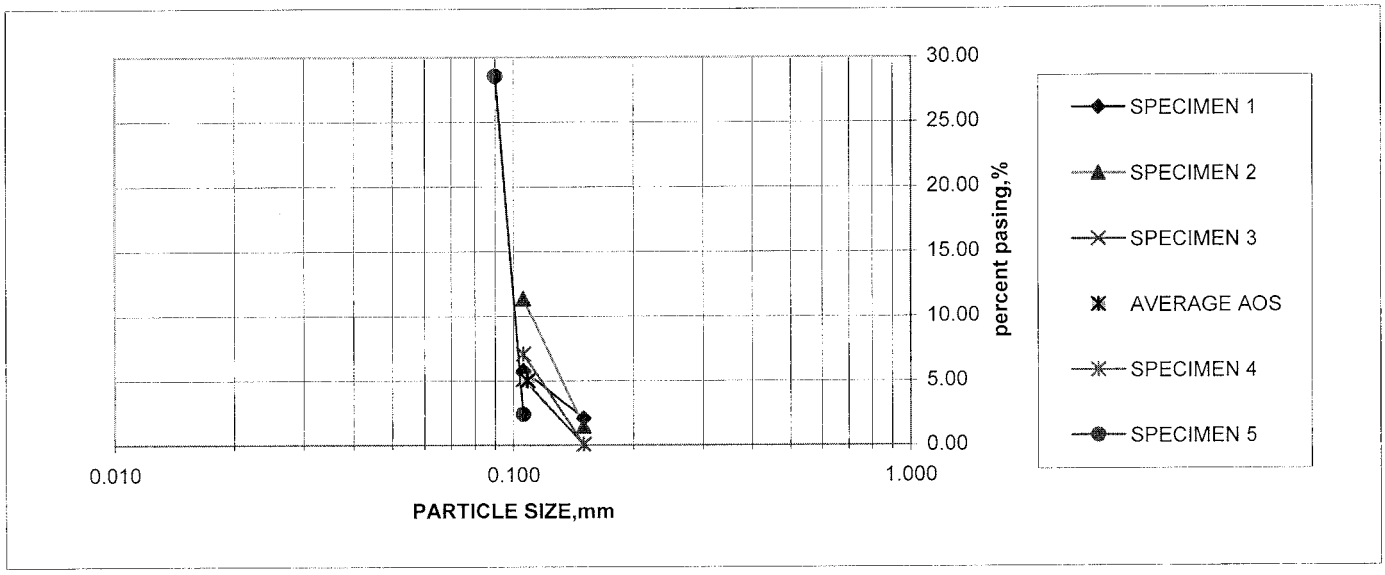
geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-01

LAB ID NO.: L09101-01
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.41

US STD. SIEVE SIZE	SIEVE OPENING (mm)	WT. FRAME & GEOTEXTILE & BEADS (gm)	WT. FRAME & GEOTEXTILE (gm)	WT. BEADS (gm)	WT. PAN & BEADS (gm)	WT. PAN (gm)	WT. BEADS PASSING (gm)	PERCENT PASSING (%)	AOS @ 5% PASSING (mm)
SPECIMEN 1									
#140	0.106	1176.08	1126.08	50.00	388.77	385.88	2.89	5.78	
#100	0.150	1178.26	1128.26	50.00	386.92	385.88	1.04	2.08	**0.114**
SPECIMEN 2									
#170	0.090	834.16	784.16	50.00	537.94	532.26	5.68	11.36	
#140	0.106	832.16	782.16	50.00	532.99	532.26	0.73	1.46	**0.100**
SPECIMEN 3									
#140	0.106	834.20	784.20	50.00	529.67	527.12	2.55	5.10	
#100	0.150	836.58	786.58	50.00	527.13	527.12	0.01	0.02	**0.107**
SPECIMEN 4									
#140	0.106	825.36	775.36	50.00	528.77	525.24	3.53	7.06	
#100	0.150	827.66	777.66	50.00	525.26	525.24	0.02	0.04	**0.117**
SPECIMEN 5									
#170	0.090	837.00	787.00	50.00	541.62	527.35	14.27	28.54	
#140	0.106	835.12	785.12	50.00	528.54	527.35	1.19	2.38	**0.104**

AVERAGE AOS @ 5% PASSING, mm 0.108
AVERAGE AOS, US STD. SIEVE SIZE **#120**



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geotechnics
INTEGRITY IN TESTING

CONFORMANCE TEST RESULTS

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-01
LAB ID NO.: L09101-01-04
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.59

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	16.04	17.65	15.86	16.76	16.70	17.06	18.10	15.99	17.03	17.45	**16.86**	**0.748**
GRAB STRENGTH	D 4632	MD-lbs	547.5	573.5	591.8	527.4	503.3	532.6	558.1	549.7	617.2	518.7	**552.0**	**34.68**
		CD-lbs	474.0	604.8	564.2	643.8	646.4	613.9	618.5	554.8	554.9	534.6	**581.0**	**54.29**
GRAB ELONGATION	D 4632	MD-%	106.7	116.7	120.0	116.7	113.3	120.0	120.0	120.0	123.3	116.7	**117.3**	**4.66**
		CD-%	146.7	146.7	140.0	140.0	146.7	136.7	140.0	133.3	146.7	163.3	**144.0**	**8.29**
PUNCTURE	D 4833	lbs	286.6	296.1	275.6	266.7	243.1	275.9	263.9	246.9	284.7	277.5		
		lbs	285.6	248.3	265.9	231.4	308.0						**270.4**	**21.15**
A.O.S.	D 4751	mm	0.105	0.106	0.097	0.105	0.110						**0.104**	
								AVERAGE AOS, US STD.SIEVE SIZE =					**#140**	

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APPARENT OPENING SIZE
ASTM D 4751

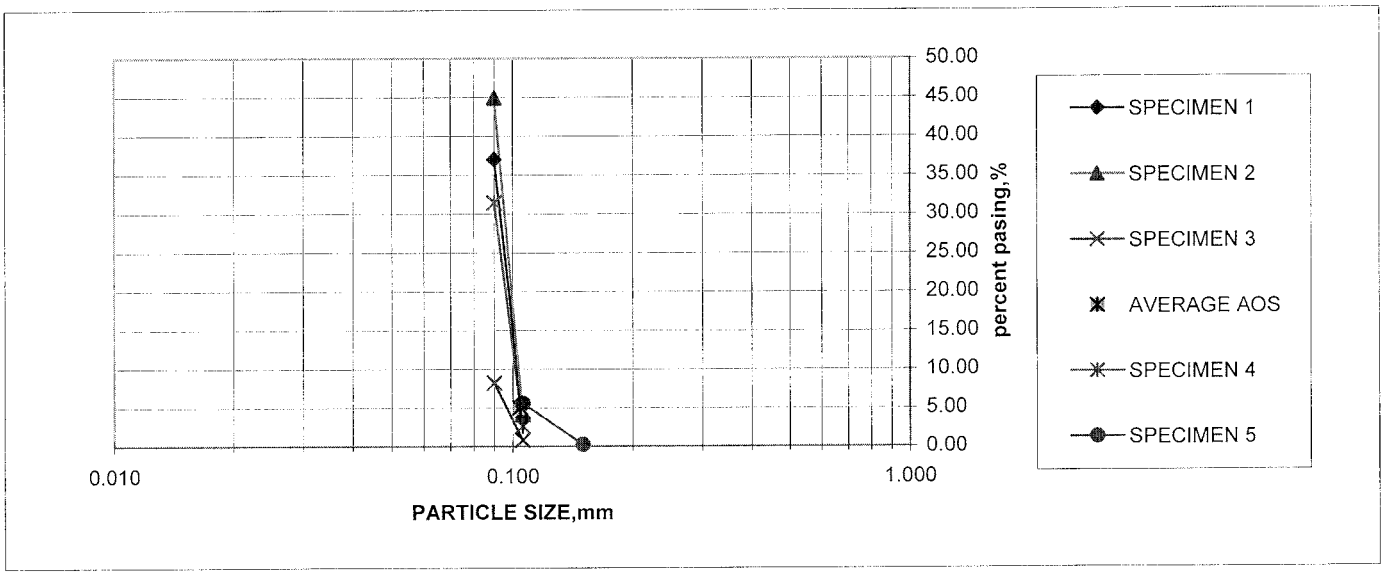
geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-01

LAB ID NO.: L09101-01
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.59

US STD. SIEVE SIZE	SIEVE OPENING (mm)	WT. FRAME & GEOTEXTILE & BEADS (gm)	WT. FRAME & GEOTEXTILE (gm)	WT. BEADS (gm)	WT. PAN & BEADS (gm)	WT. PAN (gm)	WT. BEADS PASSING (gm)	PERCENT PASSING (%)	AOS @ 5% PASSING (mm)
SPECIMEN 1									
#170	0.090	1179.12	1129.12	50.00	404.38	385.88	18.50	37.00	
#140	0.106	1177.00	1127.00	50.00	387.74	385.88	1.86	3.72	**0.105**
SPECIMEN 2									
#170	0.090	832.66	782.66	50.00	554.71	532.26	22.45	44.90	
#140	0.106	830.80	780.80	50.00	534.32	532.26	2.06	4.12	**0.106**
SPECIMEN 3									
#170	0.090	837.12	787.12	50.00	531.22	527.12	4.10	8.20	
#140	0.106	835.90	785.90	50.00	527.52	527.12	0.40	0.80	**0.097**
SPECIMEN 4									
#170	0.090	827.26	777.26	50.00	540.95	525.24	15.71	31.42	
#140	0.106	825.50	775.50	50.00	526.54	525.24	1.30	2.60	**0.105**
SPECIMEN 5									
#140	0.106	834.02	784.02	50.00	530.13	527.35	2.78	5.56	
#100	0.150	835.92	785.92	50.00	527.46	527.35	0.11	0.22	**0.110**

AVERAGE AOS @ 5% PASSING, mm 0.104
AVERAGE AOS, US STD. SIEVE SIZE **#140**



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CONFORMANCE TEST RESULTS

geotechnics
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-01
LAB ID NO.: L09101-01-05
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.77

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	6	7	8	9	10	AVG	STD
MASS/UNIT AREA	D 5261	oz/sy	17.55	18.30	17.49	17.12	17.87	17.15	16.53	16.19	16.03	16.14	**17.04**	**0.786**
GRAB STRENGTH	D 4632	MD-lbs	593.6	544.1	603.6	574.4	576.3	527.0	544.0	599.8	565.5	611.6	**574.0**	**28.71**
		CD-lbs	530.3	616.1	648.1	514.8	534.1	523.9	590.8	623.0	650.9	584.7	**581.7**	**52.60**
GRAB ELONGATION	D 4632	MD-%	116.7	123.3	116.7	123.3	126.7	123.3	116.7	120.0	116.7	113.3	**119.7**	**4.29**
		CD-%	153.3	140.0	146.7	163.3	156.7	143.3	143.3	143.3	143.3	140.0	**147.3**	**7.83**
PUNCTURE	D 4833	lbs	250.1	279.3	237.3	294.0	282.0	276.2	319.2	274.2	268.4	258.6		
		lbs	256.1	287.8	290.7	265.0	287.3						**275.1**	**20.28**
A.O.S.	D 4751	mm	0.105	0.105	0.098	0.106	0.104						**0.103**	
								AVERAGE AOS, US STD.SIEVE SIZE =					**#140**	

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CHECKED BY: BF DATE: 11-3-09

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L09101-01-05

11/3/2009

APPARENT OPENING SIZE
ASTM D 4751

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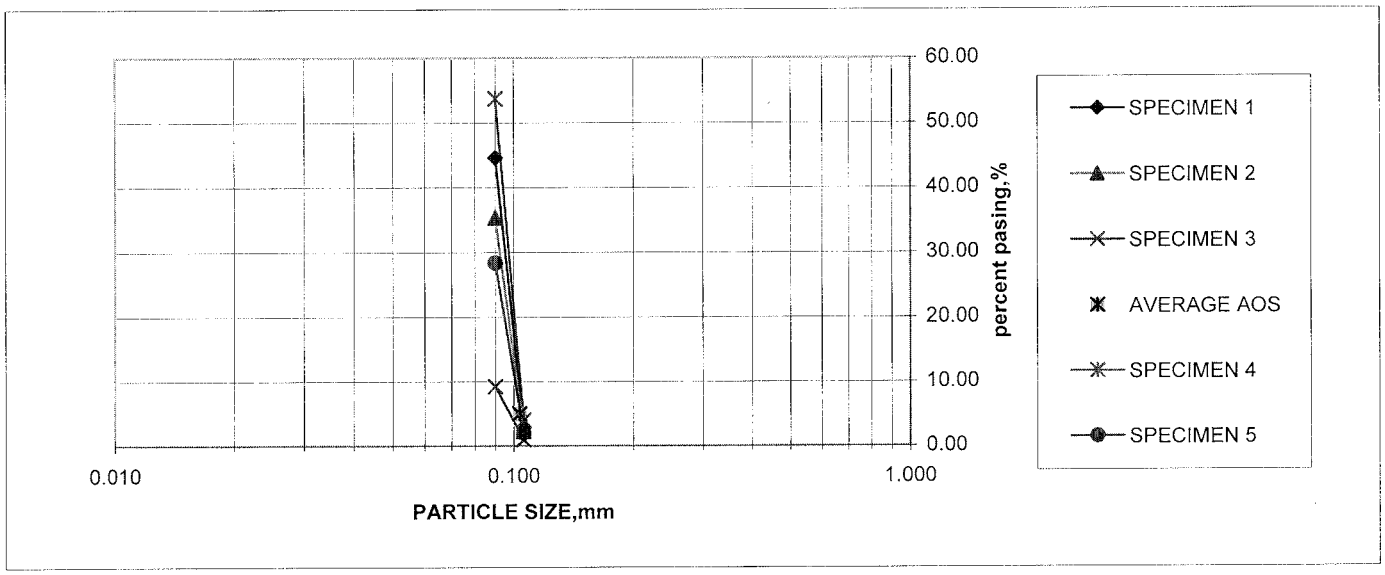
INTEGRITY IN TESTING

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL PHASES 3 & 4
PROJECT NO.: L09101-01

LAB ID NO.: L09101-01
MATERIAL: 16 OZ GEOTEXTILE
ROLL NO: 12287.77

US STD. SIEVE SIZE	SIEVE OPENING (mm)	WT. FRAME & GEOTEXTILE & BEADS (gm)	WT. FRAME & GEOTEXTILE (gm)	WT. BEADS (gm)	WT. PAN & BEADS (gm)	WT. PAN (gm)	WT. BEADS PASSING (gm)	PERCENT PASSING (%)	AOS @ 5% PASSING (mm)
SPECIMEN 1									
#170	0.090	1178.20	1128.20	50.00	408.16	385.88	22.28	44.56	
#140	0.106	1176.18	1126.18	50.00	387.30	385.88	1.42	2.84	**0.105**
SPECIMEN 2									
#170	0.090	833.14	783.14	50.00	549.91	532.26	17.65	35.30	
#140	0.106	831.26	781.26	50.00	533.39	532.26	1.13	2.26	**0.105**
SPECIMEN 3									
#170	0.090	838.68	788.68	50.00	531.74	527.12	4.62	9.24	
#140	0.106	836.54	786.54	50.00	527.59	527.12	0.47	0.94	**0.098**
SPECIMEN 4									
#170	0.090	828.50	778.50	50.00	552.09	525.24	26.85	53.70	
#140	0.106	826.50	776.50	50.00	527.27	525.24	2.03	4.06	**0.106**
SPECIMEN 5									
#170	0.090	837.92	787.92	50.00	541.51	527.35	14.16	28.32	
#140	0.106	835.92	785.92	50.00	528.34	527.35	0.99	1.98	**0.104**

AVERAGE AOS @ 5% PASSING, mm 0.103
AVERAGE AOS, US STD. SIEVE SIZE **#140**



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INTEGRITY IN TESTING

CONFORMANCE TEST RESULTS

CLIENT: JOYCE ENGINEERING, INC.
CLIENT PROJECT: WHITE OAK MSW LANDFILL
PHASES 3 & 4
PROJECT NO.: L09101-07
LAB ID NO.: L09107-07-01
MATERIAL: SKAPS TN 220-2-8 GEOCOMPOSITE
ROLL NO: 325410001

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
PLY ADHESION	D 7005 SIDE "A"	MD-lb/in	2.3	5.6	6.5	2.0	2.0	**3.66**	2.182
	SIDE"B"	MD-lb/in	0.5	2.1	2.2	2.5	2.0	**1.86**	0.764

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INTEGRITY IN TESTING

TRANSMISSIVITY TEST RESULTS

ASTM D 4716

CLIENT: JOYCE ENGINEERING, INC..
PROJECT: WHITE OAK MSW LANDFILL PHASES 3 &4
PROJECT NO.: L09101-07
MATERIAL: SKAPS TN 220-2-8 GEOCOMPOSITE

LAB I.D. NO.: L09101-07-01
ROLL NO.: 325410001

PLATE
TEST SECTION: SKAPS TN 270-2-8 GEOCOMPOSITE
PLATE

10,000 psf NORMAL COMPRESSIVE STRESS

REPL.	ELAPSED TIME (hrs)	MANOMETERS RES. (in)	MANOMETERS WEIR (in)	HYDR. GRAD.	COLLECTION DATA VOLUME (ml)	COLLECTION DATA TIME (sec.)	WATER TEMP °C	AVERAGE FLOW RATE (l/s-m)	AVERAGE FLOW RATE (gpm/ft)	CALCULATED TRANSMISSIVITY (m2/sec)
1	0.25	1.50	0.30	0.10	595 595 590	90.0 90.0 90.0	19.1	2.15E-02	0.104	**2.15E-04**
2	0.25	1.50	0.30	0.10	780 780 780	90.0 90.0 90.0	19.0	2.83E-02	0.137	**2.83E-04**
							SAMPLE AVERAGE:	2.49E-02	0.120	**2.49E-04**

CHECKED BY: BF DATE: 12-7-09

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\\GEOSERVER\Data Drive\Synthetics\2009 SYNTHETICS\[L09101-07-01 TRANS WHITE OAK.xls]REP-' L09101-07 12/7/2009

Appendix V

Appendix V – Field Reports and Logs

Appendix V A – Construction Daily Log

Day: Wednesday
Date: 06.17.09
Log No.: 1
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 12:00 PM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Enter name of other firms on site	Enter any other parties on site

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 70/pm 92
Contractor's Equipment:	Enter all contractors equipment on site		
Contractor's Personnel:	Enter number of laborers, operators, etc.		

Description of Daily Activities & Events

- I traveled to job site to deliver lab equipment for project.
- Arrived on site at 12:00 pm and met with Keith Vess of Thalle and Roy Alexander,Dave Pasko and Allen Makey of McGill Associates for a over view of the clearing and grubbing operation which has been in progress since 06.15.09.

Prepared By: Al Lambeth **Date:** 06.17.09 **Checked By:** MM **Date:** 6-30-09

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Day:	**Thursday**
Date:	**06.18.09**
Log No.:	**2**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
High Country Hydroseeding,Inc	Enter any other parties on site

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 70/pm 92

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks,1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,1 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 7 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.

- Arrived on site at 7:00 am and met with Keith Vess of Thalle to obtain soil samples from the onsite borrow area. Contractor continued the clearing and grubbing operation that began on 06.15.09 to be completed by 06.20.09. Contractor excavated in the borrow area to a total depth of 18'. I obtained 5 samples for testing from various depths of the excavation as listed below:

  Sample #1: Surface
  Sample #2: -0' to -6' blended sample
  Sample #3: -6' to -12' blended sample
  Sample # 4: - 12' to -18' blended sample
  Sample # 5: -18'

  Test to be preformed as listed below:

  Standard Proctor: ASTM D698
  Natural Moisture Content: ASTM D2216

  Proctor samples are in five gallon buckets.
  Natural moisture content samples are in one gallon plastic bags.

Prepared By: Al Lambeth **Date:** 06.18.09 **Checked By:** MMS **Date:** 6-30-09

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Day:	**Friday**
Date:	**06.18.09**
Log No.:	**3**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 10:00 AM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
High Country Hydroseeding,Inc	Enter any other parties on site

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 70/pm 92

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks,1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,1 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 7 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Contractor continued the clearing and grubbing operation that began on 06.15.09 to be completed by 06.20.09.
- Transported samples obtained on 06.18.09 to Raleigh office for lab test to be preformed on soil samples listed below:
  Sample #1: Surface
  Sample #2: -0' to -6' blended sample
  Sample #3: -6' to -12' blended sample
  Sample # 4: - 12' to -18' blended sample
  Sample # 5: -18'
- Test to be preformed as listed below:

  Standard Proctor: ASTM D698
  Natural Moisture Content: ASTM D2216

  Proctor samples are in five gallon buckets.
  Natural moisture content samples are in one gallon plastic bags.

Prepared By: Al Lambeth **Date:** 06.19.09 **Checked By:** MDS **Date:** 6-30-09

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Day:	**Monay**
Date:	**06.22.09**
Log No.:	**4**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 3:00 PM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
High Country Hydroseeding,Inc	

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 70/pm 92

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks,1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,1 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 7 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Conractor continued excavating for the tempoary sediment basin also removing chain link fence and post.

  Transported nuclear density gauge and the remander of lab equipment to job site.

Prepared By: Al Lambeth **Date:** 06.22.09 **Checked By:** MAPS **Date:** 6-30-09

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Day:	**Tuesday**
Date:	**06.23.09**
Log No.:	**5**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
High Country Hydroseeding,Inc	

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 85

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks,1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,1 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 7 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Conractor continued excavating for the tempoary sediment basin also removing chain link fence and post.
- Contractor began undercut operation of unsuitable material at sediment basin 2. Area undercut to a firm base prior to placement of a 4' bridge lift.
- Undercut area measured 109' x 54' x 2' / 27 = 436 cubic yards of unsuitable material removed today.

Prepared By: Al Lambeth **Date:** 06.23.09 **Checked By:** MMS **Date:** 6-30-09

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Day:	**Wednesday**
Date:	**06.24.09**
Log No.:	**6**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 83

Contractor's Equipment: 3 A 35 D Volvoe Offroad trucks, 1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,2 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle 1 A 40 E Volvoe Offroad truck, 1 D8R Caterpiller Dozer w/Ripper, 1 CS653 Smoothedrum roller, 1 330C Caterpiller Trackhoe

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 7 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Contractor continued excavating for sediment basin #5 and stockpiling the rocky material excavated in undercut area to be used for the bridge lift once unsuitable materials is undercut to a firm base.

Prepared By: Al Lambeth **Date:** 06.24.09 **Checked By:** MBS **Date:** 6-30-09

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Day:	**Thursday**
Date:	**06.25.09**
Log No.:	**7**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 6:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 87

Contractor's Equipment: 3 A 35 D Volvoe Offroad trucks, 1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,2 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle 1 A 40 E Volvoe Offroad truck, 1 D8R Caterpiller Dozer w/Ripper, 1 CS653 Smoothedrum roller, 1 330C Caterpiller Trackhoe

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 9 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Conractor continued excavating for sediment basin #5 and stockpiling the rocky material excavated in undercut area to be used for the bridge lift once unsuitable materials is undercut to a firm base.
- Contractor continued undercut operation of unsuitable material from sediment basin #2 to a firm base in late pm today.

Prepared By: Al Lambeth **Date:** 06.25.09 **Checked By:** MBS **Date:** 6-30-09

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Day:	**Friday**
Date:	**06.26.09**
Log No.:	**8**
Page:	**1**

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Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 6:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 63/pm 88

Contractor's Equipment: 3 A 35 D Volvoe Offroad trucks, 1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,2 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle 1 A 40 E Volvoe Offroad truck, 1 D8R Caterpiller Dozer w/Ripper, 1 CS653 Smoothedrum roller, 1 330C Caterpiller Trackhoe

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 9 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Conractor continued excavating for sediment basin #5 and stockpiling the rocky material excavated in undercut area to be used for the bridge lift once unsuitable materials is undercut to a firm base.
- Contractor continued undercut operation of unsuitable material from sediment basin #2 to a firm base prior to placement of 4' bridge lift of rocky material excavated from sediment basin #5
- Undercut quanities of unsuitable material excavated from sediment basin #2 listed below:

  Section # 2: 130' x 50' x 4' / 27 = 962.96 cubic yards.
  Section # 3: 130' x 60' x 3' / 27 = 866.67 cubic yards.

- Obtained 6 samples of clay/silt to be used for the clay liner, to be tested for conformance specifications for permability testing. BLE's Andrew A. Colby was on site to determine the test pit locations for testing of clay liner material.

Prepared By: Al Lambeth **Date:** 06.26.09 **Checked By:** MPS **Date:** 6-30-09

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Day:	**Saturday**
Date:	**06.27.09**
Log No.:	**9**
Page:	**1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering,LTD	**Client Contact:**	Hannu
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 63/pm 88

Contractor's Equipment: 3 A 35 D Volvoe Offroad trucks, 1 345B Caterpiller Trackhoe, 1 D6R Caterpiller Dozer, 1 D5M Caterpiller Dozer,2 PC 300 LG Komatsu Trackhoe, 1 IT 28G Caterpiller Loader/fork-lift, 1 CP56 Caterpiller Sheepsfoot rolle 1 A 40 E Volvoe Offroad truck, 1 D8R Caterpiller Dozer w/Ripper, 1 CS653 Smoothedrum roller, 1 330C Caterpiller Trackhoe

Contractor's Personnel: 1 Assistant Super.,2 Foremen,1 Grade checker & 9 Operators

Description of Daily Activities & Events

- I traveled to job site and met with the conractor and discussed the scope of work scheduled for today.
- Conractor continued excavating for sediment basin #5 and stockpiling the rocky material excavated in undercut area to be used for the bridge lift once unsuitable materials is undercut to a firm base.
- Contractor continued undercut operation of unsuitable material from sediment basin #2 to a firm base prior to placement of 4' bridge lift of rocky material excavated from sediment basin #5
- Undercut quanities of unsuitable material excavated from sediment basin #2 listed below:

  Section # 4: 100' x 110' x 8' / 27 = 3259.26 cubic yards.
- Transported 6 samples of soil obtained from test pits on 06.26.09 for proctor, classifications and remolded permeability testing in the Raleigh lab.
- Samples are as listed below:
  CL#1: 0'-7' blended
  CL#2: 0-6' blended
  CL#3: 0-6' blended
  CL#4: 0-5' blended
  CL#5: 0-5' blended
  CL#6: 0-4' blended

Prepared By: Al Lambeth **Date:** 06.27.09 **Checked By:** MDS **Date:** 6-30-09

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Day: Monday
Date: 06.29.09
Log No.: 10
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 6:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy warm and humid **Temperature:** am 63/pm 84

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, 2 PC300LG Komatsu Trackhoes, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A 40 E Volvo Offroad truck, D8R CAT Dozer w/Ripper, 330C CAT Trackhoe, CS 563C CAT Smoothdrum roller

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 9 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.

- Thalle continued undercutting unsuitable material from the area below the dam at sediment basin #2 to a firm base prior to placement of a 4' bridge lift of rocky material excavated from the cut area.

  The undercut quanity for today's excavation is as listed below:

  Section #5: 130' x 60' x 3' / 27= 866.67 cubic yards of unsuitable material removed today.
  Section #6: 100' x 40' x 3' / 27= 444.44 cubic yards of unsuitable material removed today.

  Total undercut quanity for today is 1311.11 cubic yards of unsuiable material removed today.

Prepared By: A. Lambeth **Date:** 06.29.09 **Checked By:** NJM **Date:** 7-7-09

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Day: Tuesday
Date: 06.30.09
Log No.: 11
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 6:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 85

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC 300 LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 9 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued undercutting unsuitable material below sediment basin #2 down to a firm base prior to placement of a 4 foot bridge lift of rocky material excavated from sediment basin #5.

Section #7: 35' x 40' x 3' / 27 = 155.56 cubic yards of unsuitable material removed in this section.
Section #8: 80' x 80' x 3' / 27 = 711.11 cubic yards of unsuitable material removed in this section.
Section #9: 50'w x 75'l x 20'w x 3= (50' + 20' / 2) x 75' x 3' /27= 291.67 cubic yards of unsuitable removed in this section.
All undercut operations and bridge lift placement completed today.

Total quanity of undercut today is 1,158.34.

Prepared By: A. Lambeth **Date:** 06.30.09 **Checked By:** NJM **Date:** 7-7-09

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Day: Wednesday
Date: 07.01.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot **Temperature:** am 53/pm 85

Contractor's Equipment: 3 A 35 D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300 LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothedrum roller, 1 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 9 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued excavating sediment basin #5 and continued clearing for sediment basin #4.
- Mr. Lambeth attended the monthly job progress meeting on-site with Thalle, McGill Associates, Haywood County, and Joyce Engineering representatives.

Prepared By: A. Lambeth **Date:** 07.01.09 **Checked By:** NJM **Date:** 7-7-09

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Day: Thursday
Date: 07.02.09
Log No.: 13
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
McGill Associates	Allen Mackey

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D,1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 9 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began excavation of sediment basin #4. Clay material was stockpiled in the clay liner stockpile, and structural fill material was placedc in the designated structural fill stockpile area.
- Thalle also began placing drain pipe from the east end of the cell into sediment basin #5 area to allow drainage of rain water from the lower end of the cell during construction.

Prepared By: A. Lambeth **Date:** 06.25.09 **Checked By:** JJM **Date:** 7-7-09

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Day: Friday
Date: 07.03.09
Log No.: 14
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 8

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued excavating for sediment basin #4. Excavated clay material was stockpiled in the clay liner stockpile area, and structural fill material was placed in the designated structural fill stockpile area.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.03.09 **Checked By:** NJM **Date:** 7-7-09

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Day: Monday
Date: 07.06.09
Log No.: 14
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy warm and humid **Temperature:** am 59/pm 82

Contractor's Equipment: 3 Volvo A35D Offroad trucks,345B CAT Trackhoe,D6R CAT Dozer,A25D Volvo
D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller
A 40 E Volvo Offroad truck, D8R CAT Dozer w/Ripper, 330C CAT Trackhoe, CS 563C CAT Smoothdrum roller

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 12 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued excavating for sediment basin #4 and stockpiling the material in designated stockpiles for structural clay liner material.

Prepared By: A. Lambeth **Date:** 07.06.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Tuesday
Date: 07.07.09
Log No.: 15
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 12:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 85

Contractor's Equipment: 3 Volvo A 35 D Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC 300 LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller,A40E Volvo A25D Volvo Offrd.tk.,CS653 Smoothedrum roller,D8R Cat Dozer w/Ripper

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 12 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued excavating for sediment basin #4 and stockpiling the excavated material in designated stockpiles for structural fill and clay liner material.
- Mr. Lambeth obtained 6 soil samples from the structural fill stockpile and transported them to Raleigh for laboratory testing.

Prepared By: A. Lambeth **Date:** 07.07.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Wednesday
Date: 07.08.09
Log No.: 16
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot	**Temperature:**	am 53/pm 85

Contractor's Equipment: 3 A 35 D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300 LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothedrum roller, 1 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 9 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began placing structural fill in the cell and compacting with CP56 Caterpiller sheepsfoot roller to obtain the required density of 95% per ASTM D698 standard proctor test results.
- Contractor placed and compacted 5600 cubic yards of structural fill in the cell bottom and SE slope of the cell today.
  Mr. Lambeth performed one nuclear density test and one drive cylinder density test on compacted structural fill placed today. All tests preformed met or exceeded the required compaction of 95% of ASTM D698A standard proctor results as required per specifications.

Prepared By: A. Lambeth **Date:** 07.08.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Thursday
Date: 07.09.09
Log No.: 17
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
McGill Associates	Allen Mackey

Weather Conditions: Cloudy w/Rain **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D,1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker & 9 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle completed all erosion and sediment control procedures in and around sediment basin #4 and perimeter silt fence. Additonally, Rip-rap was installed as indicated in the plan details for erosion control. Check dams were also installed in proposed drainage ditches.
-

Prepared By: A. Lambeth **Date:** 07.09.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Friday
Date: 07.10.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 82

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.10.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Saturday
Date: 07.11.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.11.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Monday
Date: 07.13.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued the installation of erosion and sediment control measures at sediment basin #4.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.13.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Tuesday
Date: 07.14.09
Log No.: 21
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Joyce Engineering,Inc	Hannu Kemppinen & Evan
BLE	Andrew Colby
McGill Associates	Alan Mackey

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle completed the erosion and sediment control work at sediment basin #4.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.14.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Wednesday
Date: 07.15.09
Log No.: 22
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Joyce Engineering,Inc	Hannu Kemppinen & Evan
BLE	Andrew Colby
McGill Associates	Alan Mackey

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle began installation of the underdrain system as indicated on the drawing details. Thalle installed 360' of 8" perforated HDPE pipe.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.15.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Thursday
Date: 07.16.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Joyce Engineering,Inc	Hannu Kemppinen & Evan
BLE	Andrew Colby
McGill Associates	Alan Mackey

Weather Conditions: Cloudy w/Rain **Temperature:** am 55/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled work for today due to rain.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.16.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Friday
Date: 07.17.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Joyce Engineering,Inc	Hannu Kemppinen & Evan
BLE	Andrew Colby
McGill Associates	Alan Mackey

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued installation of the underdrain system as indicated in the drawing details. Thalle installed 520' of 8" perforated HDPE pipe.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.17.09 **Checked By:** NJM **Date:** 7-23-09

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Day: Saturday
Date: 07.18.09
Log No.: 25
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title
Joyce Engineering,Inc	Hannu Kemppinen & Evan
BLE	Andrew Colby
McGill Associates	Alan Mackey

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.18.09 **Checked By:** NJM **Date:** 7-23-09

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Client:	Joyce Engineering, Inc.
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

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Report Number :	**DCFDR-01**
Date (s) :	07.08.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-01
Nuclear Test Number :	NDSF-01
Location:	ACRE 1
Depth (ft):	4'
Date :	07.08.09

Mold

Cylinder ID	1
Weight of Cylinder (lbs.)	1.33
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.24
Wt. of Cylinder (lbs.)	1.33
Wt. of WS	3.91
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB10
Wt. of Tare & WS (gm)	230.60
Wt. of Tare & DS (gm)	202.40
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	28.20
Wt. of DS (gm)	195.60
Wet Density (pcf):	118.5
Moisture Content (%):	**14.4**
Dry Density (pcf):	**103.6**

Geotechnics Representative : Al Lambeth Reviewed by: NSM 7-23-09

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Client: Joyce Enginering, Inc.
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Field Density Test Report

Report Number : **FDR-01**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **07.08.09**	Reviewed By : NJM	Date : 7-23-09

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 01	ACRE 1	4'	6"	666-01-01	101.0	20.0	**117.9**	**14.5**	**103.0**	**101.9%**	**95.0%**	The elevation shown is -4' below SG
NDSF 2	ACRE 3	4'	6"	666-01-01	101.0	20.0	**118.7**	**15.9**	**102.4**	**101.4%**	**95.0%**	The elevation shown is -4' below SG

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Day: Monday
Date: 07.20.09
Log No.: 25
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the subgrade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.20.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Tuesday
Date: 07.21.09
Log No.: 26
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.21.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Wednesday
Date: 07.22.09
Log No.: 27
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.22.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Thursday
Date: 07.23.09
Log No.: 28
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill material. This operation is being excavated to subgrade elevation of the perimeter road around the cell. In the late afternoon, Thalle began placement of structural fill material at the north end of the cell where the perimeter access road crosses and ties into the existing access road.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.23.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Friday
Date: 07.24.09
Log No.: 29
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued placement of structural fill material at the north end of the cell where the perimeter access road crosses and ties into the existing access road. The contractor placed and compacted 5,000 cubic yards of structural fill in this area today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 1 nuclear density gauge test on compacted structural fill placed today. The test met required specifications of 95% compaction for ASTM D698 Standard proctor results.
- I informed the contractor of the test results, and they continued to place structural fill material in the same location.

Prepared By: A. Lambeth **Date:** 07.24.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Saturday
Date: 07.25.09
Log No.: 30
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 2:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle was working slopes by walking them in with the D8R CAT Dozer, as well as performing general clean-up of all areas.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.25.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Monday
Date: 07.27.09
Log No.: 31
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 60/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the subgrade elevation of the perimeter access road around the cell. Thalle continued placement of structural fill material at the north end of the cell where the perimeter access road crosses and ties into the existing access road. The contractor placed and compacted 3,000 cubic yards of structural fill in this area today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.27.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Tuesday
Date: 07.28.09
Log No.: 32
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 76

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the subgrade elevation of the perimeter access road around the cell. Thalle continued placement of structural fill material at the north end of the cell where the perimeter access road crosses and ties into the existing access road. The contractor placed and compacted 3,000 cubic yards of structural fill in this area today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.28.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Wednesday
Date: 07.29.09
Log No.: 33
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers **Temperature:** am 60/pm 74

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the subgrade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.29.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Thursday
Date: 07.30.09
Log No.: 34
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers **Temperature:** am 60/pm 74

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the subgrade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.30.09 **Checked By:** NJM **Date:** 8-14-09

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Day: Friday
Date: 07.31.09
Log No.: 35
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cloudy w/ showers &	**Temperature:**	am 60/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the subgrade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.31.09 **Checked By:** NJM **Date:** 8-14-09

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INTEGRITY IN TESTING

Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Field Density Test Report

Report Number :	**FDR-01**	Geotechnics Representative :	Al Lambeth	Page :	1 of 1
Date (s) :	**07.24.09,07.27.09**	Reviewed By :	N. Melaro	Date :	8-14-09

Contractor :	Thalle	Borrow Source :	On-site

Compaction Equipment :	CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 1	ACRE 1	4'	6"	666-01-01	101.0	20.0	**117.9**	**14.5**	**103.0**	**101.9%**	**95.0%**	The elevation shown is -4' below SG
NDSF 2	ACRE 3	4'	6"	666-01-01	101.0	20.0	**118.7**	**15.9**	**102.4**	**101.4%**	**95.0%**	The elevation shown is -4' below SG

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

geotechnics
INTEGRITY IN TESTING

Report Number :	**DCFDR-01**
Date (s) :	07.08.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-01
Nuclear Test Number :	NDSF-01
Location:	ACRE 1
Depth (ft):	4'
Date :	07.08.09

Mold

Cylinder ID	1
Weight of Cylinder (lbs.)	1.33
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.24
Wt. of Cylinder (lbs.)	1.33
Wt. of WS	3.91
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB10
Wt. of Tare & WS (gm)	230.60
Wt. of Tare & DS (gm)	202.40
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	28.20
Wt. of DS (gm)	195.60
Wet Density (pcf):	118.5
Moisture Content (%):	**14.4**
Dry Density (pcf):	**103.6**

Geotechnics Representative : Al Lambeth Reviewed by: NJM 8-14-09

Day: Monday
Date: 08.03.09
Log No.: 36
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.03.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Tuesday
Date: 08.04.09
Log No.: 37
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By:	A. Lambeth	**Date:**	08.04.09	**Checked By:**	NJM	**Date:**	9/9/2009

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Day: Wednesday
Date: 08.05.09
Log No.: 38
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.05.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Thursday
Date: 08.06.09
Log No.: 39
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.06.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Friday
Date: 08.07.09
Log No.: 40
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 07.24.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Saturday
Date: 08.08.09
Log No.: 41
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.08.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Monday
Date: 08.10.09
Log No.: 42
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.10.09 **Checked By:** NJM **Date:** 9/9/2009

Day: Tuesday
Date: 08.11.09
Log No.: 43
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 76

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.

- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
  Thalle undercut unsuitable material from the bottom of the cell in the south west section of cell.
  24' x 90' x 54' = 300 cubic yards.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.11.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Wednesday
Date: 08.12.09
Log No.: 44
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers **Temperature:** am 60/pm 74

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.

- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
  Thalle continued excavating sediment basins # 5 and # 7 today and stockpiling the material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.12.09 **Checked By:** NJM **Date:** 9/9/2009

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Day: Thursday
Date: 08.13.09
Log No.: 45
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cloudy w/ showers	**Temperature:**	am 60/pm 74

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By:	A. Lambeth	**Date:**	08.13.09	**Checked By:**	NJM	**Date:**	9/9/2009

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Day: Friday
Date: 08.14.09
Log No.: 46
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers & Rain **Temperature:** am 60/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.14.09 **Checked By:** NJM **Date:** 9/9/2009

2200 Westinghouse Boulevard • Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460

Day: Saturday
Date: 08.15.09
Log No.: 47
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers & Rain **Temperature:** am 60/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to the sub grade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.15.09 **Checked By:** NJM **Date:** 9/10/2009

2200 Westinghouse Boulevard • Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460

Day: Monday
Date: 08.17.09
Log No.: 48
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.17.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Tuesday
Date: 08.18.09
Log No.: 49
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.18.09 **Checked By:** NJM **Date:** 9/10/2009

2200 Westinghouse Boulevard • Suite 103 • Raleigh, NC 27604 • Phone (919) 876-0405 • Fax (919) 876-0460

Day: Wednesday
Date: 08.19.09
Log No.: 50
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.19.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Thursday
Date: 08.20.09
Log No.: 51
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.20.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Friday
Date: 08.21.09
Log No.: 52
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.21.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Monday
Date: 08.24.09
Log No.: 53
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.24.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Tuesday
Date: 08.25.09
Log No.: 54
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 60/pm 76

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.25.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Wednesday
Date: 08.26.09
Log No.: 55
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers **Temperature:** am 60/pm 74

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.

- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
  Thalle began to excavate the remaining material in sediment basins #5 and #7 and stockpiling it in the structural fill stockpile today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.26.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Thursday
Date: 08.27.09
Log No.: 56
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers **Temperature:** am 60/pm 74

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.

- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
  Thalle continued excavation of material from sediment basins #5 and #7 and stockpiling of the material in the structural fill stockpile.

- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.27.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Friday
Date: 08.28.09
Log No.: 57
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ showers & Rain **Temperature:** am 60/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.

- Thalle continued sixty foot cut and hauling material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to sub grade elevation of the perimeter access road around the cell.
  Thalle continued excavation of material from sediment basins #5 and #7 and stockpiling the material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.28.09 **Checked By:** NJM **Date:** 9/10/2009

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Day: Monday
Date: 08.31.09
Log No.: 58
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 08.31.09 **Checked By:** MMS **Date:** 10-20-09

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Day: Tuesday
Date: 09.01.09
Log No.: 59
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 8:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of material from sediment basins #5 & #7 and stockpiling the material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Thalle constructed two test pads for clay liner today.
  A. Lambeth performed 8 nuclear density tests on each test pad and performed 2 drive cylinder tests on each test pad. Additionally, 8 shelby tube samples (w/ spare at each location) were collected for permeability testing.

Prepared By: A. Lambeth **Date:** 09.01.09 **Checked By:** MM **Date:** 11-20-09

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Day: Wednesday
Date: 09.02.09
Log No.: 60
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of material from sediment basins #5 & #7 and stockpiling material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

A. Lambeth transported the shelby tubes obtained from the test pads to the Raleigh office for permeability testing. A sample of the stockpile material used for the test pads was also delivered for standard proctor testing.

Prepared By: A. Lambeth **Date:** 09.02.09 **Checked By:** MAB **Date:** 10-20-09

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Day: Thursday
Date: 09.03.09
Log No.: 61
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of sediment basins #5 & #7 and stockpiling the material in the structural fill stockpile. Thalle is also excavating the west side of the cell to designed elevations and stockpiling excavated material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.03.09 **Checked By:** MPI **Date:** 10-30-09

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Day: Friday
Date: 09.04.09
Log No.: 62
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 83

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of the west side of the cell to design elevations.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.04.09 **Checked By:** MDS **Date:** 10-20-09

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-01**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **09.01.09**	Reviewed By : AMB	Date : 10-20-09

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment :	CP 56 Caterpiller Sheepsfoot roller and CS563 Smoothdrum roller

Test Number		Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
						MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
CLTP01	1	Test Pad 01	Lift 1	6"	666-04-01	100.5	21.3	**123.2**	**26.9**	**97.1**	**96.6%**	**95.0%**	Test Pad 01 L1
CLTPO1	2	Test Pad 01	Lift 1	6"	666-04-01	100.5	21.3	**124.5**	**25.2**	**99.4**	**98.9%**	**95.0%**	ST 01 & DC 01
CLTPO1	3	Test Pad 01	Lift 2	6"	666-04-01	100.5	21.3	**124.8**	**26.3**	**98.8**	**98.3%**	**95.0%**	ST 03
CLTPO1	4	Test Pad 01	Lift 2	6"	666-04-01	100.5	21.3	**123.0**	**27.0**	**96.9**	**96.4%**	**95.0%**	Test Pad 01 L2
CLTPO1	5	Test Pad 01	Lift 3	6"	666-04-01	100.5	21.3	**122.8**	**26.7**	**96.9**	**96.4%**	**95.0%**	Test Pad 01 L3
CLTP01	6	Test Pad 01	Lift 3	6"	666-04-01	100.5	21.3	**120.4**	**23.0**	**97.9**	**97.4%**	**95.0%**	ST 05 & DC 03
CLTP01	7	Test Pad 01	Lift 4	6"	666-04-01	100.5	21.3	**124.5**	**21.9**	**102.1**	**101.6%**	**95.0%**	ST 07
CLTP01	8	Test Pad 01	Lift 4	6"	666-04-01	100.5	21.3	**124.4**	**24.6**	**99.8**	**99.3%**	**95.0%**	Test Pad 01 L4
CLTPO2	1	Test Pad 02	Lift 1	6"	666-04-01	100.5	21.3	**125.7**	**25.4**	**100.2**	**99.7%**	**95.0%**	ST 02 & DC 02
CLTPO2	2	Test Pad 02	Lift 1	6"	666-04-01	100.5	21.3	**122.7**	**26.5**	**97.0**	**96.5%**	**95.0%**	Test Pad 02 L1
CLTPO2	3	Test Pad 02	Lift 2	6"	666-04-01	100.5	21.3	**123.6**	**26.9**	**97.4**	**96.9%**	**95.0%**	Test Pad 02 L2
CLTPO2	4	Test Pad 02	Lift 2	6"	666-04-01	100.5	21.3	**124.9**	**26.9**	**98.4**	**97.9%**	**95.0%**	ST 04
CLTPO2	5	Test Pad 02	Lift 3	6"	666-04-01	100.5	21.3	**124.2**	**23.5**	**100.6**	**100.1%**	**95.0%**	ST 06 & DC 04
CLTPO2	6	Test Pad 02	Lift 3	6"	666-04-01	100.5	21.3	**121.8**	**25.3**	**97.2**	**96.7%**	**95.0%**	Test Pad 02 L3
CLTPO2	7	Test Pad 02	Lift 4	6"	666-04-01	100.5	21.3	**121.7**	**25.3**	**97.1**	**96.6%**	**95.0%**	Test Pad 02 L4
CLTPO2	8	Test Pad 02	Lift 4	6"	666-04-01	100.5	21.3	**122.4**	**24.5**	**98.3**	**97.8%**	**95.0%**	ST 08

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Report Number : **CCL-01**
Date (s) : 09.01.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-01	DC-02	DC-03	DC-04
Nuclear Test Number :	CLTP01	CLTP02	CLTP01	CLTP02
Location:	Test Pad 01	Test Pad 02	Test Pad 01	Test Pad 02
Depth (ft):	Lift 1	Lift 1	Lift 3	Lift 3
Date :	09.01.09	09.01.09	09.01.09	09.01.09
Mold				
Cylinder ID	1	1	1	1
Weight of Cylinder (lbs.)	1.33	1.33	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.47	5.49	5.33	5.45
Wt. of Cylinder (lbs.)	1.33	1.33	1.33	1.33
Wt. of WS	4.14	4.16	4.00	4.12
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	JB10	JB-04	JB-06	JB-07
Wt. of Tare & WS (gm)	285.94	257.70	273.68	272.17
Wt. of Tare & DS (gm)	230.41	207.84	224.27	224.14
Wt. of Tare (gm)	6.80	6.80	6.80	6.80
Wt. of Water (gm)	55.53	49.86	49.41	48.03
Wt. of DS (gm)	223.61	201.04	217.47	217.34
Wet Density (pcf):	125.5	126.0	121.2	124.8
Moisture Content (%):	**24.8**	**24.8**	**22.7**	**22.1**
Dry Density (pcf):	**100.5**	**101.0**	**98.8**	**102.2**

Geotechnics Representative : Al Lambeth

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Day: Monday
Date: 09.07.09
Log No.: 63
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** **Departed:**
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy Hot humid	**Temperature:**	am 55/pm 75

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- HOLIDAY no work on site today

Prepared By: A. Lambeth **Date:** 09.07.09 **Checked By:** MMS **Date:** 10-20-09

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Day: Tuesday
Date: 09.01.09
Log No.: 64
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of material from sediment basins #5 & #7 and stockpiling the material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.08.09 **Checked By:** MMS **Date:** 10-20-09

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Day: Wednesday
Date: 09.09.09
Log No.: 65
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 75

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of material from sediment basins #5 & #6 and stockpiling material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.09.09 **Checked By:** MMK **Date:** 10-20-09

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Day: Thursday
Date: 09.10.09
Log No.: 66
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued the sixty foot cut and hauling of material to designated stockpiles for clay liner material or structural fill materials. This operation is being excavated to subgrade elevation of the perimeter road around the cell. Thalle continued excavation of sediment basins #5 & #6 and stockpiling the material in the structural fill stockpile. Thalle is also excavating the west side of the cell to design elevations and stockpiling material in the structural fill stockpile.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.10.09 **Checked By:** MWS **Date:** 10-20-09

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Day: Friday
Date: 09.11.09
Log No.: 67
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle began placing clay in preparation for GCL installation for cell construction. Thalle placed approximately 9" of clay material on the east slope of the Phase 3 cell in an area approximately 100' x 300'. The clay was compacted with a CP56 Cat Sheepsfoot roller and a CS563 Cat Smoothdrum roller for Lift #1, Acre #1.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- A. Lambeth preformed six nuclear density tests and one drive cylinder test on the compacted clay liner. Additionally, two Shelby tube samples were collected for permeability testing. All density test met or exceeded the re 95% of standard proctor results per ASTM D698 Method A for Standard Proctor. See CCL-02
  The contractor was informed of all test results performed today.

Prepared By: A. Lambeth **Date:** 09.11.09 **Checked By:** MPA **Date:** 10-20-09

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Day: Monday
Date: 09.14.09
Log No.: 68
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 54/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued placing clay in preparation for GCL installation for cell construction. Thalle placed approximately 6" of clay material on the east slope of the Phase 3 cell in an area approximately 100' x 400'. The clay was then compacted with a CP56 Cat Sheepsfoot roller and a CS563 Cat Smoothdrum roller for Lift #2, Acre #1. Thalle also began placing approximately 9" of clay material for Lift #1, Acre #2.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- A. Lambeth preformed six nuclear density tests and one drive cylinder test on compacted clay liner. Two Shelby tube samples were collected for permeability testing. All density tests performed met or exceeded the required compaction of 95% of standard proctor results per ASTM D698 Standard Proctor. See CCL-02 The contractor was informed of all test results performed today.

Prepared By: A. Lambeth **Date:** 09.14.09 **Checked By:** MAPS **Date:** 10-20-09

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Day: Tuesday
Date: 09.15.09
Log No.: 69
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy and warm pm	**Temperature:**	am 60/pm 73

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued placing clay in preparation for GCL installation for cell construction. Thalle placed approximately 9" of clay material on the east slope of the Phase 3 cell in an area approximately 100' x 400' and compacted the clay with a CP56 Cat Sheepsfoot roller and a CS563 Cat Smoothdrum roller for Lift #1, Acre #2 and 1/2 of Acre #9, Lift #1. Thalle also began placing approximately 6" of clay material for Lift #3, Acre #1 today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- A. Lambeth performed six nuclear density gauge tests and one drive cylinder on the compacted clay liner. Two Shelby tube samples were collected for permeability testing. All density test performed met or exceeded the required compaction of 95% of standard proctor results per ASTM D698 Method A for Standard Proctor. The contractor was informed of all test results performed today. See CCL-02
- A. Lambeth performed a one point proctor test to verify the density curve being used due to apparent changes in the material. The one point proctor test indicated that the material being placed was the same as lab number 2009-666-02-05 ASTM D698A Standard proctor curve.

Prepared By: A. Lambeth **Date:** 09.15.09 **Checked By:** MMS **Date:** 10-20-09

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Day: Wednesday
Date: 09.16.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cldy w/Rain showers **Temperature:** am 60/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued to compact clay liner material placed in Acre #1, Lift #3 and 1/2 of Acre #9, Lift #1 that was placed on 09.15.09. These areas should be ready for testing on 09.17.09 if weather permits.
  Intermittent rain showers continued throughout the day.
  Thalle continued to place rip-rap in sediment basin #2 and in the drainage ditch to sediment basin #7 today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on drawings.

Prepared By: A. Lambeth **Date:** 09.16.09 **Checked By:** MMS **Date:** 10-20-09

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Day: Thursday
Date: 09.17.09
Log No.: 71
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cldy w/Rain showers **Temperature:** am 60/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- Thalle continued to compact clay liner material placed in Acre #1, Lift #3 and 1/2 of Acre #9, Lift #1 that was placed on 09.15.09. These areas should be ready for testing on 09.18.09 if weather permits. Intermittent rain showers continued throughout the day.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on drawings.

Prepared By: A. Lambeth **Date:** 09.17.09 **Checked By:** MM **Date:** 10-20-09

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Day: Friday
Date: 09.18.09
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Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cldy w/Rain showers	**Temperature:**	am 60/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/ Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the work scheduled for today.
- All work cancelled due to wet site conditions from rain late on 09.17.09 and over night.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on dra

Prepared By: A. Lambeth **Date:** 09.18.09 **Checked By:** [illegible] **Date:** 10-20-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number :	**CCL-02**	Geotechnics Representative :	Al Lambeth	Page :	1 of 1
Date (s) :	**09.11,09.14,09.15.09**	Reviewed By :	MMS	Date :	10-20-09

Contractor :	Thalle	Borrow Source :	On-site stockpiled material from cell excavation

Compaction Equipment :	CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 1	ACRE 1	1	6"	666-05-02	104.6	18.0	**123.2**	**23.8**	**99.5**	**95.1%**	**95.0%**	
NDCL 2	ACRE 1	1	6"	666-05-02	104.6	18.0	**128.5**	**25.6**	**102.3**	**97.8%**	**95.0%**	
NDCL 3	ACRE 1	1	6"	666-05-02	104.6	18.0	**122.0**	**20.0**	**101.7**	**97.2%**	**95.0%**	
NDCL 4	ACRE 1	1	6"	666-05-02	104.6	18.0	**127.4**	**23.6**	**103.1**	**98.5%**	**95.0%**	DC-05 & ST-09
NDCL 5	ACRE 1	1	6"	666-05-02	104.6	18.0	**127.7**	**27.2**	**100.4**	**96.0%**	**95.0%**	
NDCL 6	ACRE 1	1	6"	666-05-02	104.6	18.0	**121.1**	**18.5**	**102.2**	**97.7%**	**95.0%**	
NDCL 7	ACRE 1	2	6"	666-05-02	104.6	18.0	**123.7**	**22.0**	**101.4**	**96.9%**	**95.0%**	
NDCL 8	ACRE 1	2	6"	666-05-02	104.6	18.0	**127.0**	**21.3**	**104.7**	**100.1%**	**95.0%**	DC-06 & ST-10
NDCL 9	ACRE 1	2	6"	666-05-02	104.6	18.0	**123.9**	**22.9**	**100.8**	**96.4%**	**95.0%**	
NDCL 10	ACRE 1	2	6"	666-05-02	104.6	18.0	**121.6**	**21.0**	**100.5**	**96.1%**	**95.0%**	
NDCL 11	ACRE 1	2	6"	666-05-02	104.6	18.0	**119.7**	**20.2**	**99.6**	**95.2%**	**95.0%**	
NDCL 12	ACRE 1	2	6"	666-05-02	104.6	18.0	**123.7**	**22.0**	**101.4**	**96.9%**	**95.0%**	
NDCL 13	ACRE 2	1	6"	666-02-05	98.8	22.0	**114.6**	**21.9**	**94.0**	**95.2%**	**95.0%**	
NDCL 14	ACRE 2	1	6"	666-02-05	98.8	22.0	**113.6**	**20.0**	**94.7**	**95.8%**	**95.0%**	
NDCL 15	ACRE 2	1	6"	666-02-05	98.8	22.0	**113.6**	**21.0**	**93.9**	**95.0%**	**95.0%**	
NDCL 16	ACRE 2	1	6"	666-02-05	98.8	22.0	**114.7**	**20.2**	**95.4**	**96.6%**	**95.0%**	
NDCL 17	ACRE 2	1	6"	666-02-05	98.8	22.0	**117.0**	**23.2**	**95.0**	**96.1%**	**95.0%**	
NDCL 18	ACRE 2	1	6"	666-02-05	98.8	22.0	**114.9**	**19.1**	**96.5**	**97.6%**	**95.0%**	DC-07 & ST-11

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Report Number : **CCL-02**
Date (s) : 09.11.09-09.15.09

Drive Cylinder - ASTM D 2937

Test Information			
Test Number :	DC-05	DC-06	DC-07
Nuclear Test Number :	NDCL-04	NDCL-08	NDCL-18
Location:	ACRE 1	ACRE 1	ACRE 2
Depth (ft):	Lift 1	LIFT 2	LIFT 1
Date :	09.11.09	09.14.09	09.15.09
Mold			
Cylinder ID	1	2	2
Weight of Cylinder (lbs.)	1.33	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033
Specimen			
Wt. of Cylinder & WS (lbs.)	5.46	5.44	5.10
Wt. of Cylinder (lbs.)	1.33	1.33	1.33
Wt. of WS	4.13	4.11	3.77
Cylinder Volume (ft^3)	0.033	0.033	0.033
Moisture / Density			
Tare Number	JB10	JB-06	JB-06
Wt. of Tare & WS (gm)	371.80	353.40	306.40
Wt. of Tare & DS (gm)	303.00	292.20	257.20
Wt. of Tare (gm)	6.80	6.80	6.80
Wt. of Water (gm)	68.80	61.20	49.20
Wt. of DS (gm)	296.20	285.40	250.40
Wet Density (pcf):	125.2	124.5	114.2
Moisture Content (%):	**23.2**	**21.4**	**19.6**
Dry Density (pcf):	**101.6**	**102.6**	**95.4**

Geotechnics Representative : Al Lambeth

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3
Project Number :	2009-666

geotechnics
INTEGRITY IN TESTING

Report Number :	**CCL-02**
Date (s) :	09.15.09

ONE POINT PROCTOR - Method for Soil Identification ASTM D698

Visual Descrpiton : Reddish brown Silty Clay (2009-666-02-05 Lab Sample Number)

Test Information

Test Number :	1pt.-02
Location:	ACRE 2
Depth (ft):	LIFT 1
Date :	09.15.09

Mold

Weight of Mold (lbs.)	4.51
Volume of Mold (ft^3)	0.033

Specimen

Weight of Mold & WS (lbs)	8.35
Weight of Mold (lbs)	4.51
Weight of WS (lbs)	3.84
Volume OF Mold (ft^3)	0.033

Moisture / Density

Tare Number	JB-10
Wt. of Tare & WS (gm)	229.40
Wt. of Tare & DS (gm)	193.80
Wt. of Tare (gm)	6.60
Wt. of Water (gm)	35.60
Wt. of DS (gm)	187.20
Wet Density (pcf)	116.4
Moisture Content %	**19.0**
Dry Density (pcf)	**97.8**

Geotechnics Represenative : Al Lambeth

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Day: Monday
Date: 09.21.09
Log No.: 73
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 53 /pm 63

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Limited work today due to site conditions from weekend Rain and weather conditions today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.21.09 **Checked By:** MDS **Date:** 10-21-09

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Day: Tuesday
Date: 09.22.09
Log No.: 74
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 61 /pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Limited work today due to site conditions from 2 1/2" of Rain during the day and over night.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.22.09 **Checked By:** MPS **Date:** 10-21-09

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Day: Wednesday
Date: 09.23.09
Log No.: 75
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 60 /pm 75

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Work eventually cancelled today due to site conditions. Drying/Site prep perfromed.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.23.09 **Checked By:** MDS **Date:** 10-21-09

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Day: Thursday
Date: 09.24.09
Log No.: 76
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began placing clay for GCL application for cell construction. Thalle placed approxamently 6" of clay material in a area on the east slope of Phase 3 cell approxamently 100' x 300' and compacted with a CP56 Cat. Sheepsfoot roller and a CS563 Cat. Smoothedrum roller for Lift #2,Acre #2 and Lift #2 of 1/2 Acre #9 and compacting for density testing on 09.25.09 in AM.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I preformed 4 nuclear density gauge test on compacted clay liner and 1 drive cylinder test for compaction, also pushed 2 shelby tubes for permability testing. All density test performed passed required compaction of 95% of standard proctor results per ASTM D698 Method A for Standard Proctor.
  I informed contractor of all test results performed today.
  The density test performed today were for 1/2 Acre #9 Lift #1 that was placed last week before the 9.3" of Rain recorded on site by Thalle for the past week.

Prepared By: A. Lambeth **Date:** 09.24.09 **Checked By:** MPS **Date:** 10-21-09

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Day: Friday
Date: 09.25.09
Log No.: 77
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 60 /pm 75

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Work eventually cancelled today due to site conditions from Rain over night .75", will be back on site on Monday 09.28.09
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.25.09 **Checked By:** MMS **Date:** 10-21-09

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number :	**CCL-03**	Geotechnics Representative :	Al Lambeth	Page :	1 of 1
Date (s) :	**9.24.09**	Reviewed By :	MMS	Date :	10-21-09

Contractor :	Thalle	Borrow Source :	On-site stockpiled material from cell excavation

Compaction Equipment :	CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 19	ACRE 9A	1	6"	666-05-02	97.5	23.0	**118.8**	**28.3**	**92.6**	**95.0%**	**95.0%**	
NDCL 20	ACRE 9A	1	6"	666-05-02	97.5	23.0	**120.4**	**28.6**	**93.6**	**96.0%**	**95.0%**	DC-08 & ST-12
NDCL 21	ACRE9A	1	6"	666-05-02	97.5	23.0	**119.4**	**28.4**	**93.0**	**95.4%**	**95.0%**	
NDCL 22	ACRE 9A	1	6"	666-05-02	97.5	23.0	**119.7**	**28.4**	**93.2**	**95.6%**	**95.0%**	
NDCL 23	ACRE 9A	1	6"	666-05-02	97.5	23.0	**123.7**	**33.3**	**92.8**	**95.2%**	**95.0%**	
NDCL 24	ACRE 2	2	6"	666-05-02	97.5	23.0	**120.6**	**32.3**	**91.2**	**93.5%**	**95.0%**	see retest
NDCL 25	ACRE 2	2	6"	666-05-02	97.5	23.0	**115.9**	**32.8**	**87.3**	**89.5%**	**95.0%**	see retest
NDCL 26	ACRE 2	2	6"	666-05-02	97.5	23.0	**113.1**	**33.9**	**84.5**	**86.6%**	**95.0%**	see retest
NDCL 27	ACRE 2	2	6"	666-05-02	97.5	23.0	**117.5**	**28.9**	**91.2**	**93.5%**	**95.0%**	see retest
NDCL 28	ACRE 2	2	6"	666-05-02	97.5	23.0	**119.8**	**31.7**	**91.0**	**93.3%**	**95.0%**	see retest

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client:	Joyce Engineering
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

Geotechnics
INTEGRITY IN TESTING

Report Number :	**CCL-03**
Date (s) :	9.24.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-08
Nuclear Test Number :	NDCL-20
Location:	ACRE 9A
Depth (ft):	LIFT 1
Date :	09.24.09

Mold

Cylinder ID	1
Weight of Cylinder (lbs.)	1.33
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.30
Wt. of Cylinder (lbs.)	1.33
Wt. of WS	3.98
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB-06
Wt. of Tare & WS (gm)	387.00
Wt. of Tare & DS (gm)	304.80
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	82.20
Wt. of DS (gm)	298.00
Wet Density (pcf):	120.6
Moisture Content (%):	**27.6**
Dry Density (pcf):	**94.5**

Geotechnics Representative : Al Lambeth

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Day: Monday
Date: 09.28.09
Log No.: 78
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 60 /pm 75

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- All work cancelled today due to site conditions from Rain over the weekend 3" of rain was measured on site from 09.25.09 to 09.28.09.
  Contractor was pumping standing water from cell to allow material to dry back prior to rolling with the sheepsfoot roller to obtain required compaction for clay liner material.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.28.09 **Checked By:** MMS **Date:** 10-21-09

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Day: Tuesday
Date: 09.29.09
Log No.: 79
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 60 /pm 75

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- All work cancelled today due to site conditions from Rain over the weekend 3" of rain was measured on site from 09.25.09 to 09.28.09.
  Contractor working th material with bulldozer to allow material to dry back prior to rolling with the sheepsfoot roller to obtain required compaction for clay liner material.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 09.29.09 **Checked By:** MRJ **Date:** 10-21-09

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Day: Wednesday
Date: 09.30.09
Log No.: 80
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy & warm **Temperature:** am 60/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued to compact clay liner material placed in Acre #2,Lift #2 and 1/2 of Acre #9, Lift #2 that was placed on 09.24.09 and these areas should be ready for testing on 10.01.09 .
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on drawings.

Prepared By: A. Lambeth **Date:** 09.30.09 **Checked By:** MPS **Date:** 10-21-09

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Day: Thursday
Date: 10.10.09
Log No.: 81
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cldy w/Rain showers **Temperature:** am 60/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued to compact clay liner material placed in Acre #2,Lift #2 and 1/2 of Acre #9, Lift #2 that was placed on 09.24.09. They also began placing lift 3 on both acres noted above after required density testing was completed.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on drawings.

Performed 10 nuclear density gauge test on compacted clay liner for Acre 2,Lift 2 and 1/2 Acre 9,Lift 2, 2 drive cylinders and 2 shelby tubes for permability testing. All density test passed required specifications of 95% standard proctor results.
I informed contractor of all test results performed today. See CCL-04

Prepared By: A. Lambeth **Date:** 10.01.09 **Checked By:** MAS **Date:** 10-21-09

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Day: Friday
Date: 10.02.09
Log No.: 82
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cldy w/Rain showers **Temperature:** am 60/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placing clay liner material for lift 3 on acres 1,acres 2 and 1/2 acre 9 and continued compacting with the CP56 Sheesfoot roller and the CS653 Smoothedrum roller pior to density testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on drawings.

I performed 16 nuclear density gauge test on compacted clay liner for Acre 1, Acre 2, and 1/2 Acre 9 lift 3, 3 drive cylinder test and 3 shelby tubes for permablity testing. All test passed the required specifications of 95% standard proctor curve results. See CCL-04
I informed contractor of all test results performed today.

I transported 7 sets of shelby tubes for permability testing to the lab in Raleigh.

Prepared By: A. Lambeth **Date:** 10.02.09 **Checked By:** MPS **Date:** 10-21-09

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-04**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **10.01,10.02.09**	Reviewed By : MMS	Date : 10-21-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 29	ACRE 2	2	6"	666-05-02	97.5	23.0	**119.3**	**28.8**	**92.6**	**95.0%**	**95.0%**	
NDCL 30	ACRE 2	2	6"	666-05-02	97.5	23.0	**119.3**	**26.7**	**94.2**	**96.6%**	**95.0%**	RETEST #24
NDCL 31	ACRE 2	2	6"	666-05-02	97.5	23.0	**120.0**	**22.5**	**98.0**	**100.5%**	**95.0%**	RETSET # 25
NDCL 32	ACRE 2	2	6"	666-05-02	97.5	23.0	**120.6**	**28.6**	**93.8**	**96.2%**	**95.0%**	RETEST #26
NDCL 33	ACRE 2	2	6"	666-05-02	97.5	23.0	**119.1**	**27.6**	**93.3**	**95.7%**	**95.0%**	RETEST # 27
NDCL 34	ACRE 2	2	6"	666-05-02	97.5	23.0	**120.7**	**26.1**	**95.7**	**98.2%**	**95.0%**	DC-09 & ST-13 RETEST # 28
NDCL 35	ACRE 2	2	6"	666-05-02	97.5	23.0	**118.9**	**28.4**	**92.6**	**95.0%**	**95.0%**	
NDCL 36	ACRE 9A	2	6"	666-05-02	97.5	23.0	**119.9**	**29.3**	**92.7**	**95.1%**	**95.0%**	
NDCL 37	ACRE 9A	2	6"	666-05-02	97.5	23.0	**119.5**	**28.8**	**92.8**	**95.2%**	**95.0%**	
NDCL 38	ACRE 9A	2	6"	666-05-02	97.5	23.0	**116.4**	**25.7**	**92.6**	**95.0%**	**95.0%**	
NDCL 39	ACRE 9A	2	6"	666-02-05	97.5	23.0	**117.7**	**25.5**	**93.8**	**96.2%**	**95.0%**	DC-10 & ST-14
NDCL 40	ACRE 1	3	6"	666-02-05	97.5	23.0	**118.5**	**26.6**	**93.6**	**96.0%**	**95.0%**	DC-11 & ST-15
NDCL 41	ACRE 1	3	6"	666-02-05	97.5	23.0	**117.9**	**26.8**	**93.0**	**95.4%**	**95.0%**	
NDCL 42	ACRE 1	3	6"	666-02-05	97.5	23.0	**118.1**	**24.8**	**94.6**	**97.1%**	**95.0%**	
NDCL 43	ACRE 1	3	6"	666-02-05	97.5	23.0	**120.2**	**27.3**	**94.4**	**96.8%**	**95.0%**	
NDCL 44	ACRE 1	3	6"	666-02-05	97.5	23.0	**118.7**	**27.4**	**93.2**	**95.6%**	**95.0%**	
NDCL 45	ACRE 1	3	6"	666-02-05	97.5	23.0	**123.2**	**28.1**	**96.2**	**98.6%**	**95.0%**	
NDCL 46	ACRE 2	3	6"	666-02-05	97.5	23.0	**120.2**	**27.2**	**94.5**	**96.9%**	**95.0%**	DC-12 & ST-16
NDCL 47	ACRE 2	3	6"	666-02-05	97.5	23.0	**116.4**	**24.5**	**93.5**	**95.9%**	**95.0%**	
NDCL 48	ACRE 2	3	6"	666-02-05	97.5	23.0	**114.5**	**23.3**	**92.9**	**95.2%**	**95.0%**	
NDCL 49	ACRE 2	3	6"	666-02-05	97.5	23.0	**118.2**	**27.6**	**92.6**	**95.0%**	**95.0%**	
NDCL 50	ACRE 2	3	6"	666-02-05	97.5	23.0	**117.8**	**26.8**	**92.9**	**95.3%**	**95.0%**	
NDCL 51	ACRE 2	3	6"	666-02-05	97.5	23.0	**121.4**	**26.3**	**96.1**	**98.6%**	**95.0%**	
NDCL 52	ACRE 9A	3	6"	666-02-05	97.5	23.0	**123.6**	**26.1**	**98.0**	**100.5%**	**95.0%**	DC-13 & ST-17
NDCL 53	ACRE 9A	3	6"	666-05-02	97.5	23.0	**124.0**	**24.9**	**99.3**	**101.8%**	**95.0%**	
NDCL 54	ACRE 9A	3	6"	666-05-02	97.5	23.0	**121.2**	**26.6**	**95.7**	**98.2%**	**95.0%**	
NDCL 55	ACRE 9A	3	6"	666-05-02	97.5	23.0	**122.1**	**28.8**	**94.8**	**97.2%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client: Joyce Engineering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Report Number : **CCL-04**
Date (s) : 10.01-10.02.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-09	DC-10	DC-11	DC-12
Nuclear Test Number :	NDCL-34	NDCL-39	NDCL-40	NDCL-46
Location:	ACRE 2	ACRE 9A	ACRE 1	ACRE 2
Depth (ft):	LIFT 2	LIFT 2	LIFT 3	LIFT 3
Date :	10.01.09	10.01.09	10.02.09	10.02.09
Mold				
Cylinder ID	2	3	2	3
Weight of Cylinder (lbs.)	1.33	1.32	1.33	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.30	5.21	5.25	5.24
Wt. of Cylinder (lbs.)	1.33	1.32	1.33	1.32
Wt. of WS	3.97	3.89	3.92	3.92
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	JB-09	JB-06	JB-06	JB-09
Wt. of Tare & WS (gm)	310.20	326.40	323.80	413.00
Wt. of Tare & DS (gm)	247.80	259.20	258.60	329.80
Wt. of Tare (gm)	6.80	6.80	6.80	6.80
Wt. of Water (gm)	62.40	67.20	65.20	83.20
Wt. of DS (gm)	241.00	252.40	251.80	323.00
Wet Density (pcf):	120.3	117.9	118.7	118.7
Moisture Content (%):	**25.9**	**26.6**	**25.9**	**25.8**
Dry Density (pcf):	**95.6**	**93.1**	**94.3**	**94.4**

Geotechnics Representative : Al Lambeth

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Haywc
Project Number :	2009-666

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INTEGRITY IN TESTING

Report Number :	**CCL-04**
Date (s) :	10.02.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-13
Nuclear Test Number :	NDCL-52
Location:	ACRE 9A
Depth (ft):	LIFT 3
Date :	10.02.09

Mold

Cylinder ID	4
Weight of Cylinder (lbs.)	1.32
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.35
Wt. of Cylinder (lbs.)	1.32
Wt. of WS	4.03
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	JB-10
Wt. of Tare & WS (gm)	341.60
Wt. of Tare & DS (gm)	274.40
Wt. of Tare (gm)	6.80
Wt. of Water (gm)	67.20
Wt. of DS (gm)	267.60
Wet Density (pcf):	122.1
Moisture Content (%):	**25.1**
Dry Density (pcf):	**97.6**

Geotechnics Representative : Al Lambeth

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Day: Monday
Date: 10.05.09
Log No.: 83
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 53 /pm 63

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Work eventually cancelled today due to site conditions from rain during the day and over night.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.05.09 **Checked By:** MM **Date:** 10-21-09

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Day: Tuesday
Date: 10.06.09
Log No.: 84
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 61 /pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Work eventually cancelled today due to site conditions.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.06.09 **Checked By:** MMI **Date:** 10-21-09

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Day: Wednesday
Date: 10.07.09
Log No.: 85
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cloudy w/ Rain	**Temperature:**	am 61 /pm 77

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Work eventually cancelled today due to site conditions.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.07.09 **Checked By:** MPS **Date:** 10-21-09

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Day: Thursday
Date: 10.08.09
Log No.: 86
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy Hot humid **Temperature:** am 55/pm 80

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began placing clay for GCL application for cell construction. Thalle placed approxamently 6" of clay materia Lift #1 and compacted with a CP56 Cat. Sheepsfoot roller and a CS563 Cat Smoothedrum roller.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 3,Lift# 1, 1 drive cylinde set of shelby tubes for permability testing. All density test performed passed the required specifications of 95% of s proctor curve results. See CCL-05
- I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 10.08.09 **Checked By:** MWS **Date:** 10-21-09

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Day: Friday
Date: 10.09.09
Log No.: 87
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 54/pm 65

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began placing clay for GCL application for cell construction. Thalle placed approxamently 6" of clay materia Lift #2 and compacted with a CP56 Cat. Sheepsfoot roller and a CS563 Cat Smoothedrum roller.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 3,Lift# 2, 1 drive cylinde set of shelby tubes for permability testing. All density test performed passed the required specifications of 95% of s proctor curve results. See CCL-05
- I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 10.09.09 **Checked By:** MMS **Date:** 10-21-09

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Day: Saturday
Date: 10.10.09
Log No.: 88
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	am 54/pm 65

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began removing the rock from the west side of the cell that was blasted on 10.09.09 in pm and stockpiling i designated area.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.09.09 **Checked By:** MMS **Date:** 10-21-09

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Client: Joyce Enginering
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-05**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **10.08-10.09.09**	Reviewed By : RMS	Date : 10-21-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 56	ACRE 3	1	6"	666-05-02	97.5	23.0	**119.5**	**26.3**	**94.6**	**97.0%**	**95.0%**	
NDCL 57	ACRE 3	1	6"	666-05-02	97.5	23.0	**123.5**	**26.0**	**98.0**	**100.5%**	**95.0%**	DC-14 & ST-18
NDCL 58	ACRE 3	1	6"	666-05-02	97.5	23.0	**121.5**	**29.9**	**93.5**	**95.9%**	**95.0%**	
NDCL 59	ACRE 3	1	6"	666-05-02	97.5	23.0	**119.2**	**28.3**	**92.9**	**95.3%**	**95.0%**	
NDCL 60	ACRE 3	1	6"	666-05-02	97.5	23.0	**122.0**	**25.5**	**97.2**	**99.7%**	**95.0%**	
NDCL 61	ACRE 3	1	6"	666-05-02	97.5	23.0	**123.4**	**25.3**	**98.5**	**101.0%**	**95.0%**	
NDCL 62	ACRE 3	2	6"	666-05-02	97.5	23.0	**118.0**	**24.7**	**94.6**	**97.1%**	**95.0%**	
NDCL 63	ACRE 3	2	6"	666-05-02	97.5	23.0	**122.6**	**27.4**	**96.2**	**98.7%**	**95.0%**	DC-15 & ST-19
NDCL 64	ACRE 3	2	6"	666-05-02	97.5	23.0	**122.4**	**28.3**	**95.4**	**97.8%**	**95.0%**	
NDCL 65	ACRE 3	2	6"	666-02-05	97.5	23.0	**125.1**	**26.5**	**98.9**	**101.4%**	**95.0%**	
NDCL 66	ACRE 3	2	6"	666-02-05	97.5	23.0	**121.5**	**23.6**	**98.3**	**100.8%**	**95.0%**	
NDCL 67	ACRE 3	2	6"	666-02-05	97.5	23.0	**121.9**	**23.0**	**99.1**	**101.6%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-05**
Date (s) : 10.08.09-10.09.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-14	DC-15
Nuclear Test Number :	NDCL-57	NDCL-64
Location:	ACRE 3	ACRE 3
Depth (ft):	LIFT 1	LIFT 2
Date :	10.08.09	10.08.09

Mold

Cylinder ID	2	2
Weight of Cylinder (lbs.)	1.33	1.33
Volume of Cylinder (ft^3)	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.32	5.34
Wt. of Cylinder (lbs.)	1.33	1.33
Wt. of WS	3.99	4.01
Cylinder Volume (ft^3)	0.033	0.033

Moisture / Density

Tare Number	JB-10	JB-06
Wt. of Tare & WS (gm)	361.80	355.60
Wt. of Tare & DS (gm)	284.80	289.00
Wt. of Tare (gm)	6.80	6.80
Wt. of Water (gm)	77.00	66.60
Wt. of DS (gm)	278.00	282.20
Wet Density (pcf):	120.9	121.5
Moisture Content (%):	**27.7**	**23.6**
Dry Density (pcf):	**94.7**	**98.5**

Geotechnics Representative : Al Lambeth

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Day: Monday
Date: 10.12.09
Log No.: 89
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 53 /pm 63

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the contractor to discuss the scope of work scheduled for today.
- Contractor doing site prep/drying due to wet conditions.
- Work eventually cancelled today due to site conditions from weekend Rain and weather conditions today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.12.09 **Checked By:** MMS **Date:** 10-21-09

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Day: Tuesday
Date: 10.13.09
Log No.: 90
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 53 /pm 63

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Contractor doing site prep/drying due to wet conditions.
- Work eventually cancelled today due to site conditions from weekend Rain and weather conditions today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.13.09 **Checked By:** MMS **Date:** 10-21-09

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Day: Wednesday
Date: 10.14.09
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cloudy w/ Rain showe	**Temperature:**	am 43 /pm 60

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Contractor doing site prep/drying due to wet conditions.
- Work eventually cancelled today due to site conditions from rain and weather conditions today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.14.09 **Checked By:** MMS **Date:** 10-21-09

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Day: Thursday
Date: 10.15.09
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cloudy w/ Rain showe	**Temperature:**	am 40 /pm 59

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Contractor doing site prep/drying due to wet conditions.
- Work eventually cancelled today due to site conditions from rain and weather conditions today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.15.09 **Checked By:** MDS **Date:** 10-21-09

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Day: Friday
Date: 10.16.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Cloudy w/ Rain showe	**Temperature:**	am 38 /pm 59

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Contractor doing site prep/drying due to wet conditions.
- Work eventually cancelled today due to site conditions from rain and weather conditions today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.16.09 **Checked By:** [illegible] **Date:** 10-21-09

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Day: Monday
Date: 10.19.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny and cool **Temperature:** am 28 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle excavating south end of cell to subgrade (removing trash and soil from Phase 2 where it connects to Phase 3) and grading south end of cell,also drilling rock in west side of cell. Contractor having #57's stone hauled in and being stockpiled for proctective cover over liner, also unloading HDPE 60 mil liner material.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.19.09 **Checked By:** AMM **Date:** 11-12-09

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Day: Tuesday
Date: 10.20.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny and cool **Temperature:** am 28 /pm 65

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle excavating south end of cell to subgrade (removing trash and soil from Phase 2 where it connects to Phase 3) and grading south end of cell,also drilling rock in west side of cell. Contractor having #57's stone hauled in and being stockpiled for proctective cover over liner, also unloading GCL liner material.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.20.09 **Checked By:** MM **Date:** 11-12-09

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Day: Wednesday
Date: 10.21.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny and cool **Temperature:** am 32 /pm 70

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle excavating south end of cell to subgrade (removing trash and soil from Phase 2 where it connects to Phase 3) and grading south end of cell,also drilling rock in west side of cell. Contractor having #57's stone hauled in and being stockpiled for proctective cover over liner, also unloading GCL liner material.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.21.09 **Checked By:** MMS **Date:** 11-12-09

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Day: Thursday
Date: 10.22.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny and cool **Temperature:** am 35 /pm 71

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began excavating shot rock from blast areas in cell and stockpiling on site. Also prepairing Acre 6 subgrade for placement of clay liner material. Contractor continued hauling #57's stone for protective cover and stockpiling on site near cel
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.22.09 **Checked By:** **Date:**

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Day: Friday
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions:	Sunny and cool	**Temperature:**	am 50 /pm 6

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued excavating shot rock from blast areas in cell and stockpiling on site. Also prepairing Acre 6 and Acre 7 subgrade for placement of clay liner material and began placement of lift 1 for Acer 6 and Acre 7 and compacting for density testing on 10.26.09
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.23.09 **Checked By:** **Date:**

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Day: Monday
Date: 10.26.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 7:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy & warm **Temperature:** am 48/pm 70

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued place and compact clay liner material placed in Acre #6,Lift #2 and compacted for density testing on 10.27.09.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on drawings.
- I performed 6 nuclear density gauge test on compacted clay liner placed in Acre# 3, lift# 3, 1 drive cylinder and 1 set of shelby tubes for permability testing. See CCL-06
- I preformed 6 nuclear density gauge test on compacted clay liner placed in Acre# 6,lift# 1, 1 drive cylinder and 1 set of shelby tubes for permability testing. See CCL-06
- All density test performed passed required density of 95% of standard proctor curve results for ASTM D988 Standard Proctor Informed contracto of all test results performed today.

Prepared By: A. Lambeth **Date:** 10.26.09 **Checked By:** MMS **Date:** 11-12-09

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Day: Tuesday
Date: 10.27.09
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy and warm **Temperature:** am 49 /pm 72

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cleaning up after 3.75" of rain overnight (pumping water and removing mud and trash from south end of cell). No clay liner material being placed today due to site conditions from overnight rain.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.27.09 **Checked By:** MWS **Date:** 11-12-09

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Day: Wednesday
Date: 10.28.09
Log No.: 101
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy and warm **Temperature:** am 50 /pm 73

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cleaning up after 3.75" of rain on 10.26.09 (pumping water and removing mud and trash from south end of cell). No clay liner material being placed today due to site conditions from rain overnight on 10.26.09.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.28.09 **Checked By:** MDS **Date:** 11-12-09

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Day: Thursday
Date: 10.29.09
Log No.: 102
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy and warm **Temperature:** am 50 /pm 73

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cleaning up after 3.75" of rain on 10.26.09 (pumping water and removing mud and trash from south end of cell). No clay liner material being placed today due to site conditions from rain overnight on 10.26.09. Contractor maintaining Acre#1 and Acre #3 by blading with bulldozer to repair wash reels from the rain on 10.26.09.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.29.09 **Checked By:** MMS **Date:** 11-12-09

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Day: Friday
Date: 10.30.09
Log No.: 103
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 44/pm 64

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle placed approxamently 6" of clay material for Acre#6,Lift#2 and compacting with sheepsfoot roller to obtain compaction for denity testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 6,Lift# 2, 1 drive cylinder and 1 set of shelby tubes for permability testing. All density test performed passed the required specifications of 95% of standard proctor curve results. See CCL-06
- I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 10.30.09 **Checked By:** MMT **Date:** 11-12-09

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Day: Saturday
Date: 10.31.09
Log No.: 104
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Mostly cldy cool w/Ra **Temperature:** am 49/pm 61

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued fine grading Acre#1 and Acre#3 prepairing for placement of GCL and HDPE liner system also excavating anchor trench for liner until being rained out in pm today. No clay liner material being placed due to weather conditions.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 10.31.09 **Checked By:** MB **Date:** 11-12-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-06**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **10.26.09, 10.30.09**	Reviewed By : MRI	Date : 11-12-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 68	ACRE 3	3	6"	666-02-06	97.5	23.0	**126.1**	**28.0**	**98.5**	**101.0%**	**95.0%**	DC-16 & ST-20
NDCL 69	ACRE 3	3	6"	666-02-06	97.5	23.0	**126.9**	**29.9**	**97.7**	**100.2%**	**95.0%**	
NDCL 70	ACRE 3	3	6"	666-02-06	97.5	23.0	**128.1**	**29.9**	**98.6**	**101.1%**	**95.0%**	
NDCL 71	ACRE 3	3	6"	666-02-06	97.5	23.0	**128.5**	**29.6**	**99.2**	**101.7%**	**95.0%**	
NDCL 72	ACRE 3	3	6"	666-02-06	97.5	23.0	**122.1**	**28.8**	**94.8**	**97.2%**	**95.0%**	
NDCL 73	ACRE 3	3	6"	666-02-06	97.5	23.0	**122.8**	**30.8**	**93.9**	**96.3%**	**95.0%**	
NDCL 74	ACRE 6	1	6"	666-02-06	97.5	23.0	**123.8**	**28.7**	**96.2**	**98.7%**	**95.0%**	
NDCL 75	ACRE 6	1	6"	666-02-06	97.5	23.0	**121.5**	**28.9**	**94.3**	**96.7%**	**95.0%**	
NDCL 76	ACRE 6	1	6"	666-02-06	97.5	23.0	**125.3**	**29.5**	**96.8**	**99.2%**	**95.0%**	
NDCL 77	ACRE 6	1	6"	666-02-06	97.5	23.0	**121.1**	**30.3**	**92.9**	**95.3%**	**95.0%**	
NDCL 78	ACRE 6	1	6"	666-02-06	97.5	23.0	**121.2**	**30.5**	**92.9**	**95.3%**	**95.0%**	
NDCL 79	ACRE 6	1	6"	666-02-06	97.5	23.0	**124.6**	**28.5**	**97.0**	**99.5%**	**95.0%**	DC-17 & ST-21
NDCL 80	ACRE 6	2	6"	666-02-06	97.5	23.0	**124.7**	**26.7**	**98.4**	**100.9%**	**95.0%**	
NDCL 81	ACRE 6	2	6"	666-02-06	97.5	23.0	**117.0**	**25.8**	**93.0**	**95.4%**	**95.0%**	
NDCL 82	ACRE 6	2	6"	666-02-06	97.5	23.0	**123.7**	**30.1**	**95.1**	**97.5%**	**95.0%**	
NDCL 83	ACRE 6	2	6"	666-02-06	97.5	23.0	**124.1**	**30.7**	**95.0**	**97.4%**	**95.0%**	
NDCL 84	ACRE 6	2	6"	666-02-06	97.5	23.0	**124.8**	**27.5**	**97.9**	**100.4%**	**95.0%**	
NDCL 85	ACRE 6	2	6"	666-02-06	97.5	23.0	**120.4**	**27.3**	**94.6**	**97.0%**	**95.0%**	DC-18 & ST-22

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-06**
Date (s) : 10.26.09, 10.30.09

Drive Cylinder - ASTM D 2937

Test Information			
Test Number :	DC-16	DC-17	DC-18
Nuclear Test Number :	NDCL-68	NDCL-79	NDCL-85
Location:	ACRE 3	ACRE 6	ACRE 6
Depth (ft):	LIFT 3	LIFT 1	LIFT 2
Date :	10.26.09	10.26.09	10.30.09
Mold			
Cylinder ID	2	3	2
Weight of Cylinder (lbs.)	1.33	1.32	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033
Specimen			
Wt. of Cylinder & WS (lbs.)	5.40	5.34	5.25
Wt. of Cylinder (lbs.)	1.33	1.32	1.33
Wt. of WS	4.07	4.02	3.92
Cylinder Volume (ft^3)	0.033	0.033	0.033
Moisture / Density			
Tare Number	JB-06	JB-10	JB-07
Wt. of Tare & WS (gm)	447.60	398.60	421.80
Wt. of Tare & DS (gm)	358.20	321.40	339.80
Wt. of Tare (gm)	6.80	6.80	6.60
Wt. of Water (gm)	89.40	77.20	82.00
Wt. of DS (gm)	351.40	314.20	333.20
Wet Density (pcf):	123.3	121.8	119.1
Moisture Content (%):	**25.4**	**24.0**	**24.6**
Dry Density (pcf):	**98.3**	**97.8**	**95.6**

Geotechnics Representative : Al Lambeth

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Day: Sunday
Date: 11.01.09
Log No.: 105
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 12:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 42 /pm 57

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- All work cancelled today due to site conditions from overnight Rain and weather conditions today. Thalle working on Erosion and Sediment control measures today
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.01.09 **Checked By:** MM **Date:** 11-12-09

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Day: Monday
Date: 11.02.09
Log No.: 106
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 36 /pm 60

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle excavating anchor trench also excavating shot rock from west side of cell (Acre# 4) and from sediment basin #5 and stockpiling on site. Contractor began drying operation on lift #3 in Acre# 6 and compacting for density testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.02.09 **Checked By:** MRS **Date:** 11-12-09

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Day: Tuesday
Date: 11.03.09
Log No.: 107
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 34 /pm 61

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued excavating shot rock from west side of cell (Acre# 4) and from sediment basin #5 and stockpiling on site. Contractor working lift# 3, acre# 6 drying material and compacting for density tesing.
  I performed two moisture content test for the contractor to determine in place moisture content, material was too wet to obtain compaction (average 35.5%) which is 12.5% above optimum moisture content. This area was scarified to allow it to dry back prior to compacting for density testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.03.09 **Checked By:** MAB **Date:** 11-12-09

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Day: Wednesday
Date: 11.04.09
Log No.: 108
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 34 /pm 57

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued working on Acre# 6,lift# 3 drying out for compaction testing also placing clay liner material in Acre# 7,lift# 1 and Acre#8,lift# 1 and compacting with a sheepsfoot roller prior to density testing. (Roller broke down before area was ready for density testing.Contractor has another one scheduled to be on site at 7:00 am on 11.05.09)
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.04.09 **Checked By:** MPS **Date:** 11-12-09

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Day: Thursday
Date: 11.05.09
Log No.: 109
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Clear and cool **Temperature:** am 32 /pm 62

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle placed approxamently 6" of clay material for Acre#6,Lift#3 and compacting with sheepsfoot roller to obtain compaction for denity testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 6,Lift# 3, 1 drive cylinder and 1 set of shelby tubes for permability testing. All density test performed passed the required specifications of 95% of standard proctor curve results.
  I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 11.05.09 **Checked By:** AMS **Date:** 11-12-09

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Day: Friday
Date: 11.06.09
Log No.: 110
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Clear and cool **Temperature:** am 32 /pm 62

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle placed approxamently 6" of clay material for Acre#5,Lift#1,Acre# 7,lift# 1 and Acre# 8,lift#1 and compacting with a sheepsfoot roller for denity testing also placing clay liner material for lifts 2 in Acers# 5, Acres# 7 and Acres# 8.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 5,Lift# 1, 1 drive cylinder and 1 set of shelby tubes for permability testing.
- I performed 4 nuclear density gauge test on compacted clay liner material placed in Acre# 7,lift# 1, 1 drive cylinder and 1 set of shelby tubes for permability testing.
- I preformed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 8,lift# 1, 1 drive cylinder and 1 set of shelby tubes for permability testing.
- I preformed 4 nuclear density gauge test on compacted clay liner material placed in Acre# 7,lift# 2, 1 drive cylinder and 1 set of shelby tubes for permability testing.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 8,lift# 2, 1 drive cylinder and 1 set of shelby tubes for permability testing.
  All density test performed today passed all required specifications of 95% compaction per ASTM D698 Standard Proctor curve results.
- I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 11.06.09 **Checked By:** MM **Date:** 11-12-09

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Day: Saturday
Date: 11.07.09
Log No.: 111
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 6:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Clear and cool **Temperature:** am 30 /pm 72

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle placed approxamently 6" of clay material for Acre#5,Lift#3,Acre# 7,lift# 3 and Acre# 8,lift# 3 and compacting with a sheepsfoot roller for denity testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner material placed in Acre# 5,Lift# 2, 1 drive cylinder and 1 set of shelby tubes for permability testing.
  All density test passed required specifications of 95% compaction per ASTM D698 Standard Proctor curve test results.
  Informed contractor of all test results performed today.
- Hallaton began placement of GCL and HDPE 60 Mil liner material in cell area prepaired for liner placement on Acres #1, Acres #3 and Acre #6. Contractor placed GCL then deployed pannel-1 thru panel-7 and all pannels were welded prior to contractor leaving for the day.
  I observed all GCL and HDPE 60 mill liner being deployed and welded together today.

Prepared By: A. Lambeth **Date:** 11.07.09 **Checked By:** MBS **Date:** 11-12-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-07**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.05.09, 11.06.09**	Reviewed By : [illegible]	Date : 11-12-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 86	ACRE 6	3	6"	666-02-01	89.7	27.5	**120.1**	**32.4**	**90.7**	**101.1%**	**95.0%**	
NDCL 87	ACRE 6	3	6"	666-02-01	89.7	27.5	**114.5**	**29.2**	**88.6**	**98.8%**	**95.0%**	
NDCL 88	ACRE 6	3	6"	666-02-01	89.7	27.5	**116.9**	**33.0**	**87.9**	**98.0%**	**95.0%**	
NDCL 89	ACRE 6	3	6"	666-02-01	89.7	27.5	**113.9**	**33.1**	**85.6**	**95.4%**	**95.0%**	
NDCL 90	ACRE 6	3	6"	666-02-01	89.7	27.5	**113.9**	**32.9**	**85.7**	**95.5%**	**95.0%**	
NDCL 91	ACRE 6	3	6"	666-02-01	89.7	27.5	**115.6**	**33.0**	**86.9**	**96.9%**	**95.0%**	DC-19 & ST-23
NDCL 92	ACRE 5	1	6"	666-02-01	89.7	27.5	**111.9**	**29.0**	**86.7**	**96.7%**	**95.0%**	
NDCL 93	ACRE 5	1	6"	666-02-01	89.7	27.5	**118.3**	**32.2**	**89.5**	**99.8%**	**95.0%**	DC-20 & ST-24
NDCL 94	ACRE 5	1	6"	666-02-01	89.7	27.5	**118.8**	**31.1**	**90.6**	**101.0%**	**95.0%**	
NDCL 95	ACRE 5	1	6"	666-02-01	89.7	27.5	**118.9**	**30.8**	**90.9**	**101.3%**	**95.0%**	
NDCL 96	ACRE 5	1	6"	666-02-01	89.7	27.5	**117.2**	**29.1**	**90.8**	**101.2%**	**95.0%**	
NDCL 97	ACRE 5	1	6"	666-02-01	89.7	27.5	**118.3**	**31.3**	**90.1**	**100.4%**	**95.0%**	
NDCL 98	ACRE 7	1	6"	666-02-01	89.7	27.5	**116.6**	**32.1**	**88.3**	**98.4%**	**95.0%**	
NDCL 99	ACRE 7	1	6"	666-02-01	89.7	27.5	**117.2**	**30.9**	**89.5**	**99.8%**	**95.0%**	DC-21 & ST-25
NDCL 100	ACRE 7	1	6"	666-02-01	89.7	27.5	**117.3**	**29.3**	**90.7**	**101.1%**	**95.0%**	
NDCL 101	ACRE 7	1	6"	666-02-01	89.7	27.5	**118.9**	**30.9**	**90.8**	**101.3%**	**95.0%**	
NDCL 102	ACRE 8	1	6"	666-02-01	89.7	27.5	**119.4**	**30.6**	**91.4**	**101.9%**	**95.0%**	DC-22 & ST-26
NDCL 103	ACRE 8	1	6"	666-02-01	89.7	27.5	**119.0**	**30.6**	**91.1**	**101.6%**	**95.0%**	
NDCL 104	ACRE 8	1	6"	666-02-01	89.7	27.5	**119.8**	**31.7**	**91.0**	**101.4%**	**95.0%**	
NDCL 105	ACRE 8	1	6"	666-02-01	89.7	27.5	**116.6**	**29.3**	**90.2**	**100.5%**	**95.0%**	
NDCL 106	ACRE 8	1	6"	666-02-01	89.7	27.5	**117.4**	**30.4**	**90.0**	**100.4%**	**95.0%**	
NDCL 107	ACRE 8	1	6"	666-02-01	89.7	27.5	**118.1**	**31.1**	**90.1**	**100.4%**	**95.0%**	
NDCL 108	ACRE 7	2	6"	666-02-01	89.7	27.5	**115.5**	**28.3**	**90.0**	**100.4%**	**95.0%**	DC-23 & ST-27
NDCL 109	ACRE 7	2	6"	666-02-01	89.7	27.5	**115.1**	**28.0**	**89.9**	**100.2%**	**95.0%**	
NDCL 110	ACRE 7	2	6"	666-02-01	89.7	27.5	**119.5**	**32.6**	**90.1**	**100.5%**	**95.0%**	
NDCL 111	ACRE 7	2	6"	666-02-01	89.7	37.5	**115.3**	**32.2**	**87.2**	**97.2%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-07**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.06.09, 11.07.09**	Reviewed By : MPS	Date : 11-12-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 112	ACRE 8	2	6"	666-02-01	89.7	37.5	**112.9**	**31.0**	**86.2**	**96.1%**	**95.0%**	
NDCL 113	ACRE 8	2	6"	666-02-01	89.7	27.5	**118.7**	**30.9**	**90.7**	**101.1%**	**95.0%**	
NDCL 114	ACRE 8	2	6"	666-02-01	89.7	27.5	**111.0**	**24.5**	**89.2**	**99.4%**	**95.0%**	
NDCL 115	ACRE 8	2	6"	666-02-01	89.7	27.5	**115.9**	**28.6**	**90.1**	**100.5%**	**95.0%**	DC-24 & ST-28
NDCL 116	ACRE 8	2	6"	666-02-01	89.7	27.5	**116.2**	**29.1**	**90.0**	**100.3%**	**95.0%**	
NDCL 117	ACRE 8	2	6"	666-02-01	89.7	27.5	**116.9**	**30.1**	**89.9**	**100.2%**	**95.0%**	
NDCL 118	ACRE 5	2	6"	666-02-01	89.7	27.5	**118.2**	**32.6**	**89.1**	**99.4%**	**95.0%**	
NDCL 119	ACRE 5	2	6"	666-02-01	89.7	27.5	**116.0**	**28.3**	**90.4**	**100.8%**	**95.0%**	
NDCL 120	ACRE 5	2	6"	666-02-01	89.7	27.5	**115.2**	**30.1**	**88.5**	**98.7%**	**95.0%**	DC-25 & ST-29
NDCL 121	ACRE 5	2	6"	666-02-01	89.7	27.5	**112.0**	**30.1**	**86.1**	**96.0%**	**95.0%**	
NDCL 122	ACRE 5	2	6"	666-02-01	89.7	27.5	**112.0**	**26.8**	**88.3**	**98.5%**	**95.0%**	
NDCL 123	ACRE 5	2	6"	666-02-01	89.7	27.5	**114.1**	**29.4**	**88.2**	**98.3%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-07**
Date (s) : 11.05.09, 11.06.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-19	DC-20	DC-21	DC-22
Nuclear Test Number :	NDCL-91	NDCL-93	NDCL-99	NDCL-102
Location:	ACRE 6	ACRE 5	ACRE 7	ACRE 8
Depth (ft):	LIFT 3	LIFT 1	LIFT 1	LIFT 1
Date :	11.05.09	11.06.09	11.06.09	11.06.09
Mold				
Cylinder ID	3	3	3	1
Weight of Cylinder (lbs.)	1.32	1.32	1.32	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.23	5.21	5.15	5.21
Wt. of Cylinder (lbs.)	1.32	1.32	1.32	1.33
Wt. of WS	3.91	3.89	3.83	3.88
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	JB-07	A-5	A-4	A-3
Wt. of Tare & WS (gm)	374.60	404.00	328.00	405.00
Wt. of Tare & DS (gm)	292.40	318.60	263.20	319.80
Wt. of Tare (gm)	6.60	8.80	9.00	9.00
Wt. of Water (gm)	82.20	85.40	64.80	85.20
Wt. of DS (gm)	285.80	309.80	254.20	310.80
Wet Density (pcf):	118.5	117.9	116.1	117.8
Moisture Content (%):	**28.8**	**27.6**	**25.5**	**27.3**
Dry Density (pcf):	**92.0**	**92.4**	**92.6**	**92.5**

Geotechnics Representative : Al Lambeth

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-07**
Date (s) : 11.06.09, 11.07.09

geotechnics
INTEGRITY IN TESTING

Drive Cylinder - ASTM D 2937

Test Information			
Test Number :	DC-23	DC-24	DC-25
Nuclear Test Number :	NDCL-108	NDCL-115	NDCL-121
Location:	ACR 7	ACRE 8	ACRE 5
Depth (ft):	LIFT 2	LIFT 2	LIFT 2
Date :	11.06.09	11.06.09	11.07.09
Mold			
Cylinder ID	1	3	4
Weight of Cylinder (lbs.)	1.33	1.32	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033
Specimen			
Wt. of Cylinder & WS (lbs.)	5.10	5.12	5.00
Wt. of Cylinder (lbs.)	1.33	1.32	1.32
Wt. of WS	3.80	3.80	3.68
Cylinder Volume (ft^3)	0.033	0.033	0.033
Moisture / Density			
Tare Number	A-2	A-1	JB-10
Wt. of Tare & WS (gm)	343.40	346.20	319.80
Wt. of Tare & DS (gm)	280.20	286.00	255.40
Wt. of Tare (gm)	9.00	9.00	9.00
Wt. of Water (gm)	63.20	60.20	84.40
Wt. of DS (gm)	2711.20	277.00	246.40
Wet Density (pcf):	115.2	115.2	111.5
Moisture Content (%):	**23.3**	**21.7**	**26.1**
Dry Density (pcf):	**93.4**	**94.6**	**88.4**

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3
Project Number :	2009-666

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INTEGRITY IN TESTING

Report Number :	**CCL-07**
Date (s) :	11.06.09

ONE POINT PROCTOR - Method for Soil Identifica ASTM D698

Visual Descrpiton : Reddish Brown Sandy Silt

Test Information

Test Number :	NDCL-91
Location:	ACRE 6
Depth (ft):	LIFT 3
Date :	11.05.09

Mold

Weight of Mold (lbs.)	4.52
Volume OF Mold (ft^3)	0.033

Specimen

Weight of Mold & WS (lbs)	8.18
Weight of Mold (lbs)	4.52
Weight of WS (lbs)	3.66
Volume OF Mold (ft^3)	0.033

Moisture / Density

Tare Number	A-1
Wt. of Tare & WS (gm)	278.90
Wt. of Tare & DS (gm)	223.90
Wt. of Tare (gm)	9.00
Wt. of Water (gm)	55.00
Wt. of DS (gm)	214.90
Wet Density (pcf)	110.9
Moisture Content %	**25.6**
Dry Density (pcf)	**88.3**

Geotechnics Represenative : Al Lambeth

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Day: Sunday
Date: 11.08.09
Log No.: 112
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 6:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** am 32 /pm 70

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Hallaton continued deploying GCL and HDPE 60 Mill geosynethic liner material and welding seams. Hallaton deployed pannels P-8 thru P-17 and all seams were welded prior to contractor leaving for the day.
  I observed all placement of GCL and HDPE 60 Mill liner being deployed and welded together today.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.08.09 **Checked By:** MMS **Date:** 11-17-09

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Day: Monday
Date: 11.09.09
Log No.: 113
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 37 /pm 62

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began backfilling shot rock area of cell to subgrade elevation today and working on erosion and sediment control areas prepairing for forcasted rain on 11.10.09.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 6 nuclear density gauge test on compacted clay liner placed on 11.07.09 for Acre# 5,lift# 3, 1 drive cylinder and 1 set of shelby tubes for permability testing.
- I performed 6 nuclear density gauge test on compacted clay liner placed on 11.07.09 for Acre# 8,lift# 3, 1 drive cylinder and 1 set of shelby tubes for permability testing.
- All density test performed passed required specifications of 95% compaction per ASTM D698 Standard proctor curve test results.
- I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 11.09.09 **Checked By:** MMS **Date:** 11-19-09

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Day: Tuesday
Date: 11.10.09
Log No.: 114
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 34 /pm 61

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled clay liner placement due to Rain overnight. They were concentrating on pumping water from north end of cell. Thalle continued to monitor pumps and pumping water thru the night.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.10.09 **Checked By:** MMS **Date:** 11-17-09

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Day: Wednesday
Date: 11.11.09
Log No.: 115
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 39 /pm 55

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled clay liner placement due to Rain from Mon. They were concentrating on pumping water from north end of cell and began cleaning up mud from 7.5" of rain from Monday night until Wednesday mid morning to allow drying of site so work can proceed this weekend to repair wash out areas of Acre# 7 and Acre# 8.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.11.09 **Checked By:** MMS **Date:** 11-12-09

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Day: Thursday
Date: 11.12.09
Log No.: 116
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 39 /pm 55

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled clay liner placement due to Rain from Mon. They were concentrating on pumping water from north end of cell and began cleaning up mud from 7.5" of rain from Monday night until Wednesday mid morning to allow drying of site so work can proceed this weekend to repair wash out areas of Acre# 7 and Acre# 8.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.12.09 **Checked By:** MPS **Date:** 11-17-09

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Day: Friday
Date: 11.13.09
Log No.: 117
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 39 /pm 55

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled clay liner placement due to Rain from Monday night until Wednesday mid day a total of 7.5" of rain. Contractor cleaning up mud from site to allow site to dry so work can proceed over the weekend to repair Acre# 7 and Acre# 8 that washed out from the rain event earlier this week also placing structural fill in shot rock area (Acre# 4 and a portion of Acre# 7).
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.13.09 **Checked By:** MMS **Date:** 11-17-09

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Day: Saturday
Date: 11.14.09
Log No.: 118
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Clear and cool **Temperature:** am 32 /pm 62

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle placed approxamently 6" to 8" of structural fill in shot rock area of cell (Acre# 4,portion of Acre# 7 and corner of Acre# 8 and Acre# 7 compacting with sheepsfoot roller to obtain compaction prior to density testing.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 3 nuclear density gauge test on compacted stuctural fill material placed in Acre# 4,portion Acre# 7,and corner of Acre#8 and Acre# 7 for subgrade elevation also ran 2 drive cylinders . All density test performed passed the required specifications of 95% compaction per ASTM D68 Standard proctor curve results.
- I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 11.14.09 **Checked By:** MMS **Date:** 11-17-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **EMBK-03**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.14.09**	Reviewed By : MMS	Date : 11-19-09

Contractor : Thalle	Borrow Source : On-site

Compaction Equipment : CP 56 Caterpiller Sheepsfoot roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDSF 7	A-7/A-8	SG	6"	666-02-03	104.1	19.0	**126.4**	**18.4**	**106.8**	**102.6%**	**95.0%**	Corner of Acre7/Acre8
NDSF 8	A-7/A-4	SG	6"	666-02-03	104.1	19.0	**125.7**	**17.9**	**106.6**	**102.4%**	**95.0%**	Corner of Acre7/Acre4
NDSF 9	A-4	SG	6"	666-02-03	104.1	19.0	**127.5**	**16.0**	**109.9**	**105.6%**	**95.0%**	Acre 4
												All test were preformed in the
												shot rock area of cell backfilled
												to subgrade

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client:	Joyce Engineering,LTD
Project Name :	White Oak MSW Landfill Phase 3 Hayw(
Project Number :	2009-666

Report Number :	**EMBK-03**
Date (s) :	11.14.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-03
Nuclear Test Number :	NDSF-07
Location:	ACRE 7
Depth (ft):	SG
Date :	11.14.09

Mold

Cylinder ID	4
Weight of Cylinder (lbs.)	1.32
Volume of Cylinder (ft^3)	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.43
Wt. of Cylinder (lbs.)	1.32
Wt. of WS	4.11
Cylinder Volume (ft^3)	0.033

Moisture / Density

Tare Number	A-1
Wt. of Tare & WS (gm)	431.80
Wt. of Tare & DS (gm)	362.80
Wt. of Tare (gm)	9.00
Wt. of Water (gm)	69.00
Wt. of DS (gm)	353.80
Wet Density (pcf):	124.5
Moisture Content (%):	**19.5**
Dry Density (pcf):	**104.2**

Geotechnics Representative : Al Lambeth

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywood Co.,N.C.
Project Number : 2009-666

Report Number : **EMBK-03**
Date (s) : 11.14.09

ONE POINT PROCTOR - Method for Soil Identificati ASTM D698

Visual Descrpiton : Brown sandy silt w/ rock

Test Information

Test Number :	NDSF-07
Location:	ACRE 7
Depth (ft):	SG
Date :	11.14.09

Mold

Weight of Mold (lbs.)	4.52
Volume OF Mold (ft^3)	0.033

Specimen

Weight of Mold & WS (lbs)	8.5
Weight of Mold (lbs)	4.52
Weight of WS (lbs)	3.98
Volume OF Mold (ft^3)	0.033

Moisture / Density

Tare Number	A-1
Wt. of Tare & WS (gm)	249.20
Wt. of Tare & DS (gm)	216.00
Wt. of Tare (gm)	9.00
Wt. of Water (gm)	33.20
Wt. of DS (gm)	207.00
Wet Density (pcf)	120.6
Moisture Content %	**16.0**
Dry Density (pcf)	**103.9**

Geotechnics Represenative : Al Lambeth MB

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

Geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-08**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.09.09**	Reviewed By : MMS	Date : 11-17-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 124	ACRE 5	3	6"	666-02-01	89.7	27.5	**114.1**	**29.4**	**88.2**	**98.3%**	**95.0%**	
NDCL 125	ACRE 5	3	6"	666-02-01	89.7	27.5	**115.6**	**31.8**	**87.7**	**97.8%**	**95.0%**	
NDCL 126	ACRE 5	3	6"	666-02-01	89.7	27.5	**110.6**	**26.2**	**87.6**	**97.7%**	**95.0%**	
NDCL 127	ACRE 5	3	6"	666-02-01	89.7	27.5	**111.7**	**24.3**	**89.9**	**100.2%**	**95.0%**	
NDCL 128	ACRE 5	3	6"	666-02-01	89.7	27.5	**109.1**	**28.0**	**85.2**	**95.0%**	**95.0%**	
NDCL 129	ACRE 5	3	6"	666-02-01	89.7	27.5	**110.9**	**28.3**	**86.4**	**96.4%**	**95.0%**	DC-26 & ST-30
NDCL 130	ACRE 5	3	6"	666-02-01	89.7	27.5	**107.9**	**26.5**	**85.3**	**95.1%**	**95.0%**	
NDCL 131	ACRE 8	3	6"	666-02-01	89.7	27.5	**113.6**	**26.6**	**89.7**	**100.0%**	**95.0%**	
NDCL 132	ACRE 8	3	6"	666-02-01	89.7	27.5	**118.9**	**32.7**	**89.6**	**99.9%**	**95.0%**	
NDCL 133	ACRE 8	3	6"	666-02-01	89.7	27.5	**109.8**	**28.9**	**85.2**	**95.0%**	**95.0%**	
NDCL 134	ACRE 8	3	6"	666-02-01	89.7	27.5	**110.9**	**27.9**	**86.7**	**96.7%**	**95.0%**	DC-27 & ST-31
NDCL 135	ACRE 8	3	6"	666-02-01	89.7	27.5	**108.2**	**27.0**	**85.2**	**95.0%**	**95.0%**	
NDCL 136	ACRE 8	3	6"	666-02-01	89.7	27.5	**111.0**	**26.0**	**88.1**	**98.2%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Hayw
Project Number : 2009-666

Report Number : **CCL-08**
Date (s) : 11.09.09

Drive Cylinder - ASTM D 2937

Test Information

Test Number :	DC-26	DC-27
Nuclear Test Number :	NDCL-129	NDCL-134
Location:	ACRE 5	ACRE 8
Depth (ft):	LIFT 3	LIFT 3
Date :	11.09.09	11.09.09

Mold

Cylinder ID	1	3
Weight of Cylinder (lbs.)	1.33	1.32
Volume of Cylinder (ft^3)	0.033	0.033

Specimen

Wt. of Cylinder & WS (lbs.)	5.03	5.00
Wt. of Cylinder (lbs.)	1.33	1.32
Wt. of WS	3.70	3.68
Cylinder Volume (ft^3)	0.033	0.033

Moisture / Density

Tare Number	A-1	A-2
Wt. of Tare & WS (gm)	306.00	317.00
Wt. of Tare & DS (gm)	251.00	255.60
Wt. of Tare (gm)	9.00	9.00
Wt. of Water (gm)	55.00	61.40
Wt. of DS (gm)	242.00	246.60
Wet Density (pcf):	112.1	111.5
Moisture Content (%):	**22.7**	**24.9**
Dry Density (pcf):	**91.4**	**89.3**

Geotechnics Representative : Al Lambeth

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Day: Monday
Date: 11.16.09
Log No.: 119
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 4:30 AM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 34 /pm 70

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placement of clay liner material for Acre# 4,Lift# 1 and portion of Acre# 7,Lift# 1 and continued placing clay liner material for lift# 2 for Acre# 4 and Acre# 7.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

I performed 6 nuclear density gauge test on compacted clay liner placed for Acre# 4,lift# 1, 1 drive cylinder and 1 set of shelby tubes for permability testing.
I performed 3 nuclear density gauge test on compacted clay liner placed for Acre# 7,lift# 1.

All density test performed passed required specifications of 95% compaction per ASTM D698 Standard proctor curve test results.
I informed contractor of all test results performed today.

Prepared By: A. Lambeth **Date:** 11.16.09 **Checked By:** MMK **Date:** 12-3-09

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Day: Tuesday
Date: 11.17.09
Log No.: 120
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 10:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 34 /pm 62

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placing clay liner material for Acre# 4,Lift# 3 and portion of Acre# 7,Lift# 3.Contractor continued crushing operation of shot rock for roadway material also continued hauling #57 stone for leacahte collection cover material in cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

I performed 23 nuclear density test on compacted clay liner placed and reworked in Acre# 4,Acre# 7 and Acre#6, 5 drive cylinders and 5 sets of shelby tubes for permability testing.
All density test performed today passed a required specifications of 95% compaction per ASTM D698 Standard Proctor curve results.
I informed contractor of all test results performed today.

Hallaton began deploying GCL and 60 Mil HDPE liner at 2:00 pm today starting with P-18 thru P-31. Observed placement of GCL and 60 Mil HDPE liner, welding of and air testing of seams for deployed panels today.

Prepared By: A. Lambeth **Date:** 11.17.09 **Checked By:** MAS **Date:** 12-3-09

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Day: Wednesday
Date: 11.18.09
Log No.: 121
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool w/Rain **Temperature:** am 44 /pm 52

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled clay liner placement due to Rain from Tuesday. They were concentrating on pumping water from north end of cell. Contractor continued to haul shot rock from sediment basin # 5 to chrushing operation.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Prepared By: A. Lambeth **Date:** 11.18.09 **Checked By:** MMS **Date:** 12-3-09

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Day: Thursday
Date: 11.19.09
Log No.: 122
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 39 /pm 55

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cancelled clay liner placement due to Rain from overnight. They were concentrating on pumping water from north end of cell and continued hauling shot rock from sediment basin #5 to crushing operation for roadway stone also working around the leachate collection lagoon.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Hallaton on site to cut destruct samples and perform air test of seams and doing repairs on liner deployed on 11.17.09.

Prepared By: A. Lambeth **Date:** 11.19.09 **Checked By:** MAK **Date:** 12-3-09

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Day: Friday
Date: 11.20.09
Log No.: 123
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 9:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 32 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued working around the leahate collection lagoon placing clay liner material for the 3' addition for volume also continued crushing operation of shot rock for roadway stone also placing #57 stone for cover material over leachate collection pipe lines.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Hallaton began deploying GCL and 60 mil HDPE liner in the afternoon today. Observed placement of all GCL and 60 mil HDPE liner panels P-32 thru P- 44 and welding of and air testing of all seams for panels deployed today.

Prepared By: A. Lambeth **Date:** 11.20.09 **Checked By:** MMT **Date:** 12-3-09

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Day: Saturday
Date: 11.21.09
Log No.: 124
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 7:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Clear and cool **Temperature:** am 32 /pm 56

Contractor's Equipment: 5 A35D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 CAT Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle began pumping water from Acre#9B sump area so they could remove all soft wet material from sump area prepairing area for structural fill and clay liner material to be placed alo placing #57 stone as cover material over the leachate collection pipe lines.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

Hallaton began deploying GCL and 60 Mil HDPE liner material at 9:00 am today. Observed placement of all GCL and 60 Mil HDPE liner material panels P-45 thru P-71. I observed all welding of and air testing of all seams for panels deployed today.

Prepared By: A. Lambeth **Date:** 11.21.09 **Checked By:** MMS **Date:** 12-3-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

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INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-09**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.16,11.17.09**	Reviewed By : MMS	Date : 12-3-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 137	ACRE 4	1	6"	666-02-01	89.7	27.5	**113.8**	**32.2**	**86.1**	**96.0%**	**95.0%**	
NDCL 138	ACRE 4	1	6"	666-02-01	89.7	27.5	**113.8**	**30.3**	**87.3**	**97.4%**	**95.0%**	DC-28 & ST-32
NDCL 139	ACRE 4	1	6"	666-02-01	89.7	27.5	**116.6**	**29.1**	**90.3**	**100.7%**	**95.0%**	
NDCL 140	ACRE 4	1	6"	666-02-01	89.7	27.5	**116.4**	**29.5**	**89.9**	**100.2%**	**95.0%**	
NDCL 141	ACRE 4	1	6"	666-02-01	89.7	27.5	**114.8**	**28.9**	**89.1**	**99.3%**	**95.0%**	
NDCL 142	ACRE 7	1	6"	666-02-01	89.7	27.5	**113.3**	**29.8**	**87.3**	**97.3%**	**95.0%**	
NDCL 143	ACRE 7	1	6"	666-02-01	89.7	27.5	**116.0**	**28.9**	**90.0**	**100.3%**	**95.0%**	
NDCL 144	ACRE 7	1	6"	666-02-01	89.7	27.5	**113.0**	**29.1**	**87.5**	**97.6%**	**95.0%**	
NDCL 145	ACRE 4	2	6"	666-02-01	89.7	27.5	**112.9**	**28.9**	**87.6**	**97.6%**	**95.0%**	
NDCL 146	ACRE 4	2	6"	666-02-06	97.5	23.0	**122.5**	**24.9**	**98.1**	**100.6%**	**95.0%**	
NDCL 147	ACRE 4	2	6"	666-02-06	97.5	23.0	**121.9**	**24.5**	**97.9**	**100.4%**	**95.0%**	
NDCL 148	ACRE 4	2	6"	666-02-06	97.5	23.0	**123.5**	**25.8**	**98.2**	**100.7%**	**95.0%**	
NDCL 149	ACRE 4	2	6"	666-02-06	97.5	23.0	**120.6**	**26.1**	**95.6**	**98.1%**	**95.0%**	DC-29 & ST-33
NDCL 150	ACRE 4	2	6"	666-02-06	97.5	23.0	**118.9**	**24.2**	**95.7**	**98.2%**	**95.0%**	
NDCL 151	ACRE 7	2	6"	666-02-06	97.5	23.0	**120.9**	**25.4**	**96.4**	**98.9%**	**95.0%**	
NDCL 152	ACRE 7	2	6"	666-02-06	97.5	23.0	**123.6**	**26.2**	**97.9**	**100.5%**	**95.0%**	
NDCL 153	ACRE 7	2	6"	666-02-06	97.5	23.0	**122.0**	**24.6**	**97.9**	**100.4%**	**95.0%**	DC-30 & ST-27A
NDCL 154	ACRE 7	2	6"	666-02-06	97.5	23.0	**120.6**	**23.9**	**97.3**	**99.8%**	**95.0%**	
NDCL 155	ACRE 7	2	6"	666-02-06	97.5	23.0	**122.1**	**25.2**	**97.5**	**100.0%**	**95.0%**	
NDCL 156	ACRE 6	2	6"	666-02-06	97.5	23.0	**119.9**	**25.0**	**95.9**	**98.4%**	**95.0%**	
NDCL 157	ACRE 6	2	6"	666-02-06	97.5	23.0	**119.8**	**24.1**	**96.5**	**99.0%**	**95.0%**	DC-31 & ST-22A
NDCL 158	ACRE 6	2	6"	666-02-06	97.5	23.0	**119.3**	**24.5**	**95.8**	**98.3%**	**95.0%**	
NDCL 159	ACRE 6	2	6"	666-02-06	97.5	23.0	**118.6**	**23.7**	**95.9**	**98.3%**	**95.0%**	
NDCL 160	ACRE 6	2	6"	666-02-06	97.5	23.0	**120.4**	**25.6**	**95.9**	**98.3%**	**95.0%**	
NDCL 161	ACRE 6	2	6"	666-02-06	97.5	23.0	**117.5**	**24.2**	**94.6**	**97.0%**	**95.0%**	
NDCL 162	ACRE 6	3	6"	666-02-06	97.5	23.0	**116.7**	**24.0**	**94.1**	**96.5%**	**95.0%**	

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number :	**CCL-09**	Geotechnics Representative :	Al Lambeth	Page :	1 of 1
Date (s) :	**11.16,11.17.09**	Reviewed By :	MMS	Date :	12-3-09

Contractor :	Thalle	Borrow Source :	On-site stockpiled material from cell excavation

Compaction Equipment :	CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 163	ACRE 6	3	6"	666-02-01	97.5	23.0	**121.8**	**25.9**	**96.7**	**99.2%**	**95.0%**	DC- 32 & ST-23A
NDCL 164	ACRE 6	3	6"	666-02-01	97.5	23.0	**122.6**	**24.6**	**98.4**	**100.9%**	**95.0%**	
NDCL 165	ACRE 6	3	6"	666-02-01	97.5	23.0	**119.7**	**24.9**	**95.8**	**98.3%**	**95.0%**	
NDCL 166	ACRE 6	3	6"	666-02-01	97.5	23.0	**118.4**	**25.4**	**94.4**	**96.8%**	**95.0%**	
NDCL 167	ACRE 6	3	6"	666-02-01	97.5	23.0	**119.9**	**25.1**	**95.8**	**98.3%**	**95.0%**	
NDCL 168	ACRE 4	3	6"	666-02-01	97.5	23.0	**120.4**	**25.2**	**96.2**	**98.6%**	**95.0%**	
NDCL 169	ACRE 4	3	6"	666-02-01	97.5	23.0	**118.9**	**27.8**	**93.0**	**95.4%**	**95.0%**	
NDCL 170	ACRE 4	3	6"	666-02-01	97.5	23.0	**121.4**	**22.1**	**99.4**	**102.0%**	**95.0%**	
NDCL 171	ACRE 4	3	6"	666-02-01	97.5	23.0	**116.8**	**24.4**	**93.9**	**96.3%**	**95.0%**	
NDCL 172	ACRE 4	3	6"	666-02-06	97.5	23.0	**123.5**	**26.2**	**97.9**	**100.4%**	**95.0%**	DC-33 & ST-34
NDCL 173	ACRE 4	3	6"	666-02-06	97.5	23.0	**123.5**	**25.4**	**98.5**	**101.0%**	**95.0%**	
NDCL 174	ACRE 4	3	6"	666-02-06	97.5	23.0	**124.4**	**29.5**	**96.1**	**98.5%**	**95.0%**	
NDCL 175	ACRE 7	3	6"	666-02-06	97.5	23.0	**119.9**	**24.4**	**96.4**	**98.9%**	**95.0%**	
NDCL 176	ACRE 7	3	6"	666-02-06	97.5	23.0	**118.1**	**26.2**	**93.6**	**96.0%**	**95.0%**	DC-34 & ST-35
NDCL 177	ACRE 7	3	6"	666-02-06	97.5	23.0	**122.6**	**25.1**	**98.0**	**100.5%**	**95.0%**	
NDCL 178	ACRE 7	3	6"	666-02-06	97.5	23.0	**119.8**	**27.2**	**94.2**	**96.6%**	**95.0%**	
NDCL 179	ACRE 7	3	6"	666-02-06	97.5	23.0	**117.9**	**26.1**	**93.5**	**95.9%**	**95.0%**	
NDCL 180	ACRE 8	2	6"	666-02-06	97.5	23.0	**120.2**	**25.1**	**96.1**	**98.5%**	**95.0%**	
NDCL 181	ACRE 8	2	6"	666-02-06	97.5	23.0	**121.4**	**26.2**	**96.2**	**98.7%**	**95.0%**	DC-35 & ST-28A
NDCL 182	ACRE 8	2	6"	666-02-06	97.5	23.0	**122.5**	**26.6**	**96.8**	**99.2%**	**95.0%**	
NDCL 183	ACRE 8	2	6"	666-02-06	97.5	23.0	**120.4**	**26.2**	**95.4**	**97.9%**	**95.0%**	
NDCL 184	ACRE 8	2	6"	666-02-06	97.5	23.0	**122.0**	**27.0**	**96.1**	**98.5%**	**95.0%**	
NDCL 185	ACRE 8	2	6"	666-02-06	97.5	23.0	**119.5**	**25.9**	**94.9**	**97.4%**	**95.0%**	
NDCL												
NDCL												
NDCL												

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-09**
Date (s) : 11.16,11.17.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-28	DC-29	DC-30	DC-31
Nuclear Test Number :	NDCL 138	NDCL 149	NDCL 153	NDCL 157
Location:	ACRE 4	ACRE 4	ACRE 7	ACRE 6
Depth (ft):	LIFT 1	LIFT 2	LFT 2	LIFT 2
Date :	11.16.09	11.17.09	11.17.09	11.17.09
Mold				
Cylinder ID	1	1	3	4
Weight of Cylinder (lbs.)	1.33	1.33	1.32	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.21	5.15	5.16	5.13
Wt. of Cylinder (lbs.)	1.33	1.33	1.32	1.32
Wt. of WS	3.88	3.82	3.84	3.81
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	A-1	A-2	A3	A1
Wt. of Tare & WS (gm)	457.20	341.60	443.20	353.60
Wt. of Tare & DS (gm)	364.00	283.20	363.80	290.20
Wt. of Tare (gm)	9.00	9.00	9.00	9.00
Wt. of Water (gm)	93.20	58.40	79.40	63.40
Wt. of DS (gm)	355.00	274.20	354.80	281.40
Wet Density (pcf):	117.6	116.1	116.4	115.4
Moisture Content (%):	**26.3**	**21.3**	**22.4**	**22.5**
Dry Density (pcf):	**93.1**	**95.7**	**95.1**	**94.2**

Geotechnics Representative : Al Lambeth

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-09**
Date (s) : 11.16,11.17.09

Drive Cylinder - ASTM D 2937

Test Information				
Test Number :	DC-32	DC-33	DC-34	DC-35
Nuclear Test Number :	NDCL 163	NDCL 172	NDCL 176	NDCL 181
Location:	ACRE 6	ACRE 4	ACRE 7	ACRE 8
Depth (ft):	LIFT 3	LIFT 3	LIFT 3	LIFT 2
Date :	11.17.09	11.17.09	11.17.09	11.19.09
Mold				
Cylinder ID	4	1	3	1
Weight of Cylinder (lbs.)	1.32	1.33	1.32	1.33
Volume of Cylinder (ft^3)	0.033	0.033	0.033	0.033
Specimen				
Wt. of Cylinder & WS (lbs.)	5.22	5.19	5.20	5.30
Wt. of Cylinder (lbs.)	1.32	1.33	1.32	1.33
Wt. of WS	3.90	3.86	3.88	3.98
Cylinder Volume (ft^3)	0.033	0.033	0.033	0.033
Moisture / Density				
Tare Number	A-2	A-5	A3	A3
Wt. of Tare & WS (gm)	456.80	425.40	425.80	426.30
Wt. of Tare & DS (gm)	364.60	341.00	342.40	342.40
Wt. of Tare (gm)	9.00	9.00	9.00	9.00
Wt. of Water (gm)	92.20	84.40	83.40	83.90
Wt. of DS (gm)	355.60	332.00	333.40	333.40
Wet Density (pcf):	118.2	116.9	117.5	120.6
Moisture Content (%):	**25.9**	**25.4**	**25.0**	**25.2**
Dry Density (pcf):	**93.8**	**93.2**	**94.0**	**96.3**

Geotechnics Representative : Al Lambeth

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Day: Tuesday
Date: 11.17.09
Log No.: 120
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 10:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 34 /pm 62

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placing clay liner material for Acre# 4,Lift# 3 and portion of Acre# 7,Lift# 3.Contractor continued crushing operation of shot rock for roadway material also continued hauling #57 stone for leacahte collection cover material in cell.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- I performed 23 nuclear density test on compacted clay liner placed and reworked in Acre# 4,Acre# 7 and Acre#6, 5 drive cylinders and 5 sets of shelby tubes for permability testing.
  All density test performed today passed a required specifications of 95% compaction per ASTM D698 Standard Proctor curve results.
  I informed contractor of all test results performed today.
- Hallaton began deploying GCL and 60 Mil HDPE liner at 2:00 pm today starting with P-18 thru P-31. Observed placement of GCL and 60 Mil HDPE liner, welding of and air testing of seams for deployed panels today.
- There appeared to be one seam end that was not welded in the Phase 2/Phase 3 tie in area. That seam was extrusion welded by Hallaton up to the dirt/trash in this area so the new liner could be welded to the old liner.
  The liner under phase 2 appeared to be shingled in a different direction from the liner being installed in phase 3.

Prepared By: A. Lambeth **Date:** 11.17.09 **Checked By:** MMS **Date:** 12-16-09

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Day: Monday
Date: 11.23.09
Log No.: 125
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 40 /pm 55

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle working slopes and setting concrete structures around sediment basin #5.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Hallaton on site preformming air test and repairs also cut destruct samples from all welded seams from 11.21.09.

Prepared By: A. Lambeth **Date:** 11.23.09 **Checked By:** MDS **Date:** 12-3-09

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Day: Tuesday
Date: 11.24.09
Log No.: 126
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 7:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** am 40 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle cleaned out sump area of cell Acre#9B and began placing structural fill to subgrade then placing clay liner material for lift# 1,lift# 2 and lift# 3 prior to placement of the GCL and 60 Mill HDPE liner.Contractor also continued crushing operation of shot rock for roadway stone and continued placement of #57 stone for cover material ove the leachate collection pipe line.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.

  I performed 12 nuclear density test on compacted clay liner placed and reworked in Acre# 9B,lift# 1 thru lift # 3, drive cylinders and 3 sets of shelby tubes for permability testing.
  All density test performed today passed a required specifications of 95% compaction per ASTM D698 Standard Proctor curve results.
- I informed contractor of all test results performed today.
- Hallaton on site pulling destruct samples,performing repairs and air testing of seams and repaired areas.

Prepared By: A. Lambeth **Date:** 11.24.09 **Checked By:** MAS **Date:** 12-3-09

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Day: Wednesday
Date: 11.25.09
Log No.: 127
Page: 1

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 9:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool w/Rain **Temperature:** am 38 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placement of #57 stone for protective cover over the leachate collection pipe lines.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Hallaton began deploying GCL and 60 Mill HDPE liner at 7:30 am today, deployed panels P-72 thru P-113. Observed the deployment of all material placed today. I observed the welding of and air testing of all seams of panels deployed today.

Prepared By: A. Lambeth **Date:** 11.25.09 **Checked By:** MMS **Date:** 12-3-09

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Day: Friday
Date: 11.27.09
Log No.: 128
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool w/Rain **Temperature:** am 32 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placement of #57 stone for protective cover over the leachate collection pipe lines.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Hallaton on site cutting destruct samples and preforming air test and repairs on 60 Mil line deloyed on 11.25.09.

Prepared By: A. Lambeth **Date:** 11.27.09 **Checked By:** MMS **Date:** 12-3-09

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Day: Saturday
Date: 11.28.09
Log No.: 129
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 12:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool w/Rain **Temperature:** am 30 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placement of #57 stone for protective cover over the leachate collection pipe lines.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Hallaton on site cutting destruct samples and preforming air test and repairs on 60 Mil line deloyed on 11.25.09.

Prepared By: A. Lambeth **Date:** 11.28.09 **Checked By:** MMS **Date:** 12-3-09

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Client: Joyce Enginering,Ltd
Project Name : White Oak MSW Landfill Phase 3
Project Number : 2009-666

geotechnics
INTEGRITY IN TESTING

Field Density Test Report

Report Number : **CCL-10**	Geotechnics Representative : Al Lambeth	Page : 1 of 1
Date (s) : **11.24.09**	Reviewed By : MMS	Date : 12-3-09

Contractor : Thalle	Borrow Source : On-site stockpiled material from cell excavation

Compaction Equipment : CP56 Caterpiller Sheepsfoot roller and CS563 Caterpiller Smoothedrum roller

Test Number	Test Location	Elevation/ Lift	Rod Depth	Proctor I.D. No.	Proctor Data		Measured In Place			Compaction		Comments
					MDD pcf	Opt. %M	WD (pcf)	% M	DD (pcf)	% C	% Req.	
NDCL 186	ACRE 9B	1	6"	666-02-06	97.5	23.0	**121.4**	**26.6**	**95.9**	**98.4%**	**95.0%**	
NDCL 187	ACRE 9B	1	6"	666-02-06	97.5	23.0	**121.9**	**30.6**	**93.3**	**95.7%**	**95.0%**	
NDCL 188	ACRE 9B	1	6"	666-02-06	97.5	23.0	**119.9**	**28.5**	**93.3**	**95.7%**	**95.0%**	
NDCL 189	ACRE 9B	1	6"	666-02-01	89.7	27.5	**114.6**	**33.0**	**86.2**	**96.1%**	**95.0%**	DC-36 & ST 36
NDCL 190	ACRE 9B	2	6"	666-02-01	89.7	27.5	**112.5**	**31.0**	**85.9**	**95.7%**	**95.0%**	
NDCL 191	ACRE 9B	2	6"	666-02-01	89.7	27.5	**113.7**	**24.9**	**91.0**	**101.5%**	**95.0%**	DC-37 & ST-38
NDCL 192	ACRE 9B	2	6"	666-02-01	89.7	27.5	**109.3**	**27.8**	**85.5**	**95.3%**	**95.0%**	
NDCL 193	ACRE 9B	2	6"	666-02-01	89.7	27.5	**111.8**	**31.1**	**85.3**	**95.1%**	**95.0%**	
NDCL 194	ACRE 9B	3	6"	666-02-01	89.7	27.5	**112.7**	**32.0**	**85.4**	**95.2%**	**95.0%**	
NDCL 195	ACRE 9B	3	6"	666-02-01	89.7	27.5	**121.4**	**29.5**	**93.7**	**104.5%**	**95.0%**	DC-38 & ST-37
NDCL 196	ACRE 9B	3	6"	666-02-01	89.7	27.5	**121.0**	**32.7**	**91.2**	**101.7%**	**95.0%**	
NDCL 197	ACRE 9B	3	6"	666-02-01	89.7	27.5	**115.3**	**29.8**	**88.8**	**99.0%**	**95.0%**	
NDCL 198	ACRE 9B	3	6"	666-02-06	89.7	27.5	**115.3**	**29.4**	**89.1**	**99.3%**	**95.0%**	
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												
NDCL												

Gauge Number	Gauge Model	Density Count	Moisture Count
24656	3430	2150	594

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Client: Joyce Engineering,LTD
Project Name : White Oak MSW Landfill Phase 3 Haywc
Project Number : 2009-666

Report Number : **CCL-10**
Date (s) : 11.24.09

Drive Cylinder - ASTM D 2937

Test Information			
Test Number :	DC-36	DC-37	DC-38
Nuclear Test Number :	NDCL 189	NDCL 191	NDCL 195
Location:	ACRE 9B	ACRE 9B	ACRE 9B
Depth (ft):	LIFT 1	LIFT 2	LIFT 3
Date :	11.24.09	11.24.09	11.24.09
Mold			
Cylinder ID	2	3	4
Weight of Cylinder (lbs.)	1.32	1.33	1.32
Volume of Cylinder (ft^3)	0.033	0.033	0.033
Specimen			
Wt. of Cylinder & WS (lbs.)	5.18	5.01	5.21
Wt. of Cylinder (lbs.)	1.32	1.33	1.32
Wt. of WS	3.86	3.68	3.89
Cylinder Volume (ft^3)	0.033	0.033	0.033
Moisture / Density			
Tare Number	A-1	A-3	A-4
Wt. of Tare & WS (gm)	449.60	458.80	498.20
Wt. of Tare & DS (gm)	360.00	367.20	391.00
Wt. of Tare (gm)	9.00	9.00	9.00
Wt. of Water (gm)	89.60	91.60	107.20
Wt. of DS (gm)	351.00	358.20	382.00
Wet Density (pcf):	117.0	111.5	117.9
Moisture Content (%):	**25.5**	**25.6**	**28.1**
Dry Density (pcf):	**93.2**	**88.8**	**92.0**

Geotechnics Representative : Al Lambeth

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Day: Wednesday
Date: 11.25.09
Log No.: 127
Page: 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 9:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Ptly cldy cool w/Rain **Temperature:** am 38 /pm 56

Contractor's Equipment: 3 A35D, 1 A25D Volvo Offroad trucks, 345B CAT Trackhoe, D6R CAT Dozer, D5M CAT Dozer, PC300LG Komatsu Trackhoe, IT 28G CAT Loader/fork-lift, CP56 CAT Sheepsfoot roller A40E Volvo Offroad truck, D8R CAT Dozer w/Ripper, CS653 Smoothdrum roller, 330C CAT Trackhoe

Contractor's Personnel: 1 Assistant Super., 2 Foremen, 1 Grade checker, 9 Operators & 3 Labors

Description of Daily Activities & Events

- Mr. Lambeth traveled to the site and met with the conractor to discuss the scope of work scheduled for today.
- Thalle continued placement of #57 stone for protective cover over the leachate collection pipe lines.
- All currently in-place silt fence was checked today and found to be in good condition and installed as indicated on the drawings.
- Hallaton began deploying GCL and 60 Mill HDPE liner at 7:30 am today, deployed panels P-72 thru P-113. Observed the deployment of all material placed today. I observed the welding of and air testing of all seams of panels deployed today.
- Hallaton Deployed an additional layer of HDPE in the sump area before placing primary HDPE liner per McGill & Associaters direction

Prepared By: A. Lambeth **Date:** 11.25.09 **Checked By:** MBS **Date:** 6-4-2010

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Day:	**Monday**
Date:	**11.30.09**
Log No.:	**130**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: loudy w/Rain showe **Temperature:** Low 36/ Hi 55

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle was setting precast structures and pumping rain water from north end of cell also welding leachate collection pipe together between rain showers today.

Prepared By: Al Lambeth **Date:** 11.30.09 **Checked By:** MMS **Date:** 12-15-09

Day:	**Tuesday**
Date:	**12.01.09**
Log No.:	**131**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Clear & Cold	**Temperature:**	Low 28/ Hi 45

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling and placing #57's stone for protective cover over leachate collection pipe lines.
- Hallaton on site cutting destruct testing samples and preforming repairs and air test as required for repairs.

Prepared By: Al Lambeth **Date:** 12.01.09 **Checked By:** MMS **Date:** 12-15-09

Day: ednesday
Date: 12.02.09
Log No.: 132
Page: 1 of 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cloudy w/ Rain **Temperature:** Low 35/ Hi 49

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell 2.5" of rain recorded today on site.
- Shipped destruct samples to Pittsburgh lab today.

Prepared By: Al Lambeth **Date:** 12.02.09 **Checked By:** MMS **Date:** 12-15-09

Day:	**Thursday**
Date:	**12.03.09**
Log No.:	**133**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cloudy w/ Rain	**Temperature:**	Low 34 / Hi 50

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell and cleaning up mud from 2.5" of rain overnight on site.

Prepared By: Al Lambeth **Date:** 12.03.09 **Checked By:** MM **Date:** 12-15-09

Day:	**Friday**
Date:	**12.04.09**
Log No.:	**134**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 11:00 AM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cloudy & Cool	**Temperature:**	Low 32 / Hi 50

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell and cleaning up mud from 2.5" of rain on site from 12.02.09. Contractor also hauling and placing #57's stone for protective cover over leachate collection pipe line also working on sediment basin #5 grading slopes to design elevations.

Prepared By: Al Lambeth **Date:** 12.04.09 **Checked By:** MMS **Date:** 12-15-09

Day:	**Monday**
Date:	**12.07.09**
Log No.:	**135**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 36/ Hi 50

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling and placing #57's stone for protective cover over the leachate collection pipe line.
- Thalle removed anchor trench material approxmantely 50 feet from anchor trench tie in at phase 2 to phase 3 where the failing anchor trench permability was and this area was resampled for permability testing. All areas disturbed were repaired and backfilled prior to leaving for the night due to weather forcast for 2+ inches of rain on 12.08.09. Contractor also completed placement of clay liner material at the leachate lagoon.
- I performed 4 nuclear density test, 1 drive cylinder and pushed 1 set of shelby tubes for permability testing. All density test performed passed required specifications of 95% compaction per ASTM D698 Standard Proctor curve results.
- I informed contractor of all test results performed today.

Prepared By:	Al Lambeth	**Date:**	12.07.09	**Checked By:** MMS	**Date:** 12-16-09

Day:	**Tuesday**
Date:	**12.08.09**
Log No.:	**136**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy&cool w/Rain	**Temperature:**	Low 32 / Hi 45

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling and placing #57's stone for protective cover over leachate collection pipe lines until rained out in pm today.
- I preformed 4 nuclear density test, 1 drive cylinder and pushed 1 set of shelby tubes for permability testing. All density test preformed passed required specifications of 95% compaction per ASTM D698 Standard proctor curve results.
- I informed contractor of all test results preformed today.
- I shipped 4 sets of shelby tubes for permability testing to the Raleigh lab.

Prepared By: Al Lambeth **Date:** 12.08.09 **Checked By:** MM **Date:** 12-16-09

Day: Wednesday
Date: 12.09.09
Log No.: 137
Page: 1 of 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:00 AM **Departed:** 3:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Clear cool & Windy **Temperature:** Low 34/ Hi 43

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell 4.5" of rain recorded on site from pm on 12.08.09 till am today. Thalle continued hauling #57's stone for protective cover and stockpiling in designated area today

Prepared By: Al Lambeth **Date:** 12.09.09 **Checked By:** MM **Date:** 12-16-09

Day:	**Thursday**
Date:	**12.10.09**
Log No.:	**138**
Page:	**1 of 1**

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cloudy w/ Rain	**Temperature:**	Low 29 / Hi 42

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell and cleaning up mud from 4.5" of rain from pm 12.08.09 and 12.09.09 in am. Contractor continued hauling #57"s stone for protective cover over the leachate collection pipe line and stockpiling in designated area. Contractor removing all soft wet soil in the anchor trench along phase 1 and phase 3 cells and replacing with drier material and compacting with plate tamp and replacing the anchor trench flap.
- I obtained the retest samples of #57's stone for sample 2 (labeled sample 2A & 2B) in the presence of Denise of Haywood County.
- I obtained another sample of #57's stone that was being hauled to site and stockpiled (sample # 4).
- All samples obtained were shipped to the appropriate lab for testing of gradation and permeability at end of day.

Prepared By:	Al Lambeth	**Date:**	12.10.09	**Checked By:**	**Date:** 12-16-09

Day:	**Friday**
Date:	**12.11.09**
Log No.:	**139**
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Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cloudy & Cool	**Temperature:**	Low 18 / Hi 38

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued removing all soft wet material from anchor trench along phase 1 and phase 3 tie in area and replacing with dryer compactable material and compacting with plate tamp prior to replacing the anchor trench flap. Contractor continued hauling #57's stone for protective cover over the leachate collection pipe line and stockpiling in designated area.
- Hallaton to be back onsite on Monday 12.14.09 to complete all work along tie in at phase 1 c1,phase 1 c2.

Prepared By:	Al Lambeth	**Date:**	12.11.09	**Checked By:** MPB	**Date:** 12-16-09

Day:	**Saturday**
Date:	**12.12.09**
Log No.:	**140**
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Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 3:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cloudy & Cool	**Temperature:**	Low 32 / Hi 50

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued removing all soft wet material from anchor trench along phase 1 and phase 3 tie in area and replacing with dryer compactable material and compacting with plate tamp prior to replacing the anchor trench flap.
- Roy Alexander w/McGill Associates, requested the contractor remove the stone along phase 2 and 3 tie in at the anchor trench in 5 different locations to verify that the material in the anchor trench was not soft and/or wet. The 5 locations were observed to be at acceptable moisture content and adequately compacted. The fabric from phase 2 cell was pulled over the new liner to the edge of the anchor trench in all 5 areas the contractor uncovered. These areas were filled back in due to the weather forcasted for this weekend.
- Hallaton is scheduled to be on site on Monday 12.14.09 to repair all areas addressed in letter to Thalle from McGill.

Prepared By:	Al Lambeth	**Date:**	12.12.09	**Checked By:** MWS	**Date:** 12-16-09

Day:	**Monday**
Date:	**12.14.09**
Log No.:	**141**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 3:30 AM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 32/ Hi 58

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line and stockpiling in designated area. The contractor also grading perimeter access road of Phase 3 to subgrade.
- Hallaton to be on site today but not on site by 3:30 pm today.

Prepared By:	Al Lambeth	**Date:**	12.14.09	**Checked By:** MOS	**Date:** 1-6-10

Day:	**Tuesday**
Date:	**12.15.09**
Log No.:	**142**
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Geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 40/ Hi 59

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line and stockpiling in designated area. The contractor also grading perimeter access road of Phase 3 to subgrade and grading perimeter ditches D3 and D4 then installing rip rap as required on drawings
  Thalle poured 3 cubic yards of 3,000 psi concrete for the riser bases in sediment basin #5 and sediment basin #6.

Prepared By: Al Lambeth **Date:** 12.15.09 **Checked By:** MRS **Date:** 12-16-09

Day:	**Wednesday**
Date:	**12.16.09**
Log No.:	**143**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 26/ Hi 45

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line and stockpiling in designated area. The contractor also grading perimeter access road of Phase 3 to subgrade and grading perimeter ditches D3 and D4 then installing rip rap as required on drawings
- I performed 8 nuclear density test and 1 drive cylinder on the perimeter access road for phase 3 at approxamently 100' intervals as noted on density report with the northing and easting locations at test locations. All density test passed required specifications of 100% of ASTM D698 Standard proctor curve test results.
- I informed contractor of all test results performed today.

Prepared By: Al Lambeth **Date:** 12.16.09 **Checked By:** MPI **Date:** 1-4-10

Day:	**Thursday**
Date:	**12.17.09**
Log No.:	**144**
Page:	**1 of 1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 4:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 25/ Hi 40

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line and stockpiling in designated area. The contractor also grading perimeter access road of Phase 3 to subgrade and grading perimeter ditches D5 and D6 then installing rip rap as required on drawings

Prepared By: Al Lambeth **Date:** 12.17.09 **Checked By:** MMS **Date:** 1-4-10

Day:	**Friday**
Date:	**12.18.09**
Log No.:	**145**
Page:	**1 of 1**

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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 7:30 AM **Departed:** 11:30 AM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Snow	**Temperature:**	Low 20/ Hi 30

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle cancelled work for the weekend due to snow and the forcast of 2+ feet overnight.

Prepared By: Al Lambeth **Date:** 12.18.09 **Checked By:** MBS **Date:** 1-6-

Day:	**Monday**
Date:	**12.21.09**
Log No.:	**146**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 10:00 AM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Cold	**Temperature:**	Low 16/ Hi 32

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle cancelled work due to 2 1/2' of snow over the weekend.
- Thalle plans on being back on site 12.28.09.

Prepared By: Al Lambeth **Date:** 12.21.09 **Checked By:** MM **Date:** 1-6-10

Day:	**Monday**
Date:	**12.28.09**
Log No.:	**147**
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 19 / Hi 32

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line system and placing into cell in 2' at a time as required by specifications also continued placement of rip rap in required permeter ditches.
- I obtained 1 sample of #57's stone for gradation sample.

Prepared By: Al Lambeth **Date:** 12.28.09 **Checked By:** MMS **Date:** 1-6-10

Day:	**Tuesday**
Date:	**12.29.09**
Log No.:	**148**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 5:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 16 / Hi 38

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line system and placing into cell in 2' at a time as required by specifications.
- I obtained 1 sample of #57's stone for gradation & permability testing sample.
- Hallaton on site to complete repairs and install liner in leachate lagoon. Hallaton patching holes in old liner at tie in to phase 3 and placing new textile under existing textile along tie in edge.

Prepared By: Al Lambeth **Date:** 12.29.09 **Checked By:** MDS **Date:** 1-6-10

Day: Wednesday
Date: 12.30.09
Log No.: 149
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 8:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** Low 20 / Hi 36

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line system and placing into cell in 2' at a time as required by specifications.
- Hallaton on site to complete repairs and install liner in leachate lagoon. Hallaton patching holes in old liner at tie in to phase 3 and placing new textile under existing textile along tie in edge.Hallaton doing repairs in leachate lagoon prior to installing new liner after lagoon was cleaned out.

Prepared By: Al Lambeth **Date:** 12.30.09 **Checked By:** MBS **Date:** 1-6-10

Day:	**Thursday**
Date:	**12.31.09**
Log No.:	**150**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 6:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	ldy cold w/ Snow sh	**Temperature:**	Low 25/ Hi 38

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from sump area of new cell.
- Hallaton on site deploying GCL at 8:30 am today and continued patching holes in existing liner in leachate lagoon. Began deploying 60 Mil HDPE liner material to cover clay extention at leachate lagoon and welding it to the existing liner with a 2' overlap by extrusion welding. Deployed panel Ex-1 thru Ex-19 and welded all seams prior to leaving for the day.

Prepared By: Al Lambeth **Date:** 12.31.09 **Checked By:** MPS **Date:** 1-6-10

Day:	**Friday**
Date:	**01.01.10**
Log No.:	**151**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Snow	**Temperature:**	Low 20/ Hi 30

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued working in the sump area of cell prepairing to install the 24" dual sump lines and pump connections
- Hallaton on site continued making reairs in the existing leachate lagoon liner as well as deploying GCL at 1:50 pm and then deploying the 60 Mil HDPE liner for caping the clay extention around the lagoon deployed panel Ex-20 thru Ex-27 which completed covering the clay extension around lagoon. All seams were welded prior to Hallaton leaving for the day.

Prepared By:	Al Lambeth	**Date:**	01.01.10	**Checked By:**	MDS	**Date:**	1-6-10

Day:	**Saturday**
Date:	**01.02.10**
Log No.:	**152**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 12:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	y,cold w Snow show	**Temperature:**	Low 10 / Hi 25

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle not on site working today.
- Hallaton not on site working due to weather conditions 1/2" snow on the ground and am to pm snow showers.

Prepared By: Al Lambeth **Date:** 01.02.10 **Checked By:** RADS **Date:** 1-6-10

Day:	**Sunday**
Date:	**01.03.10**
Log No.:	**153**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 10:00 AM **Departed:** 12:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy,cold w Snow	**Temperature:**	Low 2 / Hi 23

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle not on site working today.
- Hallaton not on site working due to weather conditions 1/2" snow on the ground and am to pm snow showers.

Prepared By: Al Lambeth **Date:** 01.03.10 **Checked By:** MMS **Date:** 1-29-10

Day:	**Monday**
Date:	**01.04.10**
Log No.:	**154**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy,cold w/Snow	**Temperature:**	Low 3 / Hi 23

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle working on the 24" lines in sump area of cell untill weather conditions halted work today.
- Hallaton not able to work due to weather conditions today am snow showers.

Prepared By: Al Lambeth **Date:** 01.04.10 **Checked By:** MPS **Date:** 1-29-10

Day:	**Tuesday**
Date:	**01.05.10**
Log No.:	**155**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy cool	**Temperature:**	Low 7 / Hi 24

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle not working due to weather conditions 1/2" snow on ground and am to pm snow showers today.
- Hallaton not on site working due to weather conditions 1/2' snow on the ground and snow showers. Hallaton to return to site on 01.11.10.

Prepared By: Al Lambeth **Date:** 01.05.10 **Checked By:** MBS **Date:** 1-29-10

Day: Wednesday
Date: 01.06.10
Log No.: 156
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Ptly cldy cool **Temperature:** Low 12 / Hi 26

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line system and placing into cell in 2' at a time as required by specifications.
- I obtained a sample of #57's stone for gradation testing.

Prepared By: Al Lambeth **Date:** 01.06.10 **Checked By:** MMS **Date:** 1-29-10

Day:	**Thursday**
Date:	**01.07.10**
Log No.:	**157**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy cold w/ Snow	**Temperature:**	Low 12/ Hi 30

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe system and placing in the cell as required by specifications of 2' of cover over the entire cell untill weather conditions halted work.

Prepared By: Al Lambeth **Date:** 01.07.10 **Checked By:** MBS **Date:** 2-3-10

Day:	**Friday**
Date:	**01.08.10**
Log No.:	**158**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 12:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Snow	**Temperature:**	Low 5/ Hi 26

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle not on site working due to weather conditions
- I loaded lab equipment and nuclear density gauge for transportation back to Raleigh office.

Prepared By: Al Lambeth **Date:** 01.08.10 **Checked By:** MDS **Date:** 2-3-10

Day:	**Monday**
Date:	**01.11.10**
Log No.:	**159**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy,cold w/Snow showers	**Temperature:**	Low 6 / Hi 32

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle hauling and stockpiling #5's stone for cover over the leachate collection system pipes prior to placing fabric then covering with #57's stone for protective cover approxamently 10 loads.
- Hallaton not able to work due to weather conditions today am snow showers and cold tempertures.

Prepared By: Al Lambeth **Date:** 01.11.10 **Checked By:** MM **Date:** 2-8-10

Day:	**Tuesday**
Date:	**01.12.10**
Log No.:	**160**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy cold am snow showers	**Temperature:**	Low 12 / Hi 32

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection system pipe lines before weather conditions haulted work for today am freezing rain followed by snow showers till mid afternoon.
- Hallaton not on site working due to weather conditions am freezing rain followed by snow showers and below freezing tempertures. Hallaton will return later this week when tempertures are forcasted t be warmer.

Prepared By: Al Lambeth **Date:** 01.12.10 **Checked By:** MM **Date:** 2-8-10

Day: Wednesday
Date: 01.13.10
Log No.: 161
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy & Cold **Temperature:** 15 low / 41 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe line system and placing into cell in 2' at a time as required by specifications.
- I obtained a sample of #57's stone for testing.

Prepared By: Al Lambeth **Date:** 01.13.10 **Checked By:** MMB **Date:** 2-8-10

Day:	**Thursday**
Date:	**01.14.10**
Log No.:	**162**
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly. Cldy & Cold	**Temperature:**	17 Low / 45 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling #57's stone for protective cover over the leachate collection pipe system and placing in the cell as required by specifications of 2' of cover over the entire cell.
- I obtained a sample of #57's stone for gradation testing.

Prepared By: Al Lambeth **Date:** 01.14.10 **Checked By:** MMS **Date:** 2-8-10

Day:	**Friday**
Date:	**01.15.10**
Log No.:	**163**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly. Cldy & Cold	**Temperature:**	Low / Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle continued hauling and placing #57's stone for protective cover over the leachate collection pipe line system and entire cell with 2' of #57's stone.

Prepared By: Al Lambeth **Date:** 01.15.10 **Checked By:** MM **Date:** 2-8-10

Day:	**Monday**
Date:	**01.18.10**
Log No.:	**164**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy & cold	**Temperature:**	Low 33 / Hi 55

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell and cleaning up from 1 1/2" of rain overnight.
- Hallaton to be on site to complete tie in repairs and leachate lagoon today.

Prepared By: Al Lambeth **Date:** 01.18.10 **Checked By:** MAS **Date:** 2-8-10

Day:	**Tuesday**
Date:	**01.19.10**
Log No.:	**165**
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 6:30 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Ptly cldy & Cold	**Temperature:**	Low 29 / Hi 58

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle hauling and stockpiling #57's stone for protective cover in designated area.
- Hallaton on site completing repairs along tie in phase 1 cell 4 and phase 3 cell and perepairing leachate lagoon for primary lier to be installed.

Prepared By: Al Lambeth **Date:** 01.19.10 **Checked By:** MMS **Date:** 2-8-10

Day: Wednesday
Date: 01.20.10
Log No.: 166
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geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy & Cold w/ Rain **Temperature:** 36 low / 50 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle not hauling stone today working on erosion control measures for pending weather forcast for rain.
- Hallaton completed all repairs along tie in of phase 3 cell to phase 1 cell 4 and phase 3 to phase1 cell 1 to phase 2 cell 1 area. It began raining before Hallaton could start deploying liner at the leachate lagoon.

Prepared By: Al Lambeth **Date:** 01.20.10 **Checked By:** MAS **Date:** 2-8-10

Day:	**Thursday**
Date:	**01.21.10**
Log No.:	**167**
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INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Cold w/ Rain	**Temperature:**	33 Low / 48 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle not working due to weather conditions. Rain
- Hallaton not working due to weather conditions.

Prepared By: Al Lambeth **Date:** 01.21.10 **Checked By:** MM **Date:** 2-8-10

Day:	**Friday**
Date:	**01.22.10**
Log No.:	**168**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 8:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy & Cold w/Rain showers **Temperature:** 32 Low / 50 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell from rain overnight.
- Hallaton on site deploying 60 Mil HDPE liner for leachate lagoon panel 1 thru panel 11 all seams were welded prior to contactor leaving for the night.

Prepared By: Al Lambeth **Date:** 01.22.10 **Checked By:** MPB **Date:** 2-8-10

Day:	**Saturday**
Date:	**01.23.10**
Log No.:	**169**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 7:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy & Cold w/Rain showers **Temperature:** 31 Low / 52 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle backfilling anchor trench around leachate lagoon once Hallaton completed placement of HDPE liner.
- Hallaton on site deploying 60 Mil HDPE liner for leachate lagoon panel 12 thru panel 19 all seams were welded prior to contactor leaving for the night. This completed the leachate lagoon all destructs and repairs comlpeted prior to leaving the site.

Prepared By: Al Lambeth **Date:** 01.23.10 **Checked By:** MMB **Date:** 2-8-10

Day:	**Monday**
Date:	**01.25.10**
Log No.:	**170**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Cold w/Rain	**Temperature:**	Low 33 / Hi 44

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle pumping rain water from north end of cell and cleaning up from 2 1/2" of rain overnight. Site too wet to haul stone today.

Prepared By: Al Lambeth **Date:** 01.25.10 **Checked By:** MBB **Date:** 2-8-10

Day:	**Tuesday**
Date:	**01.26.10**
Log No.:	**171**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy w Snow showers & Cold **Temperature:** Low 29 / Hi 39

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle working on haul road prepairing it to be able to haul #57's stone to cell on 01.27.10.

Prepared By: Al Lambeth **Date:** 01.26.10 **Checked By:** MM **Date:** 2-8-10

Day: Wednesday
Date: 01.27.10
Log No.: 166
Page: 1 of 1

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy & Cold w/ Rain **Temperature:** 36 low / 50 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle hauling and placing #57's stone for protective cover over the leachate collection pipe line system and. entire cell with 2' of #57's stone for protective cover.
- I obtained a sample of #57's stone for gradation and permibality testing and shipped to Pittsburgh office.

Prepared By: Al Lambeth **Date:** 01.27.10 **Checked By:** MM **Date:** 2-8-10

Day:	**Thursday**
Date:	**01.29.10**
Log No.:	**173**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions:	Cldy & Cold w/ Rain	**Temperature:**	29 low / 45 Hi

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle hauling and placing #57's stone for protective cover over the leachate collection pipe line system and. entire cell with 2' of #57's stone for protective cover.
- I obtained a sample of #57's stone for gradation testing.

Prepared By:	Al Lambeth	**Date:**	01.28.10	**Checked By:** MMS	**Date:** 2-8-10

Day:	**Friday**
Date:	**01.29.10**
Log No.:	**174**
Page:	**1 of 1**

geotechnics
INTEGRITY IN TESTING

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	2009-666
Client Name:	Joyce Engineering LTD	**Client Contact:**	Hannu Kemppinen
Site Location:	Haywood County,N.C.	**Time on Site:**	**Arrived:** 8:00 AM **Departed:** 4:00 PM
General Contractor:	Thalle	**Superintendent:**	Keith Vess

Visitors and Other Firms Representatives On Site

Firm Names	Representative's Name and Title

Weather Conditions: Cldy & Cold w/Snow **Temperature:** 25 low / Hi 33

Contractor's Equipment: D6N Cat. Bulldozer, D6R Cat. Bulldozer, 3 Volvo A35D Offroad Dump trucks 345B Cat. Trackhoe, 320B Cat. Trackhoe, IT 28G Cat. Loader, CP56 Cat. Sheepsfoot roller, CS563 Cat. Smoothe drum roller

Contractor's Personnel: 1 Asst.Superintendent,2 Foremen and 8 Operators

Description of Daily Activities & Events

- Mr. Lambeth traveled to site to discuss daily work scheduled by contractor today.
- Thalle hauling and placing #57's stone for protective cover over the leachate collection pipe line system and. entire cell with 2' of #57's stone for protective cover.
- I obtained a sample of #57's stone for gradation testing.

Prepared By: Al Lambeth **Date:** 01.29.10 **Checked By:** NMK **Date:** 2-8-10

Day: Thursday
Date: 3/25/2010
Log No.: 175
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	801.0900.11T01
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 11:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle Construction Co. Inc.	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature: F°** am 50/pm 80

Contractor's Equipment: A25D Volvo Offroad truck, 345B CAT Trackhoe, D6R CAT Dozer, Deer 650 Dozer, CAT Front Loader

Contractor's Personnel: 1 Assistant Super., 1 Foremen, 3 Operators & 3 Labors

Description of Daily Activities & Events

- Thalle resumed work on Monday March 22, 2010 after 37 days of winter shut down
  Move stone from stockpile and haul from quarry to Phase 3, spread stone on the cell floor with dozer equipped with GPS guiding system.
  Collect CQA sample S-20 of stone for laboratory testing of grain size and permeability.

Prepared By: *H.Kemppinen* **Date:** 3.25.2010 **Checked By:** **Date:**

Day: Wednesday
Date: 3/31/2010
Log No.: 176
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	801.0900.11T01
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 11:00 AM **Departed:** 5:00 PM
General Contractor:	Thalle Construction Co. Inc.	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature: F°** am 50/pm 80

Contractor's Equipment: A25D Volvo Offroad truck, 345B CAT Trackhoe, D6R CAT Dozer, Deer 650 Dozer, CAT Front Loader

Contractor's Personnel: 1 Assistant Super., 1 Foremen, 3 Operators & 3 Labors

Description of Daily Activities & Events

- Thalle continues this week hauling and placing drainage layer stone in the phase 3.
  Thalle removes stone along west side edge and place plywood for the future expansion.
  Pump water from the sump area.

Prepared By: *H.Kemppinen* **Date:** 3.31.2010 **Checked By:** **Date:**

Day: Wednesday
Date: 4/14/2010
Log No.: 177
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	801.0900.11T01
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 9:30 AM **Departed:** 5:00 PM
General Contractor:	Thalle Construction Co. Inc.	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature: F°** am 50/pm 80

Contractor's Equipment: A25D Volvo Offroad truck, 345B CAT Trackhoe, D6R CAT Dozer, Deer 650 Dozer, CAT Front Loader

Contractor's Personnel: 1 Assistant Super., 1 Foremen, 3 Operators & 3 Labors

Description of Daily Activities & Events

- Hallaton repairs/modifies leachate lagoon east slope by adding soil around wet well to form an even grade slope, place new layer of HDPE over the soil and boots around the wet well and vent pipe; repair number 41.
  Drain water from between the pond liners and weld patches; repair numbers 39 and 40.
  Thalle closed pond perimeter anchor trench and graded a swale to drain and erected silt fence by the evening.
  Thalle added soil in the Phase 3 NE corner to slope the subgrade to drain toward sump per McGill verbal directions, no drawing was provided to the Contractor.
  Hydroseed slopes on both sides of access road between leachate pond and Phase 3.
  Dozer equipped with GPS system continued grading Phase 3 stone drainage layer.
  Thalle has opened the Phase 2 tie-in area for the planned remedy to place GCL and HDPE over a section of anchor trench where the anchor trench permeability test sample failed. The repair are is not opened wide enough to accommodate the planned repair. Thalle needs to remove more of the 57 stone to expose the break point to Phase 3. This work should continue tomorrow

Prepared By: *H.Kemppinen* **Date:** 4.14.2010 **Checked By:** **Date:**

Day: Thursday
Date: 4/15/2010
Log No.: 178
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	801.0900.11T01
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 8:30 AM **Departed:** 5:15 PM
General Contractor:	Thalle Construction Co. Inc.	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature: F°** am 50/pm 80

Contractor's Equipment: A25D Volvo Offroad truck, 345B CAT Trackhoe, D6R CAT Dozer, Deer 650 Dozer, CAT Front Loader

Contractor's Personnel: 1 Assistant Super., 1 Foremen, 3 Operators & 3 Labors

Description of Daily Activities & Events

- Hallaton placed HDPE membrane over the prepared NE corner of Phase 3; dimensions: 46 ft long, 20 ft wide Panel number 114, geotextile placed over.
  Thalle clears more width for the Phase 2 tie-in area work for Hallaton to place GCL and HDPE membrane.
  57 stone somewhat contaminated with soil-water run-off from Phase 2 slope. QA allows reinstalling stone after GCL/HDPE has been placed. This is a small area 200x20=4000sf of the 9 acres of Phase 3 appx 400,000sf or about 1% of the entire cell.
  QA request for a detail from McGill for the rain cover anchoring along tie-in with Phases 1 and 2.
  Thalle continues grading drainage layer stone, surveyor verifies grades in Phase 3.
  Rain cover installation is planned after the stone layer survey is completed.
  Phase 2 tie-in area clearing begins 130 ft from Phase 3 west side limits of liner. GCL length is 150 ft.
  Sketch indicates work area and length of materials placed.
  Additional HDPE will be delivered on Monday 4/18.

Prepared By: *H.Kemppinen* **Date:** 4.15.2010 **Checked By:** **Date:**

Day: Friday
Date: 4/16/2010
Log No.: 179
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	801.0900.11T01
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** **Departed:**
General Contractor:	Thalle Construction Co. Inc.	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature: F°** am 50/pm 80

Contractor's Equipment: A25D Volvo Offroad truck, 345B CAT Trackhoe, D6R CAT Dozer, Deer 650 Dozer, CAT Front Loader

Contractor's Personnel: 1 Assistant Super., 1 Foremen, 3 Operators & 3 Labors

Description of Daily Activities & Events

- QA comments based on Thursday's activities and correspondence with Thalle Construction.
  Hallaton installed GCL and HDPE over the area of anchor trench as planned by McGill Ass.
  Additional material will be delivered by Monday.
  Contractor protected work area against rain.

Prepared By: *H.Kemppinen* **Date:** 4.16.2010 **Checked By:** **Date:**

Day: Monday
Date: 4/19/2010
Log No.: 180
Page: 1

Daily Field Activity Log

Project Name:	White Oak MSW Landfill Phase 3	**Project No.:**	801.0900.11T01
Client Name:	Joyce Engineering, Inc.	**Client Contact:**	
Site Location:	Haywood County, N.C.	**Time on Site:**	**Arrived:** 9:30 AM **Departed:** 5:10 PM
General Contractor:	Thalle Construction Co. Inc.	**Superintendent:**	Keith Vess

Other Firms / Sub-Contractor Represented On Site

Firm / Sub-Contractor	Representative's Name and Title

Weather Conditions: Sunny **Temperature: F°** am 50/pm 80

Contractor's Equipment: A25D Volvo Offroad truck, 345B CAT Trackhoe, D6R CAT Dozer, Deer 650 Dozer, CAT Front Loader

Contractor's Personnel: 1 Assistant Super., 1 Foremen, 3 Operators & 3 Labors

Description of Daily Activities & Events

- Bentomat DN Roll number 0003-916 (label worn out)
  Bentomat DN lot number 9008-GRV (label worn out)
  Length 150 feet, width 14 feet
  Microspike HDPE 60-mil textured Roll number 339223-09 Date 09/22/2009
  length 125 m, width 7 m, thickness 1.53 mm

  Phase 2 tie-in 203 feet long, 22 feet wide,
  Bentomat placed full length, mid point about where the anchor trench perm test failed
  Rain cover panels 48 feet wide, 235 long (length varies) from west edge of Phase 3 to east slope toe.
  Western half of Ph3 rain cover secured with rock bags tied with rope 10 feet by 10 feet.
  East slope of Ph3, 3:1 slope tied with ropes 10 feet apart and down slope 5 feet apart.
  Hallaton covered Ph2 tie-in with geotextile, Thalle begins to replace stone over the repaired area.
  Call Kennedy Garber of Hallaton to request roll info for the bentomat and microspike used for the tie-in work.

Prepared By: *H.Kemppinen* **Date:** 4.19.2010 **Checked By:** **Date:**

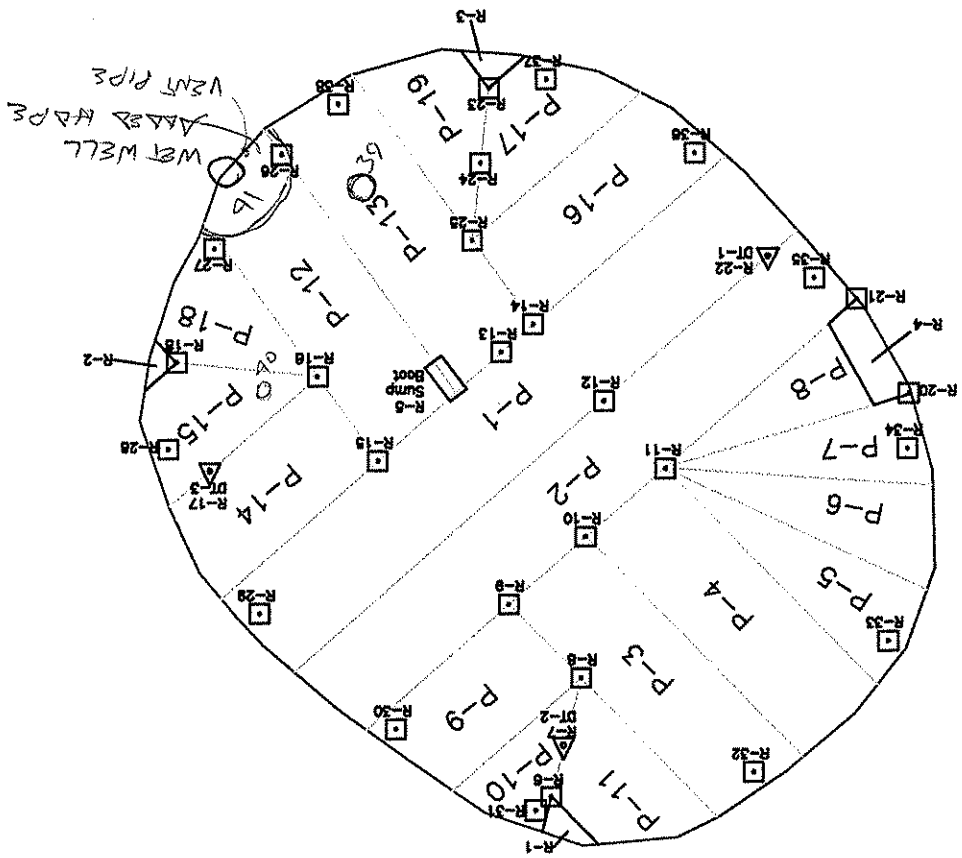
R#	PANEL	LOCATION	DATE	TIME	TYPE	SIZE	MAC
R39	P13	17 from trench	4-14-2010	11:30	Patch	4x5	X10 120
R40	P15	18 " "	4-14 2010	12:00	PATCH	2x2	"
R41	P12-13 18	Trench and Walkway	4-14 ~~1400~~	1400	PATCH	19x23	"
					2 BOLTS		

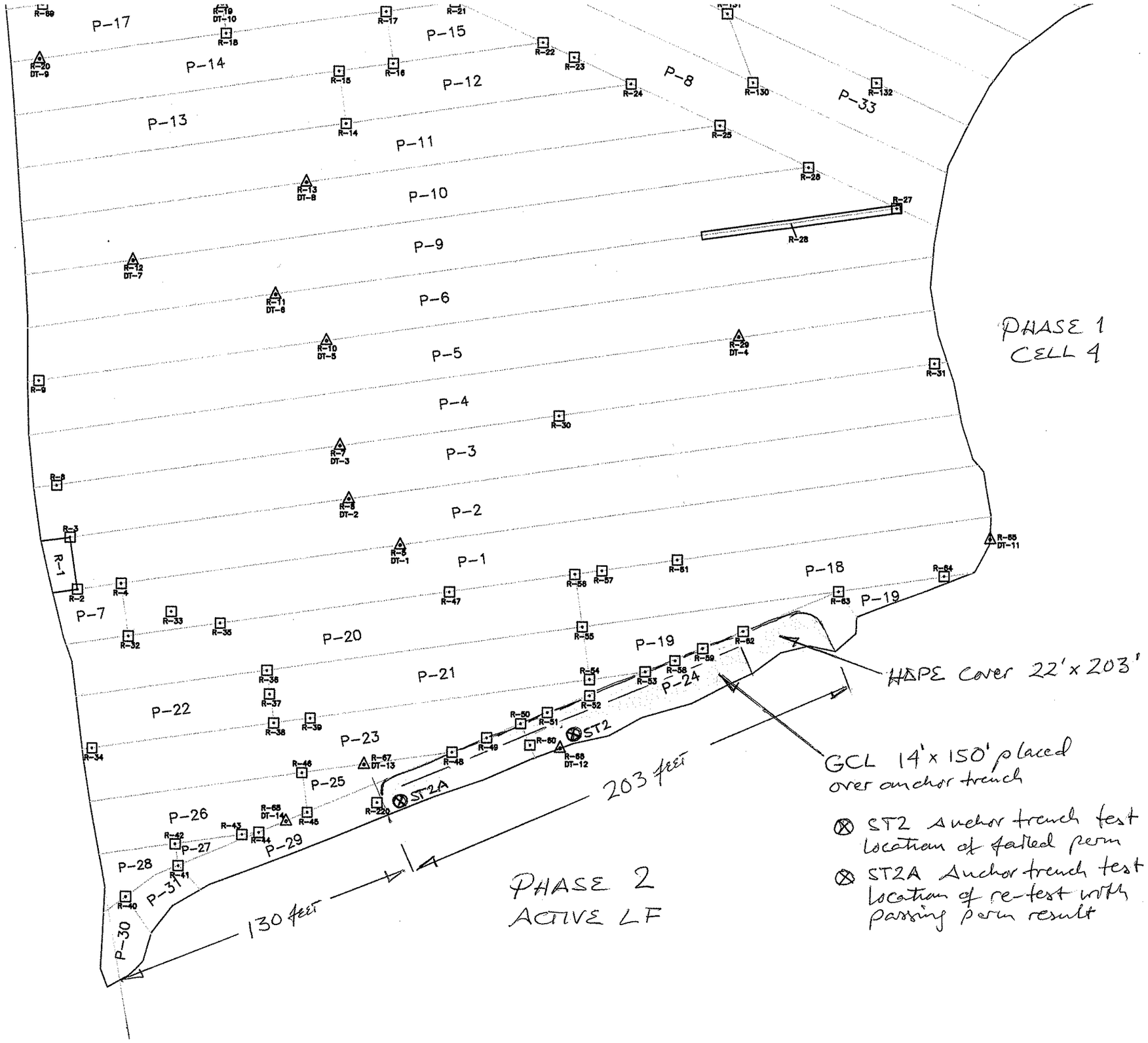
Trial Weld

4-14 11:10 70F X10 R.O. 550/500

REEL 121/123/123/123/120

SHEAR 146/145/147/148/145




PHASE 1
CELL 4
HDPE Cover 22' x 203'
GCL 14' x 150' placed over anchor trench
ST2 Anchor trench test location of failed perm
ST2A Anchor trench test location of re-test with passing perm result
203 feet
130 feet
PHASE 2
ACTIVE LF
P-17
P-15
P-14
P-12
P-13
P-11
P-10
P-9
P-6
P-5
P-4
P-3
P-2
P-1
P-8
P-33
P-18
P-19
P-7
P-20
P-21
P-22
P-23
P-24
P-25
P-26
P-27
P-28
P-29
P-30
P-31
ST2
ST2A

Appendix V B – Project Photographic Record

1. Thalle Construction excavates for Phase 3 expansion.

2. Phase 1 existing liner edge covering plywood exposed.

3. Phase 3 north end structural fill completed.

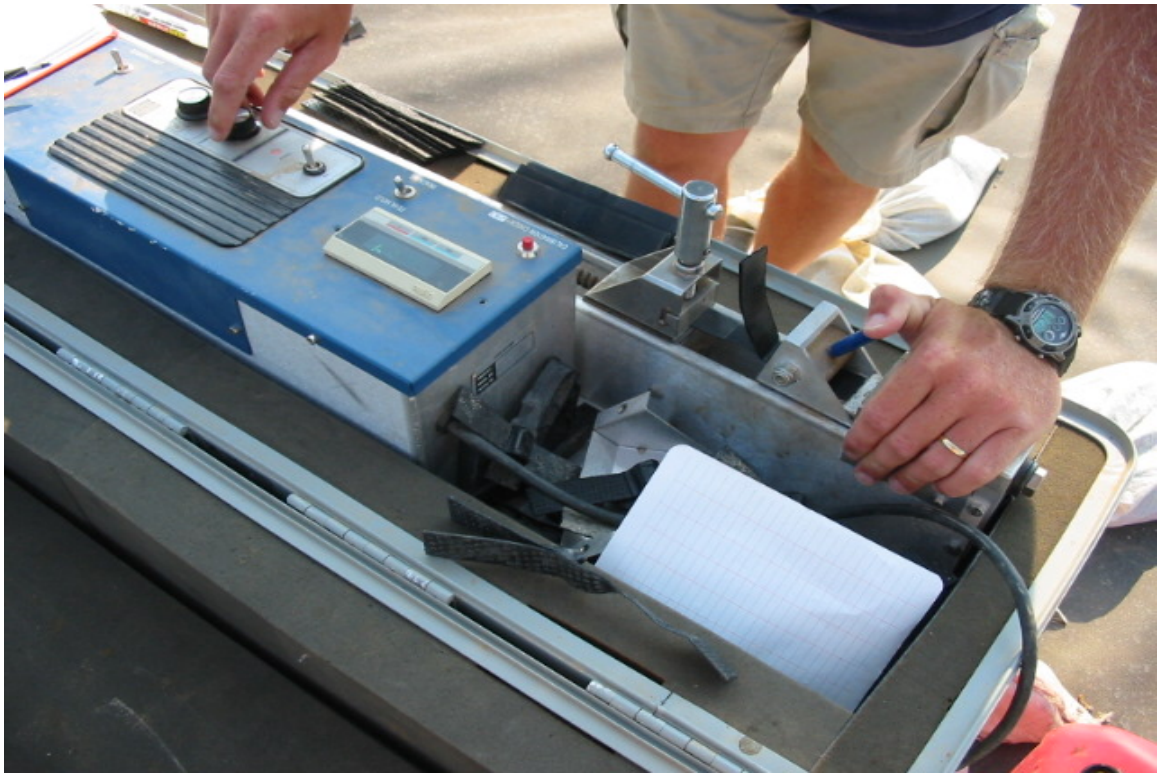
4. Contractor encountered rock during excavation of the Phase 3 west side slope.

5. Completed test pad on foreground, rock on west slope, east slope soil liner construction.

6. Thalle constructing east slope Phase 3 low-permeability soil liner.

7. Synthetic liner installation began at the south end of Phase 3.

8. Trial weld sample cuttings prepared for seam peel and shear strength field testing.



9. Field conducted peel and shear strength testing of welded membrane seam.

10. Dual track fusion welder joins adjacent geomembrane panels together.

11. Installer cuts geomembrane seam for destructive testing.

12. Geomembrane repair patch is first tacked with hot air gun to stay in place.

13. Extrusion welder is used for repairs.

14. Vacuum box testing of an extrusion welded seam.

15. Phase 3 covered with geosynthetic materials before January 2, 2010 winter weather.

16. Contractor spreading drainage layer stone, dozer equipped with GPS grading system.

17. Phase 3 stone drainage layer completed, stormwater control liner installation in progress.

18. Leachate collection pond berm was raised and entire pond lined with new material.

Appendix V C – Construction Progress Meeting Minutes

Pre-Construction Conference
White Oak MSW Landfill
MSW Phase 3
Haywood County, North Carolina
June 11, 2009
Meeting Minutes

I. Introductions

Mr. Jeff Bishop introduced the people in attendance today at the preconstruction meeting and noting what part they will be involved with during the actual construction.

II. Project Participants

A. Owner: Haywood County
215 North Main Street
Waynesville, NC 28786
David Cotton - County Manager (828) 452-6625
Marty Stamey - Assistant County Manager (828) 452-6779
Stephen King - Solid Waste Director (828) 627-8042
Mark Shumpert, P.E. - County Engineer (828) 356-2114
Denese Ballew - Landfill Superintendant (828) 627-6445
Donna Woodruff - Purchasing Manager (828) 452-6629

B. Engineer: McGill Associates, P.A.
P.O. Box 2259, Asheville, N.C. 28802
(828) 252-0575 Fax (828) 252-2518
Jeff Bishop, P.E. - Project Engineer (828) 712-0283
Roy Alexander – Construction Administrator cell (828) 712-0282
Dave Pasko – Project Designer (252-0575)

C. North Carolina Department of Health and Natural Resources - Division of Waste Management (828) 296-4500
Allen Gaither – Solid Waste Section
Andrea Keller – Solid Waste Section

D. Contractor: Thalle Construction Company, Inc.
900 NC Hwy 86 North
Hillsborough, NC 27278
(919) 245-1490 Fax (919) 245-1516
Chris Haverstrom – Project Manager (919) 422-8187, cell (919)-422-8187
Keith Vess – Project Superintendent (919) 201-0530, cell (919) 201-0530
Josh Davis – Assistant Superintendent (919) 730-6722
Fred Morin – Project Engineer (919) 201-2835, cell (919) 201-2853
Larry Fantozzi – Vice President (919) 516-2435

E. CQA Engineer: Joyce Engineering, Inc.
2211 West Meadowview Road, Suite 101
Greensboro, NC 27407
(336) 323-0092 Fax (336) 323-0093
Evan Andrews, P.E. – Project Manager (336) 209-3740 cell (336) 323-0092
Hannu Kemppinen, P.G. – Project Geologist (336) 209-7156, cell (336) 209-7156
Jacob Buda – Field Representative (919) 612-4532

III. Project Scope

Contract Schedule

Anticipated Notice to Proceed:	June 15, 2009
Completion Date:	April 11, 2009
Construction Time:	300 Calendar Days
Liquidated Damages:	$1,000 per Calendar Day

The contract documents will be completed today with the submittal of the contractor's insurance and bonds during the precon meeting this morning. The documents should be ready this afternoon for pick up and execution by the contractor.

IV. Submittals

The Contractor will need to provide the following required submittals:

A. A list of subcontractors who will be working on the project for the General Contractor, along contact information.

B. Construction Schedule - A construction bar chart with a construction schedule with critical dates. The schedule should show areas in which the Contractor plans to work in the immediate future, noting the construction of major items. The contractor's schedule must be submitted and approved prior to his submittal of the first application for payment, if not; we can process the application payment.

V. Shop Drawing Submittals

McGill Associates will require at least six (6) copies of all shop drawings submitted on equipment and materials. All shop drawings should be mailed to Jeff Bishop at McGill Associates, P.A., P.O. Box 2259, Asheville, NC, 28802; or shipped, to McGill Associates, P.A., 55 Broad Street, Asheville, NC 28801.
McGill Associates will consider electronic submittals of shop drawings. Electronic submittals shall be clear in scope, with tracking information included in the subject line. The contractor **must** have his stamp on the shop drawing, dated and signed before sending his electronic submittal to the engineer.

Chis Haverstorm stated he would submit a list of shop drawings based on his review of the specifications. He asks the engineer to review the list and see if he had missed any required shop drawings.
Mr. Jeff Bishop ask the contractor to let our office know if he has a shop drawing that is critical to his construction schedule, if so, we will place a high priority on that particular submittal.

VI. Pay Request Submittal

A. McGill Associates will require five (5) copies of the Application for Payment to be submitted on a monthly basis. The Contractor is to use the face copy of the form in the Contract document, which is located after the Notice to Proceed. The Contractor should submit back-up sheets he plans to use or wishes to use for the Unit Bid Item Quantities for our review and approval.

B. The cut-off date will be the 25th of each month. The completed Application for Payment should be in McGill Associates' office by the 1st of each month. McGill Associates will review the Application for Payment and if correct will forward it to the Owner within 5-7 business days.

   Mr. David Cotton asks about the turn around time between the approval of the contractor's application for payment and the actual payment by Haywood County. After a brief discussion, the County will try to make payment within 10 days after receiving the approved application for payment from the engineer.

C. If the Contractor wants to bill or invoice for stored materials, he must provide an original invoice the first month showing the dollar amounts of the equipment or stored materials. Beginning the second month, he will no longer have to submit that invoice, however he must submit a summary of stored materials showing the amount of stored materials from the previous month, the amount of stored materials incorporated into the project the current month, and the materials purchased and placed on the job site during the current month, with original invoices. With the second months application for payment the contractor will need to included a summary sheet show the material purchased last month, materials purchased the second month and materials placed into the new work.

D. We recommend that the Contractor compare the unit bid item quantities with the CQA Engineer for the items that the CQA engineer reviews the actual quantities installed, prior to submitting the Application for Payment so that McGill can contact the CQA Engineer if discrepancies arise.

E. With the Application for Payment, the Contractor <u>must</u> submit a sales tax statement. The sales tax statement should be broken down into County and State taxes, and the form itself signed and notarized. Should we receive an Application for Payment without a sales tax statement, the Application for Payment cannot be approved.

F. Any request for rain days should be submitted with the Application for Payment on a monthly basis.

G. The Contractor will not receive payment for any work until said work has passed all required CQA testing.

VII. Site Safety

We ask that the Contractor pay special attention to safety on this project, especially as it relates to earthwork equipment, and trenching and excavation. The Contractor is required to follow all safety requirements of the White Oak Landfill, Haywood County, and OSHA guidelines during the construction of this project. We recommend the contractor read section 6.13 of the general conditions of the contract as it relates to his responsibility for safety on this project.

VIII. Construction Operations

A. Communication, all phone calls, letters should be addressed to Roy Alexander. He will be hand all communications during construction of the new landfill cell.

B. Typical workday schedule should consist of 12 hours per day, Monday through Saturday. No Sunday or holidays, unless under extreme circumstances and only with prior approval from the Owner.
For access to the landfill site, the contractor will install his lock on the entrance gate. The landfill staff will locate the gate when their day is finished. It will be responsibility of the contractor to make sure the gate is locked early in the mornings and after normal landfill operation hours.

C. Communication and coordination with CQA Engineer, address all letter, calls and emails to Roy Alexander

D. Access to Construction Area was discussed:
1. Coordination access to the construction site with on-going landfill activities and staff personnel.
2. Trailer location was discussed and already located in the field.
3. Power hook-up. There is power available at the scale house; it will be up to the contractor to provide power to his office trailers.
4. Water & Sanitation facilities. The contractor will need to coordinate with the landfill staff about the use of the water on site. There is no sanitation facilities available to the contractor, he will need to provide porta jons for his workmen.
5. Material storage. The contractor will need to coordinate material storage areas with the landfill staff. Do not place materials what will interfere with the normal day to day activities of the landfill.

6. Cleanup. We request the Contractor to clean up his work area on a weekly basis, preferably each day after work. Do leave an issue that will interfere with normal activities of the landfill operations or the staff.

E. Leachate storage lagoon improvements. The contractor will need to give as much notice as possible to the landfill staff prior to starting the up grades to the lagoon. Mr. Chris Haverstorm stated this work item is currently scheduled mid to late October, 2009. The contractor shall coordinate the leachate lagoon construction activities in order to keep the time that the lagoon if off line to a minimum.

G. Surveying. Upon completion of the staking of the job site, the contractor should notify the engineer. Mr. Jeff Bishop requested a submittal of a grid system based on the surveying done by the contractor that will show the clay liner. Then for the monthly meetings, up grade this grid system to allow everyone to track the construction progress and CQA testing.

H. Erosion Control and impact to streams. We provided the contractor will a copy of the erosion control permit to place in his office trailer. The installation of the erosion control measures and devices must the first item on the contractor schedule. Due to the close location of the Pigeon River, the contractor can not allow material to wash off site. The erosion control measures should be inspected after each rain event and corrective measures must be taken immediately by the contractor.

I. Temporary Offices, the location of the contractor's offices have been worked out with the landfill staff.

J. Changes in Work

The Contractor should immediately notify the Construction Administrator's office if something is encountered in the field that is different than shown on the Contract drawings that may require a change order. McGill Associates will contact the Owner and schedule a meeting in the field to review the Contractor's concern. If agreed that there is additional work, a request to the Contractor to provide a cost proposal will be made. The Contractor is asked to be fair and reasonable in change order items, and the review and processing of change orders will be treated likewise.

K. As-Built drawings

McGill Associates will provide a new, clean set of Contract drawings to be kept in the Contractor's job trailer. Both the CQA Engineer and Contractor's superintendent are requested to keep an accurate set of as-builts or marked up plans, showing any changes or deviations from the Contract drawings. Also, any underground utilities encountered should be located on these as-built drawings.

The contractor stated, they will also keep an electronic copy of the original contract drawings and update any changes on their computer files.

IX. Construction Quality Assurance

Mr. Hannu Kemppinen discussed his firm's role with the CQA portion of the landfill project. He will be the main contract with Joyce Engineering. Hannu introduced Al Lambeth with Geotechnics, who will be the person on site to do the testing and compiled

the required field data. Hunnu noted a second person, Jacob Buda, would be on site within 30 days to help with the CQA testing on this project.

A. Structural Fill
   1. Field Testing
   2. Removal and replacement of unsuitable materials

B. Clay Liner
   1. Pre construction testing
   2. Field testing
   3. Laboratory Testing
      The Contractor will be responsible for all costs associated with failing permeability tests that exceed a five percent (5%) failure rate by quantity. There is a $500 minimum.

C. Primary Liner Testing
   1. Conformance material testing
   2. Construction testing
      a. Non-destructive
      b. Destructive
         The Contractor will be responsible for all costs associated with failing geomembrane destructive tests that exceed a five percent (5%) failure rate by quantity. There is a $500 minimum.

D. Drainage Layer
   1. Pre construction testing
      b. Need to complete preconstruction testing for all sources
      c. Calcium Carbonate testing required
         i. Field testing
         ii. Laboratory Testing

E. Geotextile
   1. Conformance testing

F. CQA Final Report

X. Construction Progress Meetings

We tentively scheduled the first progress and coordinate meeting for Wednesday, July 1st, 10:00am at the contractor's job site office trailer.

XI. North Carolina Department of Environment and Natural Resources - Division of Waste Management Conditions

X11. Other items

1. Steven King pointed out, it is a county requirement that all personnel working in the active landfill cell must wear safety glasses and steel toe boots.
   Keith Vess stated they have a safety program and it requires the same thing. Also their company's safety office would make routine visits to the job site and review his construction safety program.
2. David Cotton pointed out; the contractor can allow his equipment to track mud onto the DOT highway. He ask about the possibility of a washing station be constructed and used to clean the equipment. The landfill staff said the washing station was already in the works.
   Ms. Denese Ballew noted the contractor had already helped with this problem by using his street sweeper and cleaning the paved road into the landfill.
3. There may be an issue with water on the job site. Denese Ballew stated the current well is not very good and needs to be replaced with a new well or the well pump and pressure tank replaced with a higher volume pump and tank. It may be necessary for the contractor to provide bottle water for his use.
4. Dave Pasko pointed out, with the help of Ronnie Wilson of the landfill staff; they had dug and uncovered the existing landfill liner near cell no. one. However, the liner under cell no. four is 10-12 feet deep and may have trash over the liner. The contractor will have to excavate the area and locate the edge of the existing liner.
5. I have attached a copy of the precon meeting sign in sheet, with everyone phone numbers and e-mail address for future use.

07518\const. admin\ msic\precon meeting minutes doc

PRECONSTRUCTION MEETING ATTENDANCE SHEET

Project: **HAYWOOD COUNTY**
White Oak MSW Landfill
MSW Phase Three (3)

Date: **June 11, 2009** **Time: 10:00AM** **Project No. 07518**

NAME	REPRESENTING	PHONE/MOBILE
Michael Smith	Geotechnics	Office: 919-876-0405 Mobile: 919-612-4534 E-mail msmith@geotechnics.net
Jacob Buda	Geotechnics	Office: 919-876-0405 Mobile. 919-612-4532 E-mail jbuda@geotechnics.net
AL LAMBETH	Geotechnics	Office: 919-876-0405 Mobile: 919-417-4464 E-mail allambeth@yahoo.com
ALLEN GATTHER	NC-DENR SOLID WASTE SECTION	Office: 828-296-4703 Mobile. E-mail ALLEN.GATTHER@NCDENR.GOV
ANDREA KELLER	NCDENR SOLID WASTE SECTION	Office: 828-296-4700 Mobile: E-mail Andrea.Keller@ncdenr.gov
Bill Sperry	McGill Associates	Office: 828-252-0575 Mobile. 828-713-2251 E-mail bill.sperry@mcgillengineers.com
Mark Shumpert County Engineer	HAYWOOD COUNTY	Office: 356-2114 Mobile: E-mail mshumpert@haywoodnc.net
DONNA WOODRUFF PURCHASING MANAGER	HAYWOOD COUNTY	Office: 828-356-2612 Mobile. E-mail dwoodruff@haywoodnc.net
Roy Alexander	McGill Assoc. PA	Office: 828-252-0575 Mobile: 828-712-0282 E-mail roy@mcgillengineers.com

PRECONSTRUCTION MEETING ATTENDANCE SHEET

Project: **HAYWOOD COUNTY**
White Oak MSW Landfill
MSW Phase Three (3)

Date: **June 11, 2009** **Time: 10:00AM** **Project No. 07518**

NAME	REPRESENTING	PHONE/MOBILE
DAVID COTTON	COUNTY OF HAYWOOD	Office: 828.452.6707 Mobile: E-mail DCOTTON@HAYWOODNC.NET
CHRIS HAVERSTROM	THALLE CONSTRUCTION	Office: 919-245-1490 x1630 Mobile. 919-422-8187 E-mail Chaverstrome thalle.com
Keith Vess	828-645-9896 Thalle Construction	Office: 919-245-1490 Mobile: 919-201-0530 E-mail K Vess@thalle.com
Fred Morin	Thalle Construction	Office: 919-245-1490 Mobile. 919-201-2835 E-mail FMorin@Thalle.com
DAVE PASKO	McGILL ASSOCIATES	Office: 828/252-0575 Mobile: 828/231-0626 E-mail dpasko@mcgillengineers.com
Denese Ballew	Haywood County	Office: 828-627-6445 Mobile. 828-734-1374 E-mail Dballew@HaywoodNc.Net
STEPHEN KING	HAYWOOD COUNTY	Office: 828-627-8042 Mobile: 828-400-3544 E-mail Sking@haywoodnc.net
Hannu Kauppinen	Joyce Engineering, Inc	Office: 336-323-0092 Mobile. 336-209-7156 E-mail hannu@joyceengineering.com
EVAN Andrews	JOYCE Engineering, INC	Office: 336-323-0092 Mobile: 336-209-3740 E-mail eandrews@joyceengineering.com

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Monthly Progress and Coordinate Meeting
July 1, 2009

Present for the first regular monthly progress and coordination meeting were the following persons:

Mr. Mark Shumpert with Haywood County
Ms. Denese Ballew with Haywood County
Mr. Chris Haverstrom, Thalle Construction Company
Mr. Keith Vess, Thalle Construction Company
Mr. Hannu Kemppinen, Joyce Engineering Inc.
Mr. Al Lambeth, Geotechnics Inc.
Mr. Dave Pasko, McGill Associates
Mr. Alan Mackey, McGill Associates
Mr. Roy Alexander, McGill Associates

1. Review of preconstruction meeting minutes:

   Mr. Chris Haverstrom noted the completion date noted in the minutes was April 11, 2009 and the correct completion date is April 11, 2010.

2. Work performed the past 30 days:

   Mr. Keith Vess provided the following information about the work his crew had completed on this project since the preconstruction meeting:
   a. The majority of the clearing and grubbing has been completed.
   b. A number of the erosion control items have been installed, silt fencing, diversion ditches, and sedimentation basin, no. 1
   c. The crew is currently working on Sed. Basins number 4 & 5.
   d. The undercutting in the bottom on the new landfill is completed, plus a rocky bridge lift of material filled and placed in the undercut areas. Mr. Al Lambeth noted that the area had been proof rolled used a loaded off-road vehicle and he did not observe any pumping of the repair areas.

3. Work activities planned during the month of July:

   Mr. Keith Vess provided the following information about his company's planned construction activities during the month of July:

a. The two sed. basins 4 & 5 should be totally complete with in the next two weeks.
b. The contractor will start immediately grading and placing the structural fill material in the landfill cell itself.
c. The under drain system will be installed in the bottom of the new landfill. Keith Vess pointed out, he did not find any running water during the under cut operation in the area of the under drain piping.
d. The contractor plans to locate the two leachate drain pipes for cells number 1 & 2, as preparatory work for the gravity flow leachate pipe system.

4. Review of shop drawing log and submittals:

   Mr. Dave Pasko discussed the status of the shop drawing submittals. A shop drawing log was passed out and discussed. Dave ask the contractor to submit 9 copies of each shop drawing, due to needing to keep 6 copies for Haywood County, the CQA personnel and our office. If the contractor can get by with two returned copies, then continue submitting 8 copies of each shop drawing.

   Mr. Dave Pasko asks the contractor to pay closer attention to his submittal of shop drawings. Be sure and mark exactly on the submittal all information that needs to be taken into consideration with the engineer's review. Dave noted on the recent pump submittal, the pump curve or the electrical control panel had not been selected by the contractor prior to the shop drawing submittal. Also, on the recent wash stone submittal there was not enough information provided and the submittal had to be returned, correct and resubmit.

5. Application for payment:

   We discussed the first application for payment, noting that Fred Morin had stopped by our office last Friday and we discussed the formal submittal of the June application. However, I have not received the application as of today.

   Mr. Chris Haverstrom stating, they were adding the undercutting that was recently completed and would over-night mail the application to my office late this week. Upon receipt of the application, both Alan Mackey and Al Lambeth will check the unit bid items quantities. Then I will check the other items, the math and sales tax statement, if correct, I will write a letter of recommendation and send the application to Stephen King with Haywood County for processing.

6. Request for information: None noted to date.

7. Change order proposals: None noted to date.

8. Construction and coordination issues:

The contractor discussed the possibility of mining some of the rock encountered with the construction of the landfill. A portable stone crusher could be delivered to the job site and used to manufacture stone. Mr. Chis Haverstrom asks if the wash stone layer could be screen and used for this drainage layer. Mr. Dave Pasko noted the state regulatory agency will not allow screen stone, is must be washed stone. Also, the contractor will need to check with Air Quality in the DENR office to see if a permit will be required to operation a stone crushing operation at the landfill.

The contractor will review their options and see if mining the rock is feasible on the project.

Keith Vess pointed out there is a good amount of rock in the west side of the landfill site no. three. He has located rock in three areas on the west side of the new cell.

9. CQA report and status:

Mr. Al Lambeth provided the following information about the CQA work done during the past 3 weeks. The contractor has under cut the wet materials in the lowest area of cell number three. Al has measured the amount of undercutting done each day and will provide a drawing to the engineer and owner showing the under cutting and the total yardage. As the undercutting was done, the contractor place a lift of rocky material in the excavated area that will help to bridge over the under cut area and provide a stable subgrade for the new landfill cell.

Mr. Hannu Kemppinen noted the contractor will need to pay special attention with the installation of thee French drain in the new landfill cell due to the bridging rock layer that has been installed. Also, the elevations will need to be check closely due to the requirement of 4 feet between the top of the French drain and the bottom of the clay liner. The contractor will need to review the under drain detail on sheet D-10.

10. Erosion Control status:

Mr. Keith Vess noted when DENR representatives visited the job site 2 weeks ago, the expressed concern about the contractor trying to use temporary sedimentation basin number one for the entire drainage area of the new landfill.

Mr. Mark Shumpert asks the contractor to pay special attention to the area of construction that is near the property owned by Mr. Herb Kabaluk. During a heavy rainfall event several months ago, Mr. Kabaluk's pond filled full of mud and he has a law suit against Haywood County. Mark stated, "Every effort must be made to insure that sediment does not go into the neighbor's pond during the construction of the new landfill cell". We ask the contractor to check this area before and after each forecasted rain event.

Mr. Keith Vess discussed the possibility of installing a berm and a stand pipe at the bottom end of the new landfill as erosion control measure. After a brief discussion after the meeting, the contractor will try to excavate a ditch and install an 18 inch plastic pipe to sedimentation basin number 5, and then grade a drainage ditch line to the existing settling basin and place rip rap check dams as a method to control erosion within the graded landfill area. An earthen or rip rap U shaped berm or dam will be construction in front of the drain pipe plus wash stone will be placed on the spillway to filter the silt. This work needs to be accomplished before the wet weather forecasted for the July 4th weekend.

11. General discussion items:

Mr. Chris Haverstrom stated he would send a revised construction schedule with each of his monthly application for payment submittal.
Mr. Pasko, ask the contractor to review the sump area details for the bottom of the landfill, especially the elevations in this area. The bottom of the sump is 1 foot lower than the rest of the clay liner and the contractor will need to take this into consideration when installing the French drain piping.
I ask Denese Ballew if the current construction had has caused any problems with the normal day to day operation of the landfill? Denese said, "The contractor has been very good to work with and has help her with several issues at the landfill during the past weeks".
Mr. Mark Shumpert suggested moving the proposed chain link fence away from the property owned by Mr. Kabaluk. The fence is show on sheet C-1, and the west corner of the fence should be to be moved approx. 150 feet away from this property line as marked on the contractor plans.

The next monthly progress and coordination meeting is scheduled for Wednesday, August 5, 2009, 10:00am at the contractor's job site office.

HAYWOOD COUNTY

WHITE OAK MSW LANDFILL PHASE 3
MONTHLY PROGRESS AND COORDINATION MEETING
MINUTES

AUGUST 5, 2009
PROJECT NO. 07518

Present for the July monthly progress and coordination meeting were the following persons:

Mr. Mark Shumpert with Haywood County
Ms. Denese Ballew with Haywood County
Ms. Sarah McKee with Thalle Construction Company
Mr. Keith Vess with Thalle Construction Company
Mr. Hannu Kemppinen with Joyce Engineering Company
Mr. Al Lambeth with Geotechnics Inc.
Mr. Andrew Colby with Bunnell Lamons
Mr. Allen Mackey with McGill Associates
Mr. Roy Alexander with McGill Associates

1. Safety Moment:

   A. We discussed safety in general, especially with the accident that happened at the landfill earlier this week. We asked each person involved with the project, to be especially careful during construction; and if a safety issue is noted, they should immediately notify Mr. Keith Vess, the project superintendent for Thalle Construction Company. Also call Roy Alexander, with McGill Associates, I will in turn call Mr. Chris Haverstorm or Sarah McKee and report the safety concerns and follow up with an email to the contractor.

2. Review of the first progress meeting minutes.

   No corrections or comments were made to the July meeting minutes.

3. Work performed the past thirty days by the contractor: Mr. Keith Vess provided the following information:

   A. The French drain piping has been installed in the bottom of the new landfill cell with very little water noted in the area during installation.
   B. The contractor has finished the construction of sedimentation basin No. 4.

C. The outlet piping and rip-rap flume has been installed on said basin No. 4.
D. The contractor is approximately fifty percent complete with overall general excavation for the landfill cell and stock piling of the material.
E. Sedimentation basin No. 3 and No. 7 completed along with the outlet piping installed.

4: Contractor's Work activities planned during the month of August:

Mr. Keith Vess provided the following information about the contractor's planned work during the next 30 days.

A. The contractor should complete the grading of the new landfill cell to the sub grade elevation.
B. The contractor plans to install the two required clay test pads within the landfill cell itself.
C. The contractor will start placing the 2 foot deep clay liner in the new cell.
D. The contractor plans to start on the gravity-flow leachate lines and precast structures on this project.

5. Review of shop drawing log and submittals:

A. Ms. Sarah McKee was introduced as the new project manager for Thalle Construction Company; she is taking Fred Morin's position on this project.
B. Ms. Sarah McKee noted she had delivered a box full of shop drawings to our office last Friday; some of the shop drawings are for structures for the gravity flow leachate line. She asks there be high priority placed on the precast submittals due to the contractors' current construction schedule.

6. July's Application for payment:

A. Ms. Sarah McKee submitted application for payment No. 2. Upon our review of the application for payment and the checking of unit bid items quantities. If correct, I will write a cover letter and forward this second application for payment to Haywood County for processing and payment.

7. Request for information:

A. None noted to date.

8. Change Order Proposals:

A. None ordered to date.

9. Construction and coordination issues:

Mr. Keith Vess noted during the past week, he had discovered several items that will need to be addressed during the construction of the new landfill cell.

A. Mr. Keith Vess noted that at each place where he has tried to uncover the edge of the liner on the existing Phase 1 or Phase 2 Landfill cell, there is water steeping out in each location. He had to placed clay material and backfilled/compact the material to stop the flow of water into the phase three cell. Also, Keith report some the waste material placed in the existing cells appears to be past the edge of the liner. If so, the waste material will have to be removed to allow the liner tie-ins to be made.

B. Ms. Denise Ballew noted, that she felt like there may be anywhere from 10 to 12 feet of leachate water in the bottom of the existing landfill cells. Being shorthanded on the jobsite this week, Denise said they have been unable to do any pumping and hauling of the leachate water this week. Hopefully, she feels they can start back Thursday or Friday hauling leachate to the Waynesville's Waste Water Treatment Plant.

C. Mr. Keith Vess noted that with the amount of water being removed from the existing landfill cells each day, he will not be able to start the clay liner on the sides of the new landfill cell where it ties to the existing liner in Phase 1 and 2 due to the seeping water. After a brief discussion on what could be done to correct this problem, Mr. Keith Vess suggested installing several sumps into the existing landfill cells, and build a pump header and tie into a large pump and pump water out of the landfill cells directly to the leachate pond. Then, Haywood County can use their tanker trucks and haul the leachate water from the pond to the treatment plant.

D. We also discussed the possibility of renting a tanker truck from the contractor to help haul leachate water from the leachate lagoon to the wastewater treatment plant. A tanker truck may be necessary, should there be a lot of rain and Haywood County is unable haul leachate water. The proposed pump system would continuously pump water to the leachate pond and the water would have to be hauled away. We asked the contractor to provide a price for the rental of a tanker truck, if needed for our and the owners review.

E. Mr. Keith Vess noted a lot of rock has been uncovered in the West side of the new landfill cell. The seam of rock starts near Basin No. 5, where it is exposed in one quarter of this sedimentation basin and it continues under the dike at the lower end of the landfill and the rock continues up the left side or West side of new landfill. Mr. Keith Vess stated that he feels like there is going to be a considerable quantity of rock that may have to be removed in that side of the new cell if it is graded to a 3 to 1 finish slope.

F. We discussed the possibility of the slope being steepened up to a 5 to 1 or a 6 to 1 and most of the rock would be under the new landfill cell. Both Ms. Denise Ballew and Mr. Mark Shumpert said they did not want to lose air space in the new landfill cell if possible; plus they did not want to spend the money to drill and blast the rock to remove it. One option that was discussed was the possibility of raising landfill cell in elevation to make up for the lost air space. If so, plans will have to be resubmitted to DENR for an amendment to the landfill cells original approval.

G. Mr. Keith Vess noted he has concerns about the amount and the quality of clay material that is on site and can be used for the clay liner in the bottom of the landfill cell. Mr. Keith Vess pointed out that based upon initial testing of the clay material obtained from their jobsite stockpile, and the majority of this material will not provide the required compaction and density requirements.

H. Discussions with Mr. Al Lambert, with Geotechnics and Mr. Andrew Colby, with Bunnell-Lammons, the results from the majority of the permeability tests done in the labs have not met the requirements of the contract documents. Mr. Keith Vess asked why did the contract specifications state density could be obtained with 95 percent compaction while the BLE report states that it would require 97 percent compaction to meet the density requirements. Mr. Keith Vess stated his company has a concern with the 97 percent compaction requirement, it will take different equipment than he currently has on the jobsite, it would take a greater effort to meet the compaction requirements, plus his production each day would be cut down, which would cost the contractor additional monies.

I. Mr. Hammu Kemppinen, with Joyce Engineering noted that the 95 percent compaction is a minimum requirement to the contract and to satisfy the state standards.

J. In talking with Mr. Al Lambert and Mr. Andrew Colby, it appears that each laboratory doing the permeability testing used a slightly different method of testing. Mr. Al Lambert pointed out, that his firm does the test with a higher pressure on top of the sample and a lower pressure on the bottom of the sample, as required to ASTM. After a brief discussion about the testing requirements, we asked both testing labs to re-test the material they obtained on site, and make sure each test is done identical to the test being done in the other laboratory. Then immediately forward these test results to McGill Associates.

K. Mr. Keith Vess stated he has found some good clay on site; however, it is in the proposed landfill cell No. 4. To obtain this clay material the contractor would have to clear and grub the area, install erosion control measures, and then haul the clay material to the new landfill cell.

L. Mr. Andrew Colby stated that he had taken two samples of material from Thalle Construction Company's stockpile of clay materials on the job site. However, P.I. one sample was 21, which definitely would not meet the permeability requirements, and the second sample was 8, which would meet the permeability requirements. Mr. Andrew Colby stated that the majority of the stockpiled material is closer to the P.I. of 21 rather than the better clay's numbers.

M. Mr. Andrew Colby, from BLE, stated there was some very good clay in the very bottom of the new landfill cell; this material could be used for the clay liner. Mr. Keith Vess noted, the majority of the material at the bottom of the landfill cell was extremely wet and saturated due to the groundwater seeping into this area during each rain event over

the years, the material had to be hauled off as unsuitable material then a bridge lift placed in this general area to support the bottom of the new landfill cell.

N. As it relates to the Clay Liner Material, I pointed out the contractor should read the section 01700 of the contract, Clay Liner. From memory, the contract states the clay material can be obtained on site, off site or with the additional of Bentonite if required with out additional payment to the contractor. The clay issues will need to be resolved.

10. Erosion control status:

A. Mr. Keith Vess noted that since the last progress meeting that DENR has not visited the jobsite, the entire silt fence has been installed with several of the large silt basins completed and any materials washing off the new landfill cell are being contained in these erosion control devices.

11: General Discussion:

A. I asked Ms. Sarah McKee to provide for McGill Associates, P.A. the following items:

1. We need copies of BLE's test results and copies of Geotechnics lab test results on the clay samples that had been done to date.
2. Provide a copy or a map of the new landfill cell showing the areas where rock has been encountered and elevations of the rock so we may determine the amount of rock quantity to be removed.
3. We need pricing on the installation of the sumps in the existing landfill cells, the pump header, discharge piping, and the large 6 inch pump as we have discussed to help control the water elevation in the existing fill cells.
4. We request both Geotechnics, Inc. and BLE will need to do the permeability testing identical in each lab so we can compare test results and see if there is a possible problem with the method of testing.

12. The next monthly progress and coordination meeting is tentatively scheduled for Wednesday, September 2, 2009, 10:00 a.m., at the contractor's jobsite trailer.

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Monthly Progress and Coordinate Meeting
September 9, 2009

Present for the first regular monthly progress and coordination meeting were the following persons:

Mr. Mark Shumpert with Haywood County
Mr. Steven King with Haywood County
Ms. Denese Ballew with Haywood County
Mr. Chris Haverstrom, Thalle Construction Company
Ms. Sarah McKee with Thalle Construction Company
Mr. Keith Vess with Thalle Construction Company
Mr. Hannu Kemppinen with Joyce Engineering Inc
Mr. Evan Andrews with Joyce Engineering Inc
Mr. Al Lambeth with Geotechnics Inc.
Mr. Jeff Bishop with McGill Associates
Mr. Dave Pasko with McGill Associates
Mr. Bill Sperry with McGill Associates
Mr. Alan Mackey with McGill Associates
Mr. Roy Alexander with McGill Associates

1. Safety moment:
   The contractor has implemented the following safety precautions
   a. Each visitor must stop by the office and sign-in
   b. Each visitor must wear a hard hat plus an orange safety vest
   c. Vehicles visiting the site must have a flashing light on top of the vehicles
   d. Obey the safety signs that have been posted on the job site.

2. Review of the August 5th meeting minutes:

   Mr. Andrew Colby with Bunnell Lammons called last week and noted in item 9 L, the PI. numbers were reversed in the minutes. The correction is as noted, "With the majority of the clay in the stockpile closer to a PI of 8 rather than 21."

   Both Evan Andrews and Al Lambert said they did not receive the meeting minutes. I will e-mail a copy of all meeting minutes to these people today. Steven King requested the contractor to copy him with all correspondence relating to the construction of the new landfill cell. He had not been receiving the correspondence the contractor was sending to the engineer.

3. Work performed the past 30 days:

   Mr. Keith Vess provided the following information about the work his crew had completed on this project during the month of August:

   a. The Gravity flow sewer line in the new cell has been installed and the tie-in made.
   b. The excavation has been completed for Sedimentation basin no. Seven.
   c. The majority of all excavation has completed with the exception of the rocky area.
   d. The contractor has started work on Sedimentation basin no. six.
   e. The contractor is currently dressing up, seeding and matting soil stockpile no. Two (2).
   f. Clay test pads were constructed in the new landfill cell.

4. Work activities planned during the month of September:

   Mr. Keith Vess stated it would be difficult to plan the work to be done this month until a decision was made concerning the clay and rock items.

5. Review of shop drawing log and submittals:

   The contractor has requested the owner take a second look at the original pump that was returned correct and resubmit. Denese Ballew said the pump supplier had called her and they had discussed this pump. However, she and the engineer feels that the EPG pump specified would be a better choice for this project.

   The contractor needs to resubmit on the No. 57 wash stone to be used for the drainage layer.

6. Application for payment:

   Sarah McKee stated she had the August application for payment with her today. However, there was a question about the payment for rock that was removed by the use of hydraulic-ram mounted on a track hoe. Mr. Alan Mackey pointed out in the specifications it requires rock to be drilled and blasted to receive payment for his item. Mr. Chris Haverstorm noted during the August 12th meeting, rock removal using a hydraulic ram was discussed with no objections.

   To make it clear in the future, the contractor will need to cross section the rock to be removed and forward this information to the engineer. Then it will be the McGill Associates construction field representative's responsibility to keep up with the total yards of rock removed by blasting or Hydraulic-ram.

7. Request for information:

The contractor has submitted two letters to the engineer, one concerning the clay material on site and the cost to change to a GCL type of membrane and the second about the rock to be removed in the new landfill cell. The engineer will respond to each letter.

8. Change order proposals:

We received an e-mail on Monday August 31 concerning the removal of MSW waste on August 24 & 25 that was requested by NCDENR and as directed by the Owner. After a brief discussion, the contractor was requested to place their request for compensation in a formal letter with a detail cost breakdown and submit it to the engineer for review and recommendations.

The contractor has not responded to the engineer's September 4th request for a cost proposal to install a by pass pump and force main piping.

9. Construction and coordination issues:

Mr. Chris Haverstrom discussed the issues with the clay material stockpiled on site and the two test pads that were done recently. The test results from Geotechnics Inc., all four tests failed the required 10 to the minus 7 permeability. The tests that were made by BLE, only one test passed the required 10 to the minus 7 requirements. Using this information and the previous testing results with no passing test, Chris said, he did not have confidence that the clay on site would be useable for the clay liner in the new landfill cell and that is one of the reason for the letter he had written to the engineer.

Mr. Jeff Bishop ask had the contractor looked at the possibility of going off site to obtain clay material or considered the addition of Bentonite clay to the contractor's stockpile of clay that has been obtained on site? Chris Haverstorm noted the cost of buying Bentonite and having it shipped to the job site and the blended with the onsite clay was cost prohibitive.

Mr. Jeff Bishop pointed out; Haywood County will **now** allow the contractor to use the future landfill cell no. four to obtain the needed clay material. Mr. Mark Shumpert noted, before excavating in the phase four area, an erosion control plan would be needed. Jeff Bishop noted an erosion control plan would have to be developed and submitted to NCDENR for the required approval before the contractor could work in this area.

Mr. Jeff Bishop ask the contractor, did he feel that he explored and exhausted all possibilities of using the clay material on site or material hauled in from off site? Chris Haverstorm stated yes.

Mr. Jeff Bishop ask the contractor to look at the areas in the future phase 4 landfill area and try to determine if enough good clay is in this area to provide the 29,000 yd3 needed for the clay liner. Al Lambeth stated, he and Keith Vess has looked in this area and actually taken clay samples of the material from some old

test pits sites and sent the samples to his lab, the permeability test results all samples obtain in future cell four had failed the required testing.

Mr. Mark Shumpert ask at what point do we stop all the testing and move forward with a different method to construct the new cell? Jeff Bishop answered when the contractor exhausted all possibilities of obtaining the need clay on site or off site, the additional of Bentonite clay to the existing clay stockpile.

The second item that was discussed was the rock located in the new landfill cell. Mr. Chris Haverstorm stated the rock issue has two parts, first the amount of rock that will have to be removed from the cell and the second part of the question, is it feasible to move a rock crushing operation to the site and try to generate a crush stone that could be used in the new cell. Chris stated he believes there may be as much as 8,000 to 9,000 yards of rock that will have to be drilled and blasted in the new cell. With that quantity of rock, will be feasible to move a rock crushing operation to the job site, is the question.

After some discussion about the rock and crushing it on site, Jeff Bishop suggested the contractor think about the possibility of using the crushed stone for the cabc stone to be placed on the access road. Chris Haverstrom stated the cross section of the new road would have to be changed, the details call for 6 inch of rail road ballast and 6 inch of cabc stone. Jeff Bishop said this would be an option to look at.

Mr. Bill Sperry reported that he had sent the contractor blasting plan to the State. The local office will not approve the blasting plan and it was sent to Raleigh for the state's hydrologist approval. Bill stated, hopefully we receive approval from the state for the ballast plan some time next week. Bill will start calling Monday on a daily basis.

Dave Pasko asks if the contractor had planned on charging Haywood County for the broken up rock in this area where the contractor has determined that the rock will need drilling and blasting. On Monday some test holes were dug in this general area with a backhoe able to dig 5 or 6 feet in the broken up rocky material. Keith Vess ask why he was not informed about the test digging. Steven King said a decision was make late Friday evening and this why the contractor was not informed.

Keith Vess said, if a D-8 dozer with a ripper blade can not move the rock, there should not be a question about the material on site being rock. He said the owner and engineer was welcome to witness the ripping of the rock. Keith pointed out; there was a lot of rock remaining in sedimentation basin no. 5. He had previously cleaned off the rock using a D-8 with a ripper and did not think there was a question about the material remaining being rock.

I requested the contractor to install the leachate manhole no, two (2) promptly to allow the Owner to have access to the sump in Phase 2 for scheduled cleaning that needs to be done by the county.

10. CQA report and status:

Mr. Al Lambeth provided the following information about the CQA work done during the month of August:

Al stated all the permeability test that were done on samples taken from the job site to his lab had failed, including the test pads and materials obtained in the future cell no. four. Only one sample taken by BLE from the test pads had passed the required testing.

Al stated he needed a copy of BLE's clay liner borrow study with the map that Andrew Colby had on site during the last month meeting. Then he could take clay samples in the exact location where BLE did sampling.

11. Erosion Control status:

Mr. Keith Vess noted when DENR representatives were on site about two weeks ago, however they were looking at the work the County employees had done and did not report any problems to him with the new landfill cell construction.

12. General discussion items:

We discussed the rock that was removed in sedimentation basin no. 5 by the use of a hydraulic hoe-ramp. We ask the contractor to have his surveyor do cross sections or provide the engineer with survey points on all rock to be excavated to allow a calculation of the volume of rock to be removed in the future areas.

We discussed the contractor's e-mail concerning the removal of MSW waste on the edge of the existing landfill cell as requested by the state. I ask for a formal for a change order change order request be provided with a detailed breakdown and I could do the written change order document.

Mr. Dave Pasko reminded the contractor, about the request some time ago for a cost proposal for a force main pipe and a sump constructed in the existing landfill cell. We have not received a response by the contractor to our request.

Mr. Chris Haverstrom asks Mark Shumpert if the county would have any use for the perforated pipe that is stored on site. Chris said the cost of the pipe was approximately $5.00 per foot.

Ms. Sarah McKee reported the storm water liner fabric had been delivered this week.

Several people have called with a conflict in their schedule for the next monthly meeting. Therefore, we will change the meeting date to the following week. We plan to meet on Wednesday, October 7th, 10:00am at the contractor's job site office. Let me know if this date is a problem for anyone.

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Monthly Progress and Coordinate Meeting
October 7, 2009

Present for the October regular monthly progress and coordination meeting were the following persons:

Mr. Mark Shumpert with Haywood County
Mr. Steve King with Haywood County
Ms. Denese Ballew with Haywood County
Mr. Chris Haverstrom with Thalle Construction Company
Ms. Sarah McKee with Thalle Construction Company
Mr. Keith Vess with Thalle Construction Company
Mr. Hannu Kemppinen with Joyce Engineering Inc.
Mr. Mr. Evan Andrews with Joyce Engineering Inc.
Mr. Al Lambeth with Geotechnics Inc.
Mr. Jeff Bishop with McGill Associates
Mr. Dave Pasko with McGill Associates
Mr. Bill Sperry with McGill Associates
Mr. Alan Mackey, McGill Associates
Mr. Roy Alexander, McGill Associates

1. Safety Moment

   Keith Vess said there had not been any accidents on the project and his workmen that had the flu were feeling better and back at work.

2. Review of preconstruction meeting minutes:

   No comments made concerning the September meeting minutes.

3. Work performed the past 30 days:

   Mr. Keith Vess provided the following information about the work his crew had completed on this project during the past 30 days:
   a. The major excavation and earthwork is 99 percent complete.
   b. Sedimentation basin no. seven is complete, including the rip rap ditch.
   c. The rock outcropping on the west side of the new cell is being drilled, plus part of the rock in sed. basin 5 has been hammered out.
   d. The clay liner material has been placed on the east and north sides of the cell.

e. All storm drain pipe with the exception of sed basins 5 & 6 has been installed.

3. Work activities planned during the month of October:

   Mr. Keith Vess provided the following information about his company's planned construction activities for the next 30 days of construction:
   a. Drill and blast the rock in the west side of the new landfill cell and the remaining rock in sed. basin five.
   b. Remove the blasted rock, backfill and compact the soil in the over excavation area.
   c. Complete the placement of clay liner on the west and south side of the new cell.
   d. Hopefully start placing the GCL and other liner materials.
   f. The precast energy dissipater for the storm drain pipe from sed. basin 6 is to be shipped next week.

4. Review of shop drawing log and submittals:

   The contractor will need to provide a re-submittal on the stone drain layer material ASAP. Also, the contractor needs to complete the internal angle friction testing and submit this information to the engineer.

5. Application for payment:

   The contractor e-mailed a copy of this month's pay request. We have checked the quantities and math, currently waiting on the formal submittal.

   Ms. Sarah McKee provided me with the pay request package during the meeting.

6. Request for information:

   Chris Haverstorm ask about the approval of the GLC change that had been submitted the state for approval. Jeff Bishop said, we should have an approval letter by the end of this week.

7. Change order proposals:

   I received the detail break down information from the contractor on Monday of this week on the waste removal that was requested by the Owner several weeks ago. With this information I will be able to prepare a formal change order document.

8. Construction and coordination issues:

   We discussed the need for the contractor to submit the bottom of subgrade survey information in the areas where the clay liner has been placed. Also we

need the same information on the rock elevations in the area on the west side of the new cell that is to be drilled and blasted. I meet with the contractor's surveyor on site the week of September 14 and he was in the process of shoots elevations on the bottom of the subgrade and the rocky area that had been cleaned off by the contractor's crew. However, we have not received this information to date.

Keith Vess noted, he drilling and blasting subcontractor, National Quarry Service was on site and planned to do the blasting in the landfill cell on Thursday or Friday, however, the drill rig had broken down and he did not know which day.

We discussed the safety requirements that will need to take place with the blasting. The contractor will stop all visits by the public for approx. 30 minutes and ask for everyone to move to the maintenance building during the blasting operation. The county personnel will notify the neighbors nearest the landfill prior to the blasting. Keith Vess said his subcontractor will install blast monitors around the area and record the blast.
The drilling a blasting will be done in two operations, the first being the lower half of the rocky area and the second the upper portion.
Mr. Bill Sperry asks the contractor to review the approved blasting plan prior to doing the rock blasting on site.

As I had discussed with Keith Vess earlier this week, Manhole no. two need installed this week, due to Jet Clean America is scheduled to be on site Tuesday and jet and flush the sump in phase 2 by using the leachate piping installed by the contractor. This is the second request to install this manhole to allow the county to try and deal with the leachate in the existing landfill cell. Keith Vess said manhole two would be installed today and then he would lay the double containment pipe to manhole no. One and then installed this manhole. Keith asks about making smooth bend with the pipe into manhole no. one due to the steep grade in this area between the two manholes. No one objected to this change.

I ask Mark Shumpert the status of the 3 phase power service to be installed on this project. Mark said, he had placed the order with the local EMC and expects the power line to be installed next week.

9. CQA report and status:

Mr. Al Lambeth provided the following information about the CQA work done during the past 30 days. All the compaction testing done on the clay liner being installed has passed the required density. Also all the perm tests done in the labs have passed.
Mr. Hannu Kemppinen pointed out, when the contractor completes the drilling and blasting of the rock within the landfill cell, then upon removal of the rock elevations of the bottom of the rock excavations must be taken. Then submit the rock elevations to the engineer and the CQA engineer for the project files and to be included into the final report.

I provide Hannu with a copy of the pressure test field report of the leachate piping installed in the subgrade of the new cell for his files and the final report.

10. Erosion Control status:

Mr. Keith Vess noted when DENR representative, Mr. Rick Alred has visited the job site twice within the past 2 weeks. With each visit he had not problems with the construction on the new landfill cell.

Mr. Mark Shumpert pointed out the attorney for the property owner Mr. Herb Kabaluk had called about muddy water entering this private pond. Mark said there were some washes and seeding that needs to be done around sed. basin #4. Mark said he had witnessed some colored water coming down the rip rap ditch line in this area.
Mark also requested the chain link fence be moved away from this property line. We sketched up on my plans an area where the fence will need to be moved. I ask Keith to be sure and let everyone know when his fencing sub contractor will be on site and we will stake or mark where the fence will need to be installed.
I ask the project inspector, Mr. Alan Mackey to take a look at this area with Keith Vess and make sure no erosion is washing off the new construction area.

11. General discussion items:

Mr. Keith Vess discussed his plan to try and control some of the leachate water from the existing landfill cell no. two. Keith suggested excavating a ditch on the upper side of the access road to the sump in cell no. two. The access road would be lowered in grade to a point closer to the liner. Then any leachate water would be caught and directed into a sump and then pumped into the new leachate piping. Keith ask if the owner would build a berm to divert storm water off the new landfill cell, with the berm being build in the area of the phase two cell. Steve King stated his crew would help the contractor with this berm. Keith said, he would use his steel wheel roller to compact the berm after it is built.

Jeff Bishop asks about the drain pipe that was installed under the earth dike on the north side of the cell. Jeff said he understood the pipe had silted up and was no longer draining storm water. He asks how the contractor planned to abandoned this drain pipe with the installation of the liner. Jeff asks the contractor to submit a drawing with an explanation on how the contractor will permanently plug this drain pipe. Jeff asks about the removal of the wet material in the lowest part of the landfill cell. Keith Vess he planned on removing this material and then using shot rock and bed the area as previously done in the wet areas inside the cell.

I ask the contractor to schedule a meeting with the liner installer when they are ready to move on site and install the GCL and liner materials. With the GCL installation there is some additional requirement the manufacture notes in the shop drawing. Mr. Bill Sperry stated the installer must do all work by the new

specifications in the shop drawings provided by the GCL manufacture. The contractor will need to give 3 or 4 days notice to allow a pre-deployment of liner meeting to be scheduled.

I ask Chris Haverstorm the status of the proposal for a change in the contract as discussed with Mr. David Cotton approx. 1.5 weeks ago. Chris said, he was waiting until he receives approval of the GCL before he can complete his proposal.

Chris Haverstorm asks if the county would be interested in buying the remaining perforated pipe he has on site. Chris said the pipe cost is about $5.00 per foot. Steve King said the county may be interested in this pipe.

The next monthly progress and coordination meeting is scheduled for **Tuesday November 3, 2009, 10:00am** at the contractor's job site office.

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Monthly Progress and Coordinate Meeting
November 4, 2009
Minutes

Present for the November monthly progress and coordination meeting were the following persons:

Mr. Steve King with Haywood County
Mr. David Francis with Haywood County
Mr. Chris Haverstrom with Thalle Construction Company
Ms. Sarah McKee with Thalle Construction Company
Mr. Ken Thomas with Thalle Construction Company
Mr. Mr. Evan Andrews with Joyce Engineering Inc.
Mr. Al Lambeth with Geotechnics Inc.
Mr. Jeff Bishop with McGill Associates
Mr. Dave Pasko with McGill Associates
Mr. Alan Mackey, McGill Associates
Mr. Roy Alexander, McGill Associates

1. Safety Moment

   The contractor reported no accidents since the last monthly meeting. I complimented the contractor on the way they handled the safety precautions during the blasting that was done recently on the project.

2. Review of preconstruction meeting minutes:

   No comments made concerning the October monthly meeting minutes.

3. Work performed the past 30 days:

   Mr. Chris Haverstrom provided the following information about the work his crew had completed on this project during October, 2009:

   - The majority of the rock in the new cell and sed. basin 5 has been drilled and blasted. A small amount of rock remains to be removed using a hydraulic hammer.
   - The subgrade of the cell is nearly complete with the exception of the rocky area and the lower center section of the cell.

- The GCL, the geo-textile and the line materials have been delivered to the job site.
- Some of the storm water piping had been installed.
- Removal of some contaminated soils near cell no. two.
- The fencing subcontractor is installing the new chain link fence
- A liner pre-deployment meeting was done with the contractor and his liner subcontractor.

3. Work activities planned during the next month:

   Mr. Chris Haverstrom provided the following information about his company's planned construction activities during the month of November:
   - Start the placement of structural fill in the blast area.
   - Completion of the clay liner within the new cell.
   - All the liner materials are on site or will be in the near future.
   - Thalle's liner subcontractor will start placing the liner materials.
   - Start the placement of the stone drainage layer.
   - The rock crushing equipment is to be delivered the week of November 9th. Chris delivered a sample of a 3 inch crushed concrete as a representative sample of the material that can be produced from his equipment. The sample was approved.

4. Review of shop drawing log and submittals:

   Dave Pasko pointed out the following shop drawings remain to be submitted, Frictional angle on the clay, stone and the 16 ounce geo-textile material. Dave noted the pump submittal is in our office and currently being reviewed, and will be returned to the contractor within the next few days.

5. Application for payment:

   Sarah McKee stated they would e-mail me a preliminary copy of the application late today or tomorrow. I reminded the contractor, I will be on vacation Nov. 6th through the 15th. If the pay requested is not received by lunch on Thursday, I will not be able process it before leaving on vacation.

6. Request for information: None noted.

   Dave Pasko provided copies of the anchor trench detail for the attachment of the ` new liner to the existing liner. Al Lambert expressed concerns about having to do compaction test in the trench dug by the contractor, plus he did not know how the Shelby Tubes could pushed in the bottom of the trench. Chris Haverstorm said he will talk to Keith Vess about how he planned on doing the anchor trench.
   Dave also provided the contractor with a detail on how to permanently seal the storm drain pipe the contractor installed under the dike of the new landfill cell.

7. Change order proposals:

I provide copies of the proposed change order no. one to Sarah McKee. The change order covers the solid waste removal that the state requested the County do on August 24 and 25th.
We discussed the contractor's proposal to change the contract from a unit bid to a modified lump sum contract. Jeff Bishop said David Cotton has been out of his office for 2 weeks due to shoulder surgery. Jeff has an appointment today with Mr. Cotton to discuss the changing in the type of contract to construct the new landfill cell.

8. Construction and coordination issues:

We discussed the need for the contractor to submit the bottom of subgrade, top of clay and the bottom of rock elevations. Sarah McKee stated the project surveyor was on site the past two days checking top of clay elevations and bottom of the rock in the blast area. He should be able to submit the need information sometime this week.
Evan Andrews stated, he always has concerns about placing liner without the contractor submitting the needed elevations on the clay liner to allow the elevations to be checked prior to liner placement.

9. CQA report and status:

Mr. Al Lambeth noted that all the compaction testing done on the clay liner that has been installed has passed the required density. Also all the perm tests done in the lab have passed.
Mr. Evan Andrews noted that 9 rolls of the liner material are missing. He had received bills of laden on 48 rolls: however, only 39 rolls are on site. Evan ask the contractor to call the factory and request the liner samples cut before shipping, if so, mail the samples directly to his office.
Mr. Andrews noted the geo-textile samples had been sent to the Pittsburg office for the required testing.
Al Lambert noted the majority of all the finish clay liner placed on the slopes is about 1 inch high. This was purposely done by contractor to allow fine grading and the filling of the small finger washes on the slopes.
I ask if the contactor has furnished the spread sheets with the bottom of clay and top of clay elevations that Hannu had requested during the recent liner pre-deployment meeting. Sarah McKee said the project surveyor was working on the spread sheet and should be sending them to everyone with in the next few days.

10. Erosion Control status:

As requested by Mark Shumpert, we have reviewed the area around sed. basin no. Four which is near the property owner Mr. Herb Kabaluk. It appears the erosion control devices installed by the contractor in this area is working well. However,

the seeding and the resulting stand of grass if not good and the area will need to be reseeded by the contractor's subcontractor. The County has dug a small pit to collect storm water from the area the trees were removed by the owner at the beginning of the project. It appears this area is where silt may be washing on to this private property.

11. General discussion items:

We discussed some housekeeping items that Thalle Crew needs to do, the first at the leachate pond, cleaning up the mud, moving the precast units and straightening up the cul-de-sac. The owner is having problems getting the large tanker truck to the leachate pond. Second area needing attention is near the contractor's trailer and storage area. We request the mud hole and soft subgrade be removed, and some shot rock placed in the area, then a layer of rail road ballast placed and then the area capped off with cabc stone. Third remove the windrow of material near the cleanout used by the county to pump leachate, which is near the corner of phase no. two cell.
Chris Haverstorm noted his liner subcontractor; Hallaton was doing a project near by and could be on site within a day's notice, once a section of the new landfill cell is ready for the liner material to be installed.
Mr. Dave Hesibit with BLE reviewed the bottom of the blast area inside the new cell. He did not see any problems that resulted from the blasting done by the contractor and will write up a report and sending to McGill Associates. Upon removal of the high rocky spots, structural fill can be placed in this area.

The next monthly progress and coordination meeting is scheduled for **Wednesday, December 2nd, 2009, 2:00 pm** at the contractor's job site office.

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Monthly Progress and Coordinate Meeting
December 2, 2009
Minutes

Present for the December monthly progress and coordination meeting were the following persons:

Mr. Steve King with Haywood County
Mr. Mark Shumpert with Haywood County
Mr. Chris Haverstrom with Thalle Construction Company
Ms. Sarah McKee with Thalle Construction Company
Mr. Keith Vess with Thalle Construction Company
Mr. Hannu Kemppinen with Joyce Engineering Inc.
Mr. Al Lambeth with Geotechnics Inc.
Mr. Jeff Bishop with McGill Associates
Mr. Dave Pasko with McGill Associates
Mr. Roy Alexander, McGill Associates

1. Safety Moment:

We discussed the recent killing of a deer on the County's landfill property by a Thalle Construction employee. Keith Vess stated one of his workmen did kill a sick deer near the CD landfill area. Keith said he called the Wildlife Department; a wildlife officer, Mr. Shawn Martin came and picked up the deer and plans to take it to a biologist to have the carcass checked. Keith said, as soon as he receives the report from the biologist, he will forward a copy to the owner and engineer.

2. Review of preconstruction meeting minutes:

No comments made concerning the November monthly meeting minutes.

3. Work performed the past 30 days:

Mr. Keith Vess provided the following information about the work his crew had completed on this project during the month of November, 2009:

- The layer of 18 inches of compacted clay has been totally completed.

- Thalle's subcontractor started placing the liner materials inside the new cell.
- The area where the rock was blasted and removed, the area has been filled with clay, compacted and tested.
- The GCL material has been installed.
- The majority of the liner and textile material has been installed
- Leachate piping and the placement of the 24 inch depth drainage layer has started with approx. 25-30 % installed.
- Some of the storm water piping had been installed.
- The rock crushing operation has crushed enough rock to stone the new roads on this project.
- The fencing subcontractor has completed the installation of the new chain link fence

3. Work activities planned during the next month:

Mr. Keith Vess provided the following information about his company's planned construction activities during the month of November:

- Complete the leachate piping.
- Complete the placement of the stone drainage layer.
- The work at the leachate pond will be completed.
- The drainage structures will be installed.
- Install the pump station; the pumps are to be delivered the week of Christmas.

I asked Keith when he thought they would be completed with this project. Keith said, with good weather, his crew would be done by the end of the year.

4. Review of shop drawing log and submittals:

We believe the contractor has submitted all the required shop drawings on this project.

5. Application for payment:

We discussed the November application for payment. Noting the contractor will need to leave the unit items as in the original contract and remove all over billing of rock and waste removal. Sarah will revise the application for payment and submit it with the proposed change order no. two.

6. Request for information: None noted.

7. Change order proposals:

I provided the contractor with copies of the proposed change order no. two, which will change the contract from a unit bid item format to a modified lump sum contract.

8. Construction and coordination issues:

Mr. Chris Haverstorm asks if Haywood County had made a decision on the amount of crush stone (cabc) they want his firm to crush and stockpile on the job site. Mr. Jeff Bishop will touch base with the Owner about the amount of crushed stone they want to purchase.

We discussed what would be the best way to determine the amount of stone crushed for the County. A conversation factor will need to be determined and the method of calculating stone volume agreed upon. One suggestion was for the contractor to build a 3x3x3 box and fill it with stone and then weigh the cubic yard of stone and use this number as a conversion factor.

Both Steven King and Denise Ballew said they would like to use some of this crushed stone on their roads due to the recent rains.

I asked the contractor what would be his holiday schedule. Mr. Keith Vess said his crew would take Friday, Saturday and Sunday for Christmas and would work on New Year's Day.

Ms. Denise Ballew asks when the work would be done at the Leachate Lagoon take place. Keith Vess reported the liner material should be delivered on December 10th, and it will take approx. 10 days to complete all the required work.

Steven King asks when could the County plan on reusing the leachate lagoon. Keith Vess said within 1 or 2 days of the completion of this work.

9. CQA report and status:

Mr. Al Lambeth noted that all the density testing done on the clay liner has passed minimum required density. Also all the perm tests done in the lab have passed all the testing requirements, plus three extra perm test were made.

Mr. Al Lambeth said two of the destructive testing (double extrusion welds) had failed, especially where the new liner was welded to the old existing liner edge. Al provided some examples of the cut section of new liner welded to the old existing liner. Al said he will ship new destructive test samples to his lab today and have the results tomorrow or Thursday. Also two fusion weld destructive test on the new liner, 22A and 22b had failed. These areas have already be cut and removed, repairs made and new samples taken.

Mr. Hannu Kemppinen reported one perm test of the anchor trench near the existing cell no. two failed. Hannu said, the anchor trench perm testing was not required by (DENR) and is not part of the state's requirements for certification of this new landfill cell, as the number of perms completed meets the Project requirements.

Mr. Jeff Bishop asks why we would allow the contractor to place the new liner in the anchor trench knowing there was a failing perm test.

Mr. Al Lambert stated the anchor trench was in residual soils and the perm test was taken the same day the contractor installed the liner. Al Lambert said he did not have the authority to tell a contractor to not install liner.

Mr. Jeff Bishop asks Hannu and Al to provide him a drawing and show the locations of all perm tests and where the failing test is actually located with the new landfill cell's anchor trench.

Mr. Jeff Bishop noted the purpose of the anchor trench is to eliminate any pulling force from the connection of the new liner and existing liner.

Mr. Jeff Bishop stated the critical item is the completion of the landfill and the CQA report that must be submitted to the state for approval before the Owner can start placing solid waste in the new cell.

I ask Hannu Kemppinen if he had received all the information concerning the bottom of clay, top of clay liner and elevations where the rock was drilled and blasted. Hannu said he was still missing a portion of the required contractor's survey information. Ms. Sarah McKee said their surveyor has completed all the surveying work; however, he needs to down load the data and should be able to furnish the need information by the end of this week.

10. Erosion Control status:

Mr. Keith Vess said the state erosion control officer normally visits the site about once a month. With each visit he has not found any problems with the work his crew has done.

11. General discussion items:

I pointed out one concern with the seeding that will be done during the next 30-60 days, with the winter weather it will difficult to establish an acceptable stand of grass with seeding done this time of year. Keith Vess said, his subcontractor will use the winter seeding mix in the contract and return next spring and reseed as necessary. The Owner requested that erosion control matting be used on the steep slopes of all stockpile, cut or fill slopes as noted in the contract documents and included in the bid schedule.

After the meeting Mark Shumpert and I visited Sedimentation basin no. Four, and noted some issues with the storm water and erosion. We noticed that water is not getting into the slope drains above sed. four and the storm water has cut a wash in side of the basin and in the cut slope next to this sed. basin. The contractor needs to review the area and the problems noted and made repairs in this area.

The next monthly progress and coordination meeting is scheduled for **Wednesday, January 6th, 10:00 am** at the contractor's job site office.

p/07518/const.admin/misc/Dece. 2-09 meeting minutes

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Monthly Progress and Coordinate Meeting
January 6, 2010
Minutes

Present for the January monthly progress and coordination meeting were the following persons:

Mr. Steve King with Haywood County
Mr. Mark Shumpert with Haywood County
Ms. Denese Ballew with Haywood County
Mr. Chris Haverstrom with Thalle Construction Company
Ms. Sarah McKee with Thalle Construction Company
Mr. Mike Honeycutt with Thalle Construction Company
Mr. Hannu Kemppinen with Joyce Engineering Inc.
Mr. Even Andrews with Joyce Engineering Inc.
Mr. Al Lambeth with Geotechnics Inc.
Mr. Jeff Bishop with McGill Associates
Mr. Dave Pasko with McGill Associates
Mr. Roy Alexander, McGill Associates

1. Safety Moment:

I ask about the report from the Wildlife Department concerning the killing of a deer by a Thalle Construction Company employee on the Haywood County property. Mr. Keith Vess said at the December meeting, he had given the dead deer to a wildlife office and they would do some testing on the deer and would give him a report
.

Mr. Chris Haverstorm said, he would contract Keith Vess and have him check on this item.

2. Review of December meeting minutes:

No comments were made concerning the last month's meeting minutes.

3. Work performed the past 30 days:

Mr. Chris Haverstorm and Ms. Sarah McKee provided the following information about the work completed during the month of December, 2009.

- The placement of the liner and textile material in the new landfill cell is completed.
- Leachate piping and the placement of the 24 inch depth wash stone drainage layer is approx. 40 % complete.
- The majority of the storm water piping had been installed.
- The rock crushing equipment crushed enough gravel for the stone paving of the new roads on this project, and the equipment has been moved from the project.
- The 24 inch sump piping for the submersible pumps have been installed, Chris noted the pumps had been delivered and are on the job site.
- The majority of the on site electrical work has been installed.

3. Work activities planned during the January 2010:

Mr. Chris Haverstorm provided the following information about his company's planned construction activities during the 30 days of construction:

- Complete the placement of the stone drainage layer.
- The work at the leachate pond will be completed; Hallaton will be on site Monday of next week.
- Completion of the electrical work by Haynes Electric Company.
- Install the new pump station.

I ask about the moving of equipment and workmen from the White Oak project to another job site. Mr. Chris Haverstorm stated due the winter weather in the area during the past month, they felt it would be better move most of the crew to another job while keeping a skeleton crew on this project. Then when the weather improves, the man-power and equipment will return and complete the project.

4. Review of shop drawing log and submittals:

We believe the contractor has submitted all the required shop drawings and they have been reviewed and returned to the contractor.

5. Application for payment:

Ms. Sarah McKee provided me with the December application for payment for our review and processing.

6. Request for information: None noted.

7. Change order proposals:

The contractor submitted a request for a change order covering work done on the project during the rain event in November. However, not enough information has been provided to make a decision on this request.

8. Construction and coordination issues:

Thalle's fencing subcontractor called our office about not getting paid for installing the chain link fence at the White Oak landfill. The subcontractor said, he has called Thalle's office a number of times and no one will return his call. Ms. Sarah McKee said the new fence was on the last application for payment that was delay by the county due to the change order needing to be approved.

I provided a list of items that need attention by the contractor. During the past week, I was on site a number of days and noted several items that are not complete and will need additional work. This is not a punch list, just a list of outstanding items needing the contractor's attention.

Mr. Pasko asks the contractor about the failed perm test in the anchor trench near the phase two (2) cell. Did the contractor agree with the placement of a GCL layer under the liner flap would be the best method to correct this issue? Mr. Chris Haverstorm said he agreed and they would correct the failed perm test.

Mr. Al Lambert asks about the location where the GCL material should be installed? Mr. Jeff Bishop reminded Al and Hannu, he had requested a drawing showing the location of all liner anchor trench perm test and the one failed test. Upon receipt of the drawing showing the perm test, we will stake the beginning and ending point where the GCL roll will be installed.

Ms. Denise Ballew asks when the Leachate Lagoon liner would be completed and ready to be placed back into service. Ms. Sarah McKee said, the liner subcontractor would be back on site Monday of next week and they need 3 working days to be completed with the Lagoon work.

Mr. Chris Haverstorm asks about the placement of GCL in the lagoon as part of the new work. Mr. Al Lambert said, with the lower compact test results on the new earthen dike, Keith Vess had told him to have the liner subcontractor installed the GCL, on the raised earthen dike portion of the lagoon.

9. CQA report and status:

Mr. Hannu Kemppinen with Joyce Engineering asks McGill Associates if they would prefer a disk or a hard copy with all the CQA information. Mr. Jeff Bishop said, he would like to have both.

Mr. Hannu Kemppinen reported he has all the information on the bottom of clay or subgrade of the new landfill cell. Plus he had plotted out the information from the contractor provided on the top of clay liner and it looked good.

Mr. Hannu Kemppinen said, he had all the information from Hallaton on the liner welding and was reviewing this information.

Mr. Al Lambert said he had taken 50% of the required wash stone samples of the material being placed in the new landfill cell.

10. Erosion Control status:

I pointed about that some of the silt fence between the leachate lagoon and sedimentation basin no. 5 has failed and silt is washing into the County's large silt basin and has created a delta in the upper end. The contractor will need clean out the silt from his construction that has washed into the basin, plus repair or replace the silt fencing in this area.

11. General discussion items:

Mr. Jeff Bishop ask about a comment that Keith Vess had made at the December meeting, Keith said some of the liner in the existing landfill cells had been installed in a shingle like fashion and not welded together. Jeff asks Al Lambert did he see any problems with the existing liner. He said, in the low area where the county normally pumps leachate, there may have been one or two joints that were not welded. He said the liner subcontractor did weld these seams all the way to the earthen wall.

Mr. Even Andrews said, he had talked to Hallaton about this item, and they did not see any problems with the new liner tie-in to existing liner connection.

I pointed out there are currently 4 issues with the tie ins between the new liner and the existing liner. We had found two areas of the existing liner have been damaged, plus one area where Hallaton did not find the existing liner to make the tie-in. Also there is an area where the contractor damaged the existing liner while excavating to locate the liner edge. These four areas will have to be corrected when the liner subcontractor returns to the job site.

Mr. Steven King reported the two change orders submitted by the contractor were approved at the December 28, 2009 County meeting. This meeting was postponed two weeks due to the snow that fell in mid-December. Also, he had received several phone calls from people about the dump trucks hauling gravel to the job site, they are not stopping at the intersection or cutting off traffic as they turn into the landfill. Steven asks Chis Haverstorm to call the hauling company and make them aware of this problem.

The next monthly progress and coordination meeting is scheduled for **Wednesday, February 3rdth, 1:30pm** at the contractor's job site office.

HAYWOOD COUNTY
WHITE OAK MSW LANDFILL
PHASE THREE (3)
Final Inspection
May 6, 2010

Present for the Final Inspection was the following persons:

Mr. Mark Shumpert with Haywood County
Ms. Denese Ballew with Haywood County
Mr. Chris Haverstrom, Thalle Construction Company
Mr. Keith Vess, Thalle Construction Company
Mr. Hannu Kemppinen, Joyce Engineering Inc.
Mr. Jeff Bishop, McGill Associates.
Mr. Dave Pasko, McGill Associates
Mr. Roy Alexander, McGill Associates

The following items were identified needing additional or correctional work:

1. Reshape the rip rap at the mouth of the drain pipe no. P-13. Place rip rap on the left side of the existing rip rap apron to insure surface water is directed to the pipe and reduce washing in this area.
2. Remove the large rip rap stones from the mouth of the up stream end of the drainage pipe P-15. The existing rip rap is blocking the opening and drainage into this pipe.
3. In Sedimentation Basin no. four (4), remove the accumulation of silt in the upper two (2) sections of the basin. The wet muddy material needs to be hauled to the existing landfill cell and stockpiled for future use as waste cover material.
4. Place rip rap under the outlet end of the over-flow line from Sedimentation Basin no. four (4), currently the water leaving this pipe is washing a hole under the edge of the pipe.
5. General Note; with the seeding that was done recently at the landfill, the contractor shall provide a letter concerning the project not having an acceptable stand of grass as of this date. In the letter, the contractor shall state, if the recent seeding does not provide an acceptable stand of grass, Thalle Construction company will have their seeding subcontractor return and do the as much seeding as necessary to provide an acceptable stand of grass on the areas disturbed by the contractor during construction.
6. On the hill above the Phase three (3) waste cell, a pond of water was noted standing in the area near where the rock was crushed. The contractor will need to regrade the drainage ditch to make this area drain properly. Then install four (4) rip rap check dams with the face covered with wash stone in this drain ditch.

7. The HDPE clean out pipe near the orange concrete liner edge marker needs to be extended about 4 feet in length.
8. Remove the wooden pallets and the section of HDPE pipe near where the GCL sandwich was installed at the tie in to the phase two (2) cell.
9. Remove the wooden rope spools along the tie-in to the phase one (1) cell.
10. We noticed two piles of old liner materials and some broken up wooden pallets on the high area of the existing phase one (1) cell and the new cell no. three (3) that needs to be removed.
11. The contractor will need to fine grad and cover exposed waste with soil material in the Phase 1, along the interface with Phase 3 and re-grass. Then re-establish the drain ditch to divert water away from the new cell.
12. In order to install electrical service to the Leachate Pump Station no. One, the electrical contractor drove their backhoe down the hill towards the pump station from the road half way up the existing phase 1 slope, resulting in severe rutting of the landfill cap. As you know, maintaining the integrity of the landfill cap is the operational goal of the County, and required per the State. In preparation for a recent site inspection by the state, the County was forced to repair this area themselves. The track hoe ruts were never repaired and there is severe rilling just above the pump station no. one. This area needs repairs and seeding.
13. We noticed a wash area near the first rip rap baffle in Sedimentation basin no. 5, place rip rap in this area to stabilize the bank from erosion.
14. Pour a concrete pad per the details in the plans, around the two monitoring wells that were raised or lowered in this contract.
15. Remove the accumulation of mud at the three (3) rip rap check dams in the drain ditch on the left side of the access road, along the west side of Phase 3 cell.
16. The contractor will need to provide the engineer with as built drawing, with all changes made during construction marked on a set of plans. Provide the engineer the certification surveys as required per the Special Conditions of the contract, section 01200, paragraph J.
17. The contractor will need to provide Joyce Engineering all information that is necessary to provide the state certification of construction for the new landfill cell.

Appendix VI

Appendix VI – Warranties

RAVEN INDUSTRIES INC.
EXPOSED GEOMEMBRANE LIMITED WARRANTY

Warranty No: 410003DSS

Effective Date: 4/23/2010

PURCHASER NAME: Hallaton Inc. PROJECT NAME: White Oak Landfill

ADDRESS: 1206 Sparks Road ADDRESS/LOCATION: 3898 Fines Creek Rd

CITY, STATE, ZIP, COUNTRY Sparks MD 21152 CITY, STATE, ZIP, COUNTRY Waynesville NC 28785

GEOMEMBRANE TYPE/DESCRIPTION R20DDV S/O 163363

Raven Industries Inc. warrants each Raven geomembrane to be free from manufacturing defects (as defined by the contract's material specifications) and to be able to withstand normal weathering for a period of 5 years from the above effective date for normal use in approved applications.

This Limited Warranty does not include damages or defects in the Raven geomembrane resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" as used herein does not include, among other things improper handling during transportation, unloading, storage or installation, the exposure of Raven geomembranes to harmful chemicals, atypical atmospheric conditions, weather abuse of Raven geomembranes by machinery, equipment or people; improper site preparation or covering materials, excessive pressures or stresses from any source or improper application or installation. Raven geomembrane material warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson Moss Warranty or any similar federal, state, or local statues. The parties expressly agree that the sale hereunder is for commercial or industrial use only.

Should defects or premature loss of use within the scope of the above Limited Warranty occur, Raven Industries Inc. will, at its option, repair or replace the Raven geomembrane on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. Raven Industries Inc. will have the right to inspect and determine the cause of any alleged defect in the Raven geomembrane and to take appropriate steps to repair or replace the Raven geomembrane if a defect exists which is covered under this warranty. This Limited Warranty extends only to Raven's geomembrane, and does not extend to the installation service of third parties nor does it extend to materials furnished or installed by others in connection with the intended use of the Raven geomembranes.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail, to the General Manager of Engineered Films Division of Raven Industries Inc. within ten (10) days of becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have any rights under this warranty. Raven Industries Inc. shall not be obligated to perform repairs or replacements under this warranty unless and until the area to be repaired or replaced is clean, dry, and unencumbered. This includes, but is not limited to, the area made available for repair and/or replacement of Raven geomembrane to be free from all water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this Limited Warranty, Purchaser shall reimburse Raven Industries Inc. for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the material as Raven Industries Inc. determines to have violated the warranty provided herein. Raven Industries Inc. shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to, damages for loss of production, lost profits, personal injury or property damage. Raven Industries Inc. shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser unless Raven Industries Inc. specifically authorized, in writing, said repairs, replacements, modifications or alteration in advance of them having been made. Raven Industry's liability under this warranty shall in no event exceed the replacement cost of the material sold to the Purchaser for the particular installation in which it failed.

Raven Industries Inc. neither assumes nor authorizes any person other than the undersigned of Raven Industries Inc. to assume for it any other or additional liability in connection with the Raven geomembrane made on the basis of the Limited Warranty. The Limited Warranty on the Raven geomembrane herein is given in lieu of all other possible material warranties, either expressed or implied, and by accepting delivery of the material; Purchaser waives all other possible warranties, except those specifically given. This Limited Warranty may only be modified by written document mutually executed by Owner and Raven Industries Inc.

Limited Warranty is extended to the purchaser/owner and is non-transferable and non-assignable; i.e., there are no third-party beneficiaries to this warranty.

Purchaser acknowledges by acceptance that the Limited Warranty given herein is accepted in preference to any and other possible materials warranties.

THIS LIMITED WARRANTY SHALL BE GOVERNED BY SOUTH DAKOTA LAW AND VENUE FOR ALL LEGAL PROCEEDINGS IN CONNECTION WITH THIS LIMITED WARRANTY SHALL BE IN MINNEHAHA COUNTY, SOUTH DAKOTA. RAVEN INDUSTRIES INC. MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESSED OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS IS THE ONLY WARRANTY THAT APPLIES TO THE MATERIALS REFERRED TO HEREIN AND RAVEN INDUSTRIES INC. DISCLAIMS ANY LIABILITY FOR ANY WARRANTIES GIVEN BY ANY OTHER PERSON OR ENTITY, EITHER WRITTEN OR ORAL.

RAVEN INDUSTRIES' WARRANTY BECOMES AN OBLIGATION OF RAVEN INDUSTRIES INC. TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT AND EXECUTION BY A DULY AUTHORIZED OFFICER OF RAVEN INDUSTRIES INC.

I hereby state that I have read and understand the above and foregoing and agree to such by signing hereunder and agree that but for the warranties provided herein, no other warranties or representatives of Raven Industries Inc. have been made by agents or representatives of Raven Industries Inc. and this Limited Warranty supercedes all other documents or agreements concerning the warranty of the geomembrane.

PURCHASER NAME: Kennedy Garber - Hallaton RAVEN INDUSTRIES INC: Dan Smith

SIGNATURE: DATE 5/6/10 SIGNATURE: Dan Smith (Authorized Representative) DATE 4/29/2010

LIMITED MATERIAL WARRANTY

REQUESTED BY: Hallaton, Inc.
PROJECT: White Oak Landfill
OWNER: Haywood County Recycling & Solid Waste
TYPE MATERIAL: 60 mil HDPE Microspike ®
LOCATION: Waynesville, NC

The company, referred to herein as AGRU AMERICA, warrants that AGRU AMERICA liners will correspond to the specifications as indicated in AGRU AMERICA technical records, catalogs, guidelines and test certificates at the time when sold.

AGRU AMERICA warrants that the material is faultless and resistant for a period of five (5) years, prorated, from the point of time sold when properly installed, covered and used for: Landfill, Buried, Primary application.

AGRU AMERICA's liability under this warranty is not applicable when damage is caused by:

-Natural phenomena such as thunderstorms, floods, earthquakes, act's of war or other acts of God;
-Chemicals which are not suitable for HDPE liner materials according to chemical resistance guides or from experience.

Further, AGRU AMERICA is not liable for damages due to the misapplication, incorrect installation, and damages resulting from any kind of inadequate handling. In the event that any defects are noticed in the liner, AGRU AMERICA must be notified in writing within thirty (30) days.

AGRU AMERICA shall be given an opportunity to ascertain the cause of damages. AGRU AMERICA reserves the right to decide how damages will be settled.

Under no circumstances will AGRU AMERICA assume liability for consequential damages due to defective liner or incorrect installation. AGRU AMERICA will not be responsible for failures arising from incorrect welding of seams in the installation.

Further, AGRU AMERICA's warranty will be void in the event that the buyer performs repairs or makes alterations without the express approval of AGRU AMERICA in writing. AGRU AMERICA's maximum liability under this warranty will not exceed the purchase price of liner and will only be in force when payment has been made in full and further claims regardless of the legal suppositions are not applicable.

This warranty is only valid on condition that the generally approved technical standards and in particular the guidelines for the installation of the liner are followed and only after full bank funding of this project.

For AGRU AMERICA, Inc.

Paul W. Barker

Authorized Official (Date) Paul W. Barker, Vice President –April 19, 2010

HALLATON INC.
EXPOSED GEOMEMBRANE LIMITED WARRANTY

Warranty No: W0932-RC

Effective Date: 4/23/2010

PURCHASER NAME: Haywood Co. Solid Waste PROJECT NAME: White Oak Landfill

ADDRESS: 278 Recycle Rd. ADDRESS/LOCATION: 3898 Fines Creek Rd

CITY, STATE, ZIP, COUNTRY Clyde, NC 28721 CITY, STATE, ZIP, COUNTRY Waynesville NC 28785

GEOMEMBRANE TYPE/DESCRIPTION R20DDV S/O 163363

Hallaton, Inc. warrants the Raven geomembrane to be free from manufacturing defects (as defined by the contract's material specifications) and to be able to withstand normal weathering for a period of 5 years from the above effective date for normal use in approved applications.

This Limited Warranty does not include damages or defects in the Raven geomembrane resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" as used herein does not include, among other things improper handling during transportation, unloading, storage or installation, the exposure of Raven geomembranes to harmful chemicals, atypical atmospheric conditions, weather abuse of Raven geomembranes by machinery, equipment or people; improper site preparation or covering materials, excessive pressures or stresses from any source or improper application or installation. Raven geomembrane material warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson Moss Warranty or any similar federal, state, or local statues. The parties expressly agree that the sale hereunder is for commercial or industrial use only.

Should defects or premature loss of use within the scope of the above Limited Warranty occur, Hallaton, Inc. will, at its option, repair or replace the Raven geomembrane on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. Hallaton, Inc. will have the right to inspect and determine the cause of any alleged defect in the Raven geomembrane and to take appropriate steps to repair or replace the Raven geomembrane if a defect exists which is covered under this warranty. This Limited Warranty extends only to Raven's geomembrane, and does not extend to the installation service of third parties nor does it extend to materials furnished or installed by others in connection with the intended use of the Raven geomembranes.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail, to the Vice President of Hallaton, Inc. within ten (10) days of becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have any rights under this warranty. Hallaton, Inc. shall not be obligated to perform repairs or replacements under this warranty unless and until the area to be repaired or replaced is clean, dry, and unencumbered. This includes, but is not limited to, the area made available for repair and/or replacement of Raven geomembrane to be free from all water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this Limited Warranty, Purchaser shall reimburse Hallaton, Inc. for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the material as Hallaton, Inc. determines to have violated the warranty provided herein. Hallaton, Inc. shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to, damages for loss of production, lost profits, personal injury or property damage. Hallaton, Inc. shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser unless Hallaton, Inc. specifically authorized, in writing, said repairs, replacements, modifications or alteration in advance of them having been made. Raven Industry's liability under this warranty shall in no event exceed the replacement cost of the material sold to the Purchaser for the particular installation in which it failed.

Hallaton, Inc. neither assumes nor authorizes any person other than the undersigned of Hallaton, Inc. to assume for it any other or additional liability in connection with the Raven geomembrane made on the basis of the Limited Warranty. The Limited Warranty on the Raven geomembrane herein is given in lieu of all other possible material warranties, either expressed or implied, and by accepting delivery of the material; Purchaser waives all other possible warranties, except those specifically given. This Limited Warranty may only be modified by written document mutually executed by Owner and Hallaton, Inc.

Limited Warranty is extended to the purchaser/owner and is non-transferable and non-assignable; i.e., there are no third-party beneficiaries to this warranty.

Purchaser acknowledges by acceptance that the Limited Warranty given herein is accepted in preference to any and other possible materials warranties.

THIS LIMITED WARRANTY SHALL BE GOVERNED BY SOUTH DAKOTA LAW AND VENUE FOR ALL LEGAL PROCEEDINGS IN CONNECTION WITH THIS LIMITED WARRANTY SHALL BE IN MINNEHAHA COUNTY, SOUTH DAKOTA. HALLATON, INC. MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESSED OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS IS THE ONLY WARRANTY THAT APPLIES TO THE MATERIALS REFERRED TO HEREIN AND HALLATON, INC. DISCLAIMS ANY LIABILITY FOR ANY WARRANTIES GIVEN BY ANY OTHER PERSON OR ENTITY, EITHER WRITTEN OR ORAL.

RAVEN INDUSTRIES' WARRANTY BECOMES AN OBLIGATION OF HALLATON, INC. TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT AND EXECUTION BY A DULY AUTHORIZED OFFICER OF HALLATON, INC.

I hereby state that I have read and understand the above and foregoing and agree to such by signing hereunder and agree that but for the warranties provided herein, no other warranties or representatives of Hallaton, Inc. have been made by agents or representatives of Hallaton, Inc. and this Limited Warranty supercedes all other documents or agreements concerning the warranty of the geomembrane.

PURCHASER NAME: STEPHEN KENG DATE 5/11/10 HALLATON, INC.: Scott Brinkerhoff- V.P. DATE 5-7-10

SIGNATURE: [signature] SIGNATURE: Scott Brinkerhoff (Authorized Representative)

HALLATON, INC.
LIMITED WORKMANSHIP WARRANTY

Warranty No: W0932
Project No: 0932-8009
Effective Date: 4/19/10

PURCHASER NAME: Haywood County Recycling & Solid Waste

ADDRESS: 278 Recycle Road

CITY, STATE, ZIP: Clyde, NC 28721

PROJECT NAME: White Oak MSW Landfill

DESCRIPTION: Phase 3 Construction

ADDRESS: 3898 Fines Creek Road

CITY, STATE, ZIP: Waynesville, NC 28785

HALLATON, INC. warrants each **LINER SYSTEM** installed by HALLATON, INC. to be free from defects in workmanship. This "Workmanship Warranty" shall be in effect from the date the installation of the Liner System is completed and accepted by the Owner for a period of **one (1) year** of normal use in approved applications.

This Limited Warranty does not include damages or defects in The Liner System resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" as used herein does not include, among other things, the exposure of The Liner System to harmful chemicals, abuse of The Liner System by machinery, equipment or people, excessive pressures or stress from any source, subsurface or overburdened soil conditions, and total or differential soil settlements and the effect these may have on the liner system.

Should defects or premature loss of use within the scope of the above Limited Workmanship Warranty occur, Hallaton, Inc. will, at its option, repair or replace the Liner on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. Hallaton, Inc. will have the right to inspect and determine the cause of any alleged defect in the Liner and to take appropriate steps to repair or replace the Liner if a defect exists and is within the term of this Limited Warranty.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail, to the President of Hallaton, Inc. within thirty (30) days after the alleged defect is noticed. Should the required notice not be given, the defect and all warranties shall be deemed to have been waived by the Purchaser, and Purchaser shall have no right of recovery against Hallaton, Inc. In the event repairs and/or replacements are to be effected, said repairs and/or replacements shall not become due until the area subject to repair and/or replacement of The Liner is available to Hallaton, Inc. in a clean, dry, unencumbered condition. This includes, but is not limited to, the area made available for repair and/or replacement of The Liner to be free from all water, dirt, sludge, residuals, and liquids of any kind.

Hallaton, Inc.'s liability under this warranty shall in no event exceed the replacement cost of the material and installation sold to the Purchaser for the particular installation in which it failed. Further, under no circumstances shall Hallaton, Inc. be liable for any special, direct, indirect, or consequential damages arising from loss of production or any other losses including losses due to personal injuries and product liability owing to the failure of the material or installation and no allowance will be made for repairs, replacements, or alterations made by the Purchaser without the express written consent of Hallaton, Inc.

Hallaton, Inc. neither assumes nor authorizes any person other than an officer of Hallaton, Inc. to assume for it any other or additional liability in connection with the Liner System made the basis of the Limited Warranty. The Limited Workmanship Warranty on the Liner herein is given in lieu of all other possible material warranties, either express or implied, and by accepting delivery of the material, Purchaser waives all other possible workmanship warranties, except those specifically given.

The parties expressly agree that the sale hereunder is for commercial or industrial use only.

Hallaton, Inc. Limited Warranty is extended to the purchaser/owner and is non transferable and non-assignable.

Purchaser acknowledges by acceptance that the Limited Workmanship Warranty given herein is accepted in preference to any and all other possible workmanship warranties.

HALLATON, INC. MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESS OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE

WARRANTY BECOMES EFFECTIVE UPON RECEIPT OF FINAL PAYMENT

I hereby state I have read and understood the above and foregoing Limited Warranty and agree to such by signing hereunder.

PURCHASER NAME: STEPHEN KING

SIGNATURE: [signature]

TITLE: SOLID WASTE DIRECTOR

DATE: 5/11/10

HALLATON, INC.

[signature]
Vice President

Sworn before me this 29 day of April, 2010.

[signature]

ANGELA GIBSON
NOTARY PUBLIC
BALTIMORE COUNTY
MARYLAND
MY COMMISSION EXPIRES JAN. 23, 2013

RAVEN INDUSTRIES INC.
EXPOSED GEOMEMBRANE LIMITED WARRANTY

Warranty No: 410003DSS

Effective Date: 4/23/2010

PURCHASER NAME: Hallaton Inc. PROJECT NAME: White Oak Landfill

ADDRESS: 1206 Sparks Road ADDRESS/LOCATION: 3898 Fines Creek Rd

CITY, STATE, ZIP, COUNTRY Sparks MD 21152 CITY, STATE, ZIP, COUNTRY Waynesville NC 28785

GEOMEMBRANE TYPE/DESCRIPTION R20DDV S/O 163363

Raven Industries Inc. warrants each Raven geomembrane to be free from manufacturing defects (as defined by the contract's material specifications) and to be able to withstand normal weathering for a period of 5 years from the above effective date for normal use in approved applications.

This Limited Warranty does not include damages or defects in the Raven geomembrane resulting from acts of God, casualty or catastrophe including but not limited to: earthquakes, floods, piercing hail, tornadoes or force majeure. The term "normal use" as used herein does not include, among other things improper handling during transportation, unloading, storage or installation, the exposure of Raven geomembranes to harmful chemicals, atypical atmospheric conditions, weather abuse of Raven geomembranes by machinery, equipment or people; improper site preparation or covering materials, excessive pressures or stresses from any source or improper application or installation. Raven geomembrane material warranty is intended for commercial use only and is not in effect for the consumer as defined in the Magnuson Moss Warranty or any similar federal, state, or local statues. The parties expressly agree that the sale hereunder is for commercial or industrial use only.

Should defects or premature loss of use within the scope of the above Limited Warranty occur, Raven Industries Inc. will, at its option, repair or replace the Raven geomembrane on a pro-rata basis at the then current price in such manner as to charge the Purchaser/User only for that portion of the warranted life which has elapsed since purchase of the material. Raven Industries Inc. will have the right to inspect and determine the cause of any alleged defect in the Raven geomembrane and to take appropriate steps to repair or replace the Raven geomembrane if a defect exists which is covered under this warranty. This Limited Warranty extends only to Raven's geomembrane, and does not extend to the installation service of third parties nor does it extend to materials furnished or installed by others in connection with the intended use of the Raven geomembranes.

Any claim for any alleged breach of this warranty must be made in writing, by certified mail, to the General Manager of Engineered Films Division of Raven Industries Inc. within ten (10) days of becoming aware of the alleged defect. Should the required notice not be given, the defect and all warranties are waived by the Purchaser, and Purchaser shall not have any rights under this warranty. Raven Industries Inc. shall not be obligated to perform repairs or replacements under this warranty unless and until the area to be repaired or replaced is clean, dry, and unencumbered. This includes, but is not limited to, the area made available for repair and/or replacement of Raven geomembrane to be free from all water, dirt, sludge, residuals and liquids of any kind. If after inspection it is determined that there is no claim under this Limited Warranty, Purchaser shall reimburse Raven Industries Inc. for its costs associated with the site inspection.

In the event the exclusive remedy provided herein fails in its essential purpose, and in that event only, the Purchaser shall be entitled to a return of the purchase price for so much of the material as Raven Industries Inc. determines to have violated the warranty provided herein. Raven Industries Inc. shall not be liable for direct, indirect, special, consequential or incidental damages resulting from a breach of this warranty including, but not limited to, damages for loss of production, lost profits, personal injury or property damage. Raven Industries Inc. shall not be obligated to reimburse Purchaser for any repairs, replacement, modifications or alterations made by Purchaser unless Raven Industries Inc. specifically authorized, in writing, said repairs, replacements, modifications or alteration in advance of them having been made. Raven Industry's liability under this warranty shall in no event exceed the replacement cost of the material sold to the Purchaser for the particular installation in which it failed.

Raven Industries Inc. neither assumes nor authorizes any person other than the undersigned of Raven Industries Inc. to assume for it any other or additional liability in connection with the Raven geomembrane made on the basis of the Limited Warranty. The Limited Warranty on the Raven geomembrane herein is given in lieu of all other possible material warranties, either expressed or implied, and by accepting delivery of the material; Purchaser waives all other possible warranties, except those specifically given. This Limited Warranty may only be modified by written document mutually executed by Owner and Raven Industries Inc.

Limited Warranty is extended to the purchaser/owner and is non-transferable and non-assignable; i.e., there are no third-party beneficiaries to this warranty.

Purchaser acknowledges by acceptance that the Limited Warranty given herein is accepted in preference to any and other possible materials warranties.

THIS LIMITED WARRANTY SHALL BE GOVERNED BY SOUTH DAKOTA LAW AND VENUE FOR ALL LEGAL PROCEEDINGS IN CONNECTION WITH THIS LIMITED WARRANTY SHALL BE IN MINNEHAHA COUNTY, SOUTH DAKOTA. RAVEN INDUSTRIES INC. MAKES NO WARRANTY OF ANY KIND OTHER THAN THAT GIVEN ABOVE AND HEREBY DISCLAIMS ALL WARRANTIES, BOTH EXPRESSED OR IMPLIED, OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THIS IS THE ONLY WARRANTY THAT APPLIES TO THE MATERIALS REFERRED TO HEREIN AND RAVEN INDUSTRIES INC. DISCLAIMS ANY LIABILITY FOR ANY WARRANTIES GIVEN BY ANY OTHER PERSON OR ENTITY, EITHER WRITTEN OR ORAL.

RAVEN INDUSTRIES' WARRANTY BECOMES AN OBLIGATION OF RAVEN INDUSTRIES INC. TO PERFORM UNDER THE WARRANTY ONLY UPON RECEIPT OF FINAL PAYMENT AND EXECUTION BY A DULY AUTHORIZED OFFICER OF RAVEN INDUSTRIES INC.

I hereby state that I have read and understand the above and foregoing and agree to such by signing hereunder and agree that but for the warranties provided herein, no other warranties or representatives of Raven Industries Inc. have been made by agents or representatives of Raven Industries Inc. and this Limited Warranty supercedes all other documents or agreements concerning the warranty of the geomembrane.

PURCHASER NAME: Kennedy Garber - Hallaton RAVEN INDUSTRIES INC: Dan Smith

SIGNATURE: DATE 5/6/10 SIGNATURE: (Authorized Representative) DATE 4/29/2010

Appendix VII

Appendix VII – NCDENR Correspondence

REVISED
GENERAL BLASTING PLAN

Haywood County Sanitary Landfill

Haywood County, NC

September 3, 2009

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GENERAL BLASTING PLAN

1.0 INTRODUCTION

This Blasting plan identifies measures to be taken by National Quarry Service Inc. to ensure that blasting operations are carried out in accordance with federal, state and local regulations and restrictions.
Measures identified in this blasting plan apply to work within the project area as defined as, the right-of-way, access roads, temporary use areas and other areas used during construction of the project.
Contractors sub – contractors and all site personnel are to be thoroughly familiar with this plan.

1.1 Purpose

The project encounters one or more areas of surface and subsurface rock where mechanical equipment will be unable to rip or excavate rock to allow construction. There is estimated to approximately 25,000 cubic yards of this type of rock on this project. In these areas blasting will be used to fracture the rock to allow for grading and excavation.

This plan describes safety standards and practices that will be implemented during construction to minimize health, safety and environmental concerns related to blasting on the project.

2.0 Blasting Procedures

2.1 Notifications

National Quarry Service Inc. will notify all appropriate federal, state and local authorities at least 24 hours prior storing or using explosives on the project. In addition, the following notifications will be needed throughout the project.

Prior to any detonation of explosives in the vicinity of existing facilities (such as pipelines, dwellings, structures, overhead or underground utilities, farm operations, or public crossings), a minimum of 24 hours notice will be given to appropriate authorities, and the owners or operators of any facilities that may be affected by the blasting.

2.2 Blasting Process

Drilling - Scaled Distance formulas will be used as guidelines to determine maximum pounds within any 8ms delay period and appropriate drill hole spacing and diameter will be applied.

Loading - The rock to be excavated occurs in various depths between elevation 2510' and elevation 2550' with the average cut expected to be 13'. According to borings done

at the site and our experience in this area of North Carolina, we expect to find a medium to hard layer of weathered rock overlying hard granite with layers of gneiss, quartz and feldspar. National Quarry Service intends to use non-electric type blasting caps to initiate high explosive primers approximately 1' above the blast hole bottom. We expect that the area will be free of ground water and will use ammonium nitrate/ fuel oil blasting agent to load the holes to required weight and depth. Explosive type will be determined by drilling reports and ground water encountered. The holes will then be stemmed to the collar with crushed stone for maximum confinement. Drill pattern and blast hole size will be manipulated so that a powder factor of 1 pound to 1.25 pounds per cubic yard of rock will be maintained with the holes being drilled to a depth 3' below proposed sub-grade. This industry accepted standard for blasting of unconfined mass rock will result in desired fracturization of the rock while minimizing disturbance outside of the actual blast area. Each blast will be fired with an "open face" blast designed so that each hole fires a minimum of 25 milliseconds prior to the adjoining holes effectively "unburdening" each hole sequentially. This ensures that maximum energy is used to fracture the intended rock and not confined so to fracture the underlying mass. Maximum pounds per delay will be expected to occur in an area of cut between 27' and 29' which is approximately 450' from existing phase 1. Using the calculated scaled distance of 46.134 and an "H" factor of 160, the maximum peak particle velocity at the nearest corner of the structure is predicted to be less than 0.4 inches per second. In addition, there is an area of excavation to below proposed sub grade separating the blast area from the existing cell which would be expected to reduce the conductivity of ground vibration. We would recommend that a thorough survey be done of the existing conditions of the structures as near prior to blasting as possible. Seismic monitoring will be done at all areas of concern and readings will be reviewed after each blast to assess the effects of the blast and the need for changes to blast designs.

Cartridge and or bulk explosives will be primed with an appropriate primer in the bottom of the blast hole. Once loaded to a predetermined depth, all holes will be stemmed with #78 crushed stone. All delay and ignition caps will be non – electric type and will be connected and inspected a certified blaster. Tail caps of will be of sufficient length that visual inspection after the blast will be possible to insure that all holes have detonated.

Matting/Covering – Whenever necessary blasting mats or earth cover will be used to protect surrounding property from blasting debris.

Warning – The blaster inspects the blast area to ensure that vehicles and personnel have withdrawn to a safe distance. Access to the area is restricted and warning signals are sounded.

Blast – Following the warning signals, the blast will be detonated.

Clearance – National Quarry Service personnel will conduct a thorough post blast inspection of the blast area to ensure that all explosives and blasting caps are detonated prior to any other work proceeding. Once the area is verified clear, the all clear will be sounded.

2.2.1 Misfires/Cut-offs

If during the post blast inspection of any shot it is determined that all of any part of the shot did not detonate, the immediate area of the shot will be secured and will be treated as an area where explosives are being loaded. No additional work, other than that necessary to remove the hazard, shall be performed, and only those persons needed to do such work shall remain at the blast site. As soon as practical, notifications will be given and blasting procedures outlined in section 2.2 will begin.

2.3 Restrictions

Special blasting controls will be required in the vicinity of power lines, telephone lines, fiber optic lines, existing pipeline facilities, structures, water wells, springs, or buildings or where directed by National Quarry Service, Inc. to preclude the possibility of damage due to fly-rock, shock waves, vibrations, or changes to hydraulic conductivity of the bedrock near important springs and wells. This will be accomplished by a combination of blast design, adequate collaring, and matting. Matting to control fly-rock includes, but is not limited to, fabricated mats, overburden, and sand-pad matting.

3.0 EXPLOSIVES STORAGE & TRANSPORTATION

National Quarry Service inc. will obtain necessary permits and comply with 27 CFR Part 55 & 13 NCAC 07F.0707 regulations and NFPA 495 state and local government having jurisdiction as to storage and transportation of explosives. National Quarry Service will maintain an inventory and use record for all explosives and detonating caps that will be reconciled at the end of the working day. Inventory and use records will be available on site for inspection by any jurisdictional authorities at all times.

4.0 SAFETY MEASURES

Standard safety measures will be employed during blasting operations to prevent damage to adjacent resources, residences, utilities, and roadways. As discussed above, these measures will include blasting controls to limit fly-rock, air blast, and vibrations near sensitive areas. Warning signals, signage, and procedures to protect human health and safety are discussed below.

4.1 General Safety Measures

National Quarry Service Inc. will at all times protect its workers and the public from any injury or harm from drilling or the use of explosives. Only workers thoroughly experienced in handling explosives will be permitted to supervise, handle, haul, load or fire explosives. In those jurisdictions where the licensing of blasters is mandatory, National Quarry Service, Inc. will provide proof of the necessary certification for every person so required before any crew assignment.

National Quarry Service Inc. will not leave holes loaded overnight, unattended or unprotected. Explosives will be primed immediately before use. Loading and blasting will be conducted only during daylight hours. No explosives will be abandoned on the right of way.

During the blasting procedure, all personnel not involved in the actual detonation will stand back from the time the "blast imminent" signal is given until the "all clear" has been sounded. The Contractor will post flagmen on all roadways passing the blast area to stop all traffic during blasting operations.

The Contractor will ensure that no members of the general public are in the area when a blast occurs.

4.2 Warning Signs and Signals

The Contractor will install "Blast Zone Ahead" signs along roads, public ways, in the vicinity of occupied buildings immediately adjacent to the blast area, and other locations deemed necessary to warn the public of the blasting area. Additional signs warning to turn off electrical devices shall be required if electric blasting caps are used. NQS will install "Leaving Blast Zone "to notify everyone that they are leaving blast area.

4.2.2 Blast Signals

National Quarry Service will use an acceptable air horn or siren to give the blasting warning and "All – Clear" signals. The warning system used for blast signals will produce a sound that is distinct from any other signals used on the site. Use of vehicle horns as blast signals will not be permitted.

- Three minutes prior to blasting - Blast Imminent; the blaster in charge will give three short blasts of an air horn.
- One minute prior to blasting – The blaster will give two short blasts of an air horn.
- Prior to blasting – the Blaster in Charge will shout "Fire in the Hole" and the explosives will be fired.
- If there is any interruption to the blast routine once the "Blast Imminent" signal has been given, the entire procedure will begin again.
- All Clear Signal – The blaster will check the blast site to ensure all charges have been detonated and give one long blast of the air horn

5.0 STANDARD SAFETY OPERATING PROCEDURES

1. This General Blasting Plan will be made available to all personnel involved in field activities. Prior to the start of field activities, all personnel working on the site will be thoroughly briefed about the type of work to be done, potential hazards, safety equipment to be used and worn, safety precautions, emergency procedures, and procedures for reporting accidents or injuries.

2. A fully stocked first-aid kit will be on site at all times.
   Eye wash kits will be available on-site.
   Drinking water will be available at all times.

3. No blasting activities will be conducted during thunderstorms or during periods of potential lightning.

4. All blasting operations will be restricted to daylight hours.

5. National Quarry Service Inc. will adhere to all Federal, State and Local restrictions.

6. Emergency response procedures will be understood by all site personnel. Any visitors to the site will be briefed by the project manager.

North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

September 15. 2009

Mr. Stephen King
Haywood County Solid Waste Director
278 Recycle Road
Clyde, North Carolina 28721

Re: Authorization Approval for Blasting Plan, Phases 3 & 4 – Rock Delineation and Blasting Plan, White Oak MSW Landfill, Haywood County, North Carolina, Permit No. 44-07, ID No. 8588

Dear Mr. King:

Mr. Jeffrey Bishop, P.E. on behalf of White Oak Landfill, submitted an initial Rock Delineation / Blasting Plan on August 27, 2009, pertaining to the subgrade and construction of Phase 3 and Phase 4. Supplemental documentation was submitted on September 1 & 2, 2009 and a Revised General Blasting Plan (Doc ID 8558) was submitted on September 3, 2009 by Mr. Bill Sperry, P.E. of McGill Associates.

The initial Rock Delineation / Blasting plan addressed removal of unrippable rock identified during construction. The rock is located in the northwest corner of proposed Phase 3, northeast corner of proposed Phase 4, and proposed sediment basin north of Phase 3. This area is about two (2) acres. Intent of removing the rock is to achieve the four (4) feet separation below the designed base liner system. Blasting operations shall comply with all applicable local, state, and federal ordinances, regulations, and laws.

The Revised General Blasting Plan will be included with the list of the approved documents in the permit to operate. Please include the report documenting the approved activity in the final CQA report as well as submitting the blasting report within 30 days of the activity. Please note that further modifications to the construction of these phases may require a permit modification fee. Also, future landfill expansion areas (Phases) to be constructed may require further lithologic investigative characterization (i.e. top of rock / rock borings) at the time of design study phase.

If you have any questions please contact me at (919) 508-8401 or at zinith.barbee@ncdenr.gov.

Sincerely,

Zinith Barbee

Zinith Barbee
Hydrogeologist
Solid Waste Section

cc: Jeffrey R. Bishop, P.E. McGill Associates, P.A. Bill Sperry, P.E. McGilll Associates, P.A.
Allen Gaither Solid Waste Section Andrea Keller Solid Waste Section

DRAFT

ROCK BLASTING AT LINED LANDFILL UNITS

The Solid Waste Section allows blasting for rock removal only after all other options have been explored, including the viability of adjusting base grades.

Generally, the base grades must be designed to maintain four foot of vertical separation from the top of rock as established by the Design Hydrogeologic Study. This study requires a boring density of about one boring per acre for the area of investigation, which includes the footprint for the planned landfill phase of development and the area around the footprint that will be subject to ground-water monitoring. For the purposes of the Design Study the top of rock is defined by auger refusal or a Standard Penetration Resistance blow count of about 50/.2'. The base grades are then designed to maintain four foot of vertical separation from the top of bedrock datum plane as established in the Design Hydrogeologic Study.

If during excavation of the disposal cell, rock pinnacles are found that are above the top of rock datum plane established in the Design Hydrogeologic Study, then the Solid Waste Section will consider authorizing some rock removal. If blasting is necessary the landfill owner/operator or their consultants should submit a blasting plan. This blasting plan should show the location and size of the rock pinnacles, the elevations of the rock, and an estimate of the volume of rock that needs to be removed. The blasting plan must be designed so as to minimize the impact to underlying rock and nearby structures.

If rock removal is determined to be necessary, the Solid Waste Section may authorize blasting with the following conditions:

- Effort shall be made to minimize the amount of blasting necessary, and to minimize the effects of the blasting that is required.

- Blast monitoring shall be conducted at appropriate locations. Monitoring may be required at the edge of the proposed cell, at the location of monitoring wells, at the edge of clay liner of nearby landfill cells, at the edge of nearby structures, etc. Every effort shall be made to limit the peak particle velocity to 1 inch per second at the blast monitoring locations.

DRAFT

- A full, detailed report of the rock blasting activities shall be submitted to the Solid Waste Section within 30 days of the completion of the rock removal. The Licensed Blaster shall certify that the drill hole pattern, charge weights, and delays were selected in such a manner as to minimize the amount of energy which may impact underlying rock.

- A Professional Engineer shall certify that rock blasting was kept to a minimum and that controlled blasting techniques were used to minimize the effects of blasting to the underlying bedrock.

- The report of blasting activities shall also include a discussion by a Licensed Professional Geologist on the effect of heavy ripping and/or blasting on the ground-water flow regime at the site. Additional subsurface investigation may be required to determine the effect of heavy ripping and/or blasting on the hydrogeology of the area.

- During and after excavation of the area and prior to backfilling with soil, the Licensed Professional Geologist shall evaluate the excavation for any evidence of structural features that could influence ground-water flow (fractures, dikes, pegmatites, etc.) The Solid Waste Section shall be informed of when the excavation will be completed, so a Section Hydrogeologist may schedule a site visit to inspect the area. The report of blasting activities shall include a report by the Licensed Professional Geologist on the evaluation of the excavated area and recommendations of any modifications that may be needed to the ground-water monitoring system based on this evaluation.

- If modifications to the water quality monitoring plan are necessary, based upon the evaluation of the excavation area or additional subsurface investigation, a revised monitoring plan shall be submitted by the Licensed Professional Geologist to the Solid Waste Section for review.

- The Professional Engineer shall include a discussion in the CQA Report of the location and nature of the rock blasting and the backfill of the over-excavation. This shall be included as part of the certification of the subgrade.

BUNNELL-LAMMONS ENGINEERING, INC.

GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS

REPORT OF GEOLOGIC OBSERVATION OF ROCK BLASTING IN PHASE 3

WHITE OAK LANDFILL
HAYWOOD COUNTY, NORTH CAROLINA

PERMIT NO. 44-07

PREPARED FOR:

MCGILL ASSOCIATES
ASHEVILLE, NORTH CAROLINA

PREPARED BY:

BUNNELL-LAMMONS ENGINEERING, INC.
GREENVILLE, SOUTH CAROLINA

NOVEMBER 20, 2009

BLE Project Number J09-1957-10

BUNNELL-LAMMONS ENGINEERING, INC.
GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS

November 20, 2009

McGill Associates
55 Broad Street
Asheville, North Carolina 28801

Attention: Mr. Jeff Bishop, P.E.

Subject: **Report of Geologic Observation of Rock Blasting in Phase 3**
White Oak Landfill
Haywood County, North Carolina
Permit No. 44-07
BLE Project Number J09-1957-10

Dear Mr. Bishop,

As authorized, by McGill Associates (McGill) acceptance of our proposal number P09-0658 dated October 7, 2009, Bunnell-Lammons Engineering, Inc. (BLE) performed field geologic observation after blasting activities at the subject site. The purpose of this work was to conduct geologic observations of the areas of the site where rock blasting was performed and to prepare a report of our findings. The enclosed report describes the work performed and presents the results obtained.

1.0 PROJECT INFORMATION

The following project information was obtained from conversations with Mr. Bill Sperry, P.E. of McGill, documents provided by McGill and from site data (in BLE's project records) from our current services contract with Haywood County.

The existing 286-acre White Oak Municipal Solid Waste (MSW) Landfill facility is located in Haywood County, North Carolina, approximately 12 miles north of Waynesville at the Fines Creek Exit (Exit 15) off of Interstate 40 (Figure 1). Haywood County owns and operates the White Oak Landfill which is currently being expanded in the areas designated Phases 3 & 4. McGill has been retained by Haywood County to provide engineering services related to the expansion of the landfill.

We understand that "unrippable" rock was encountered at the site above proposed landfill base grades. McGill submitted a *Rock Delineation and Blasting Plan* for the subject site which was approved by the Solid Waste Section (SWS) of the NCDENR. McGill requested that BLE conduct geologic observations and prepare a report in accordance with the approved blasting plan.

6004 PONDERS COURT
GREENVILLE, SOUTH CAROLINA 29615
PHONE (864) 288-1265
FAX (864) 288-4430

2.0 SITE GEOLOGY

The subject site is located within the Blue Ridge Belt. The crystalline rocks of the Blue Ridge occur in generally northeast-southwest trending geologic belts in the Carolinas and Virginia. Precambrian-age (Proterozoic) basement complexes of metamorphosed igneous and sedimentary rocks underlie the region (Hadley and Goldsmith, 1963; Horton and Zullo, 1991). The site is underlain by the Middle to Late Proterozoic-aged Spring Creek Granitoid Gneiss, which are metamorphosed-igneous rocks. The multiple metamorphic deformations of the igneous rocks have resulted in biotite granitic gneiss interlayered with biotite granodiorite gneiss, tonalitic gneiss, quartz monzodiorite gneiss, amphibolite, biotite gneiss, and biotite schist (Carter and Weiner, 1999). Late Proterozoic-aged Great Smoky Group has been mapped southeast of the facility boundary, which are metamorphosed-sedimentary rocks. The multiple metamorphic deformations of the sedimentary rocks have resulted in metagraywache, with lesser amounts of locally interbedded kyanite-garnet-mica schist, garnet-mica schist, and calc-silicate granofels (Carter and Weiner, 1999). In the vicinity of the site, bedding and foliation generally strike northeast-southwest and dips moderately to the southeast. Structurally, the contact between the Spring Creek Granitoid Gneiss and the Great Smoky Graywacke is mapped as a thrust fault in which the Great Smokey formation overlies the Spring Creek formation (Carter and Weiner, 1999).

Holocene and younger age faults were not indicated on site or within 200 feet of the site from the literature review or from the field reconnaissance.

The typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. Residual soil zones develop by the in situ chemical weathering of bedrock, and are commonly referred to as "saprolite." Saprolite usually consists of silt with lesser amounts of sand, clay, and large rock fragments. The thickness of the saprolite in the Piedmont ranges from a few feet to more than 100 feet. The boundary between soil and rock is not sharply defined.

A transitional zone of partially weathered rock is normally found overlying the parent bedrock. Partially weathered rock is defined, for engineering purposes, as residual material with standard penetration resistance in excess of 100 blows per foot (bpf). Fractures, joints, and the presence of less resistant rock types facilitate weathering. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and boulders of hard rock and zones of partially weathered rock within the soil mantle, well above the general bedrock level.

3.0 FIELD OBSERVATIONS

Mr. Benjamin P. Nisbeth, P.G. of BLE visited the site on October 23, 2009 and November 4, 2009 after blasting activities were completed. During these visits, the exposed ground surface was observed to identify potential anomalous geologic features not identified during previous geologic investigations. The October site visit was conducted before the blast rock was removed and before rough grading for the subgrade of the Phase 3 area had begun. The November site visit was conducted after the blast zone had been rough graded to the design elevation. Site observations are summarized below and are shown on the attached Photographs 1 through 6.

The blast zone was located in the northern half of Phase 3 along the western limits of the area (Figure 2, Photo No. 4). The blasting reduced the near-surface boulders and bedrock in size to rock fragments that could be removed by conventional excavating equipment (Photos No. 1 and No. 2). Sandy-silt and silty-sand residual soils, partially weathered rock, and fractured rock that could be excavated to achieve the desired grade were encountered below the boulder-rock mass (Photo No. 5).

Several small boulders/pinnacles of bedrock were exposed above the desired grade along the south end of the blast zone (Photos No. 3 and No. 6). In a conversation with the grading contractor, it was indicated that the small boulders/pinnacles of rock were to be removed using conventional excavation equipment (track-hoe mounted hydraulic hammer and excavator). We did not observe attempts to excavate the rock; however, we understand that the rock was successfully removed after our last site visit. Other than the noted rock, no other pertinent geologic features were observed at the site.

The soils and partially weathered bedrock, and rock were observed to be consistent with those found in the borings performed during previous site investigations.

4.0 CONCLUSIONS & RECOMMENDATIONS

Bedrock/boulders were encountered at elevations above the proposed subgrade. A limited amount of rock blasting was performed in the immediate area of the bedrock/boulders and the rock mass was removed. No exposed pertinent geologic features were observed in the Phase 3 area subgrade which were different from that encountered at the site during previous site investigations by BLE.

The rock blasting did not significantly alter the groundwater flow regime since the blasting was restricted to shallow depths below ground surface. The effects of blasting were limited to the immediate vicinity of the rock mass. Therefore, we conclude that modification of the existing *Water Quality Monitoring Plan* is not necessary.

We understand that this report will be submitted as part of the CQA report which will be prepared by others. We also understand that the blast vibration monitoring was completed by others and will also be submitted as part of the CQA report.

5.0 CLOSING

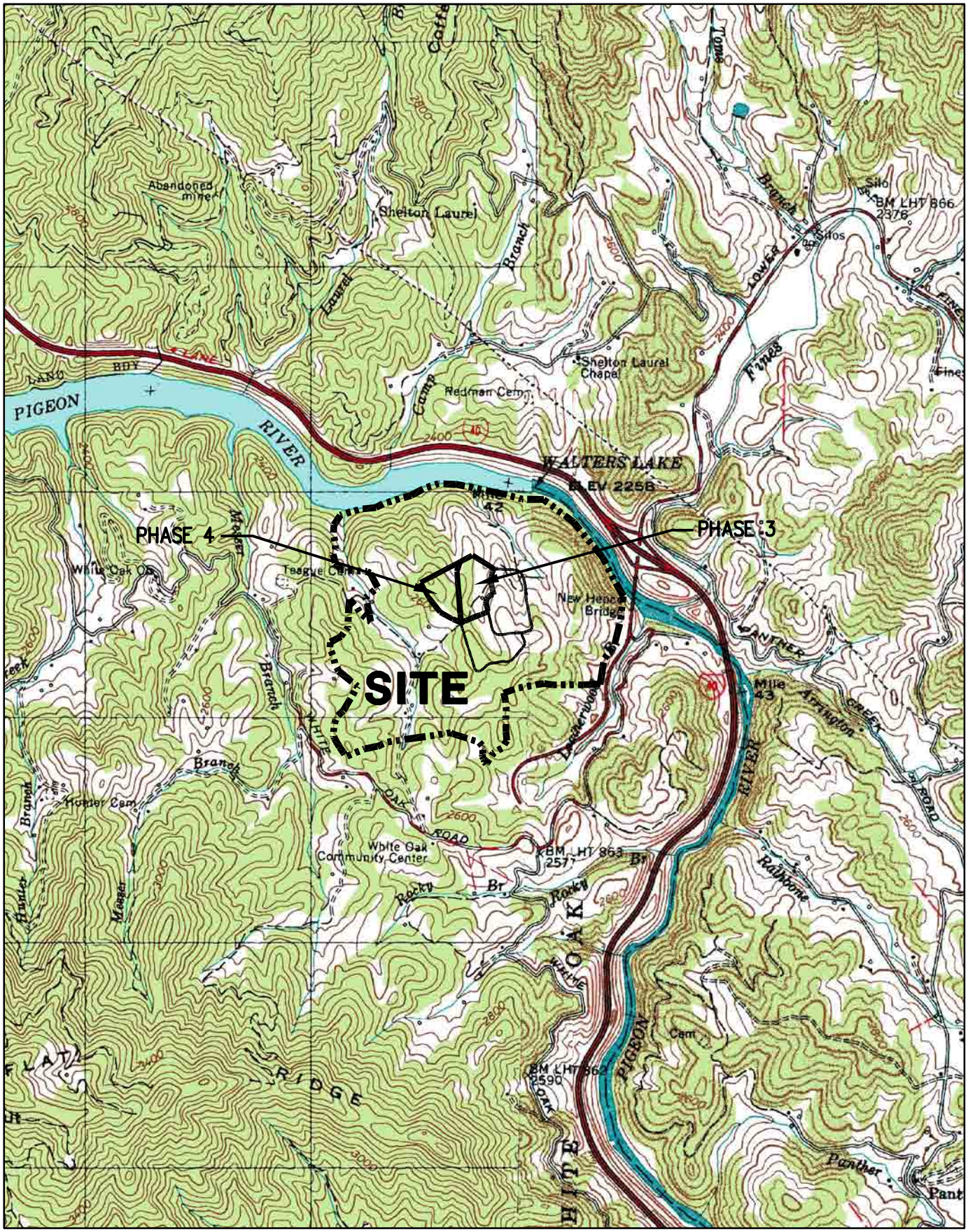
We appreciate the opportunity to serve as your environmental consultant on this project. Please contact us at (864) 288-1265 if you have any questions or comments regarding this report.

Sincerely,
BUNNELL-LAMMONS ENGINEERING, INC.

Benjamin P. Nisbeth, P.G.
Staff Geologist
Registered, North Carolina #2134

Andrew W. Alexander, P.G., RSM
Senior Hydrogeologist
Registered, North Carolina #1475

FIGURES



2000 1000 0 2000 4000

APPROXIMATE SCALE IN FEET

REFERENCE:
USGS TOPOGRAPHIC MAP, 7.5 MINUTE SERIES,
COVE CREEK GAP AND FINES CREEK, N.C. QUADRANGLES, 1967.

DRAWN: AEH	DATE: 11-19-09	BLE INC. BURNELL-LAMMONS ENGINEERING, INC. 6004 PONDERS COURT GREENVILLE, SOUTH CAROLINA 29615 PHONE: (864)288-1265 FAX: (864)288-4430	SITE LOCATION MAP WHITE OAK LANDFILL HAYWOOD COUNTY, NORTH CAROLINA	FIGURE
CHECKED: MSP	CAD: HCWOLF-10 SLM			1
APPROVED:	JOB NO: J09-1957-10			

DRAWING TITLED "CONCEPTUAL SITE PLAN, OPTION 1 & 2" BY McGILL ASSOCIATES DATED JUNE 2007.

REVISIONS		
No.	DESCRIPTION	BY

DRAWN:	AEH
CHECKED:	AWA
APPROVED:	

DATE:	11-19-09
CAD FILE:	HCWOLF-10 SMBZ
JOB NO:	J09-1957-10

BLE INC.

BUNNELL-LAMMONS ENGINEERING, INC.
6004 PONDERS COURT
GREENVILLE, SOUTH CAROLINA 29610
PHONE: (864)288-1288 FAX: (864)288-4430

SITE MAP WITH APPROXIMATE BLASTING ZONE LIMITS
WHITE OAK MSW LANDFILL
HAYWOOD COUNTY, NORTH CAROLINA

FIGURE NO. 2

APPENDICES

APPENDIX A

PROJECT PHOTOGRAPHS

Photo No. 1 – Picture of Blast Zone prior to rough grading, looking southwest. Taken on 10/23/2009.

Photo No. 2– Picture of blast rock, looking Northwest from southeast corner of the Blast Zone. Taken on 10/23/2009.

Photo No. 3 – Picture of the south edge of Blast Zone showing exposed rock/boulders above base grades, looking West. Taken on 11/04/09.

Photo No. 4 – Picture of Blast Zone in Phase 3, looking West. Taken on 11/04/09.

Photo No. 5 – Picture of boulders and rock fragments near North edge of Blast Zone, looking Northwest. Taken on 11/04/09.

Photo No. 6 – Picture of exposed boulder/rock pinnacle near south edge of Blast Zone, looking Northeast. Taken on 11/04/09.

ENGINEERING, INC.

Waste Industry Experts

Joyce Engineering, Inc
2211 W. Meadowview Road
Suite 101
Greensboro, NC 27407

tel: 336/323-0092
fax: 336/323-0093

www.JoyceEngineering.com

November 19, 2009

Mr. Allen Gaither, P.E.
Permitting Engineer
DENR Division of Waste Management, Solid Waste Section
2090 US Highway 70
Swannanoa, NC 28778

RE: Haywood County, White Oak Landfill, Permit No. 44-07, Phase 3 Construction – Geologist Inspection

Dear Allen,

On behalf of Haywood County Solid Waste Department, Joyce Engineering, Inc. is submitting this geologist inspection for the Phase 3 construction at the White Oak landfill in response to Rule .1624 Construction Requirements for MSWLF Facilities.

The subgrade certification of Phase 3 was conducted in partial segments as the contractor was excavating the expansion area. Rock was encountered on the west side before reaching the subgrade elevations. The remaining excavation was completed by cutting and hauling the in-situ material until the subgrade elevations were achieved.

On September 9, 2009 Hannu Kemppinen, P.G. (NC#1490) conducted an inspection of Phase 3 subgrade. On this day, the east side slope of Phase 3 was prepared in accordance with the design grades and exhibited no unusual geologic conditions that would adversely affect the design, construction or operation of the unit. At that time, the construction excavation had exposed resistant bedrock on the west side of Phase 3. The County was considering removal of the rock to retain the permitted capacity. Further decision of the rock removal or subgrade alteration was pending. Due to the delay, the west side and remaining areas of the Phase 3 subgrade inspection were to be conducted at a later time.

On October 1, 2009 Hannu Kemppinen conducted a subgrade inspection at the south end of the Phase 3. On this day, the south end of the Phase 3 was prepared in accordance with the design and exhibited no unusual geologic conditions that would adversely affect the design, construction or operation of the unit.

On November 18, 2009 Hannu Kemppinen conducted a subgrade inspection of the west side of the Phase 3 after the rock was removed and the subgrade surface was properly prepared in accordance with the approved engineering plans and exhibited no unusual geologic conditions that would adversely affect the design, construction or operation of the unit.

It is my belief that the Phase 3 subgrade was prepared in accordance with Rule .1624(7)(C) certification requirements.

Sincerely,
JOYCE ENGINEERING, INC.

Hannu Kemppinen

Hannu Kemppinen, P.G.
Senior Project Consultant

C: Stephen King, Haywood County

North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue, Governor
Dexter R. Matthews, Director
Dee Freeman, Secretary

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT
SOLID WASTE SECTION

MUNICIPAL SOLID WASTE LANDFILL FACILITY
Permit No. 44-07

HAYWOOD COUNTY
is hereby issued a

PERMIT TO OPERATE
WHITE OAK MUNICIPAL SOLID WASTE LANDFILL
PERMIT TO CONSTRUCT
MUNICIPAL SOLID WASTE LANDFILL PHASE 3

Located at 3898 Fines Creek Road, SR 1338, in Haywood County, North Carolina, in accordance with Article 9, Chapter 130A, of the General Statutes of North Carolina and all rules promulgated thereunder and subject to the conditions set forth in this permit. The legal description of the site is identified on the deeds recorded for this property listed in Attachment No. 1 of this permit.

Edward F. Mussler, III, P.E.,
Permitting Branch Supervisor
Solid Waste Section

ATTACHMENT 1

PART I: PERMITTING HISTORY

1. On June 30, 1999 an amendment was made to the Permit to Operate for a five-year renewal of the MSW landfill unit.
2. On November 27, 2001 an amendment was made to the Permit to Operate for the operation of Phase 2.
3. On November 18, 2002 an amendment was made to the Permit to Operate for the operation of a C&D landfill unit.
4. On November 8, 2008 an amendment was made to the Permit to Operate for a five-year renewal of the MSW landfill unit and the addition of a LCID landfill unit.
5. On May 5, 2009 an amendment was made to the Permit to Construct. Conditions were added for the construction of MSW Unit Phase 3. In addition, a modification was made to the Permit to Operate for the addition of a Processing (mulching and grinding of land clearing waste) unit, a small Type II Composting unit, tarp and soil/mulch mixture alternative daily covers as well as Type II composting for use as a soil amendment.
6. On October 7, 2009 a modification was made to the Permit to Construct for the addition of a GCL alternative base-liner system.

Permit Type	**Date Issued**	**DIN**
Original Permit to Construct	July 22, 1992	
Original Permit to Operate	October 8, 1993	
Permit Amendment	June 30, 1999	
Permit Amendment	November 27, 2001	
Permit Amendment	November 8, 2006	595
Permit Amendment /Modification	May 5, 2009	7070
Permit Modification	October 7, 2009	8720

PART II: LIST OF DOCUMENTS FOR THE APPROVED PLAN

NO.	**DOCUMENT DESCRIPTION**	**DOCUMENT ID NO.**
1.	*MSWLF Facility Permit To Construct, Phase 2*. Prepared by Municipal Engineering. Prepared for Haywood County. March 2000.	
2.	*Design Hydrogeologic Study, Phase 2, White Oak Subtitle D Landfill*. Prepared by Municipal Engineering. Prepared for Haywood County. June 2000.	

3.	*Alternate Liner System Modifications / Permit to Construct for Haywood County Municipal Solid Waste Landfill Facility, Phase 2*. Prepared by Municipal Engineering, Prepared for Haywood County. October, 2000.	
4.	*Site Hydrogeologic Study, Haywood County Construction & Demolition Landfill, Waynesville, North Carolina*. Prepared by Municipal Engineering. Prepared for Haywood County. June 4, 2001.	
5.	*Construction Quality Assurance Report, Municipal Solid Waste Landfill Facility, Phase 2, Haywood County.* Prepared by Municipal Engineering. Prepared for Haywood County. August, 2001.	
6.	*Plans entitled As-Built for Haywood County C&D Landfill*. Prepared by Municipal Engineering. Prepared for Haywood County. October 22, 2002.	
7.	*Letter with reference: Geologic Conditions Haywood County C&D Landfill*. Prepared by Edward Custer, L.G. Prepared for Haywood County. November 5, 2002.	
8.	*Land Clearing and Inert Debris Landfill Facility, Haywood County*. Prepared by Municipal Engineering. Prepared for Haywood County. September, 2006.	
9.	*Permit Renewal Proposed Fill Plan, Municipal Solid Waste Landfill Facility, Phase 2, Haywood County*, Prepared by: Municipal Engineering. Prepared for: Haywood County. October 31, 2006.	
10.	*Alternative Daily Cover Demonstration Authorization Letter, Polypropylene Tarp*. Prepared by: James Patterson. Prepared for: Solid Waste Section. June 28, 2007.	3924
11.	*Email: Haywood County Construction & Demolition Landfill Closure*. Prepared by: McGill Associates. Prepared for: Haywood County. March 31, 2008.	4286
12.	*Modifications to the Operations Plan, White Oak MSW Landfill, Haywood County, North Carolina*. Prepared by: McGill Associates. Prepared for: Haywood County. June 6, 2008.	4929
13.	*White Oak Operations Plan Modification Response Letter*. Prepared by: Allen Gaither. Prepared for: Solid Waste Section. June 30, 2008.	4930
14.	*Closure Plan, Construction & Demolition Landfill Phase 1*. Prepared by: McGill Associates. Prepared for: Haywood County. June 27, 2008.	5031
15.	*Permit to Construct Submittal, MSW Phases 3 & 4, White Oak MSW Landfill, Haywood County, North Carolina*. Prepared by: McGill Associates. Prepared for: Haywood County. September 12, 2008.	5806

16.	*Design Hydrogeologic Report, Phases 3 and 4, White Oak MSW Landfill, Haywood County, North Carolina*. Prepared by: Bunnell-Lammons Engineering. Prepared for: McGill Associates. July 11, 2008	5807
17.	*Environmental Monitoring Plan, Phases 3 and 4, White Oak MSW Landfill, Haywood County, North Carolina*. Prepared by: Bunnell-Lammons Engineering. Prepared for: McGill Associates. July 11, 2008	5808
18.	*Letter: Request for Demonstration Period for Mulch/Soil Material as an Alternate Daily Cover*. Prepared by: Stephen King. Prepared for: Haywood County. August 7, 2008.	5914
19.	*Letter: Response to Comments Modifications to Operations Plan*. Prepared by: McGill Associates. Prepared for: Haywood County. October 3, 2008.	6013
20.	*Letter: Corps of Engineers Permit Information*. Prepared by: McGill Associates. Prepared for: Haywood County. December 10, 2008.	6449
21.	*Letter of Approval with Modifications*. Prepared by: Charles Koontz, Land Quality Section. Prepare for: Haywood County. December 18, 2008.	6798
22.	*Response to Technical Review: Design Hydrogeologic Report and Environmental Monitoring Plan*. Prepared by: McGill Associates. Prepared for: Haywood County. March 2, 2009.	7040
23.	*Revised CQA Plan*. Prepared by: McGill Associates. Prepared for: Haywood County. April 1, 2009.	7307
24.	*Response to Technical Review: Revised Operations Plan*. Prepared by: McGill Associates. Prepared for: Haywood County. April 9, 2009.	7308
25.	*Permit to Construct MSW Phase 3, Modifications for GCL Liner*. Prepared by: McGill Associates. Prepared for: Haywood County. September 18, 2009.	8660

PART III: PROPERTIES APPROVED FOR THE SOLID WASTE FACILITY

Haywood County, N.C. Register of Deeds				
Book	Page	Grantee	Grantor	Parcel No.
424	204	Haywood County	Leatherwood & Monson	8712-30-1872
403	1374	Haywood County	Davis, Davis & Raulerson	8712-11-8775
461	1036	Haywood County	Bramlett	8712-00-6575
				Total Site Acreage: ±268.4 acres

Notes:

1. Deed book references are from the Haywood County Register of Deeds office (http://maps.haywoodnc.net/gisweb/default.aspx).

PART IV: GENERAL PERMIT CONDITIONS

1. This permit is issued by the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section (Section). In accordance with North Carolina Solid Waste Management Rule 15A NCAC 13B .0201(d), a solid waste management facility permit shall have two parts: a Permit to Construct and a Permit to Operate. The Permit to Construct shall expire on November 5, 2010. The Permit to Construct must be implemented in accordance with Attachment 2 of this permit. The Permit to Operate shall expire November 8, 2011. The Permit to Operate must be implemented in accordance with Attachment 3 of this permit.

2. The persons to whom this permit is issued ("permittee") are the owners and operators of the solid waste management facility.

3. (Intentionally blank)

4. When this property is sold, leased, conveyed, or transferred in any manner, the deed or other instrument of transfer shall contain in the description section in no smaller type than that used in the body of the deed or instrument, a statement that the property has been used as a sanitary landfill and a reference by book and page to the recordation of the permit.

5. By initiating construction or receiving waste at this facility the permittee shall be considered to have accepted the terms and conditions of this permit.

6. Construction and operation of this solid waste management facility must be in accordance with the Solid Waste Management Rules, 15A NCAC 13B, Article 9 of the Chapter 130A of the North Carolina General Statutes (NCGS 130A-290, et seq.), the conditions contained in this permit; and the approved plan. Should the approved plan and the rules conflict, the Solid Waste Management Rules shall take precedence unless specifically addressed by permit condition.

7. This permit is issued based on the documents submitted in support of the application for permitting the facility including those identified in Attachment 1, "List of Documents for Approved Plan," and which constitute the approved plan for the facility. Where discrepancies exist, the most recent submittals and the Conditions of Permit shall govern.

8. This permit may be transferred only with the approval of the Section, through the issuance of a new or substantially amended permit in accordance with applicable statutes and rules. In accordance with NCGS 130A-295.2(g) the permittee must notify the Section thirty (30) days prior to any significant change in the identity or business structure of either the owner or the operator, including but not limited to a proposed transfer of ownership of the facility or a change in the parent company of the owner or operator of the facility.

9. The permittee is responsible for obtaining all permits and approvals necessary for the development of this project including approval from appropriate agencies for a General or Individual NPDES Stormwater Discharge Permit. Issuance of this permit does not remove the permittee's responsibilities for compliance with any other local, state or federal rule, regulation or statute.

- End of Section -

ATTACHMENT 2
CONDITIONS OF PERMIT TO CONSTRUCT

PART I: MUNICIPAL SOLID WASTE LANDFILL UNIT SPECIFIC CONDITIONS

1. Pursuant to the NC Solid Waste Management Rules (Rule) 15A NCAC 13B .0201(c) and (d)(1), this permit approves construction for MSW Phase 3 consisting of approximately 8.8 acres with a projected operating capacity of 686,000 cubic yards of airspace.

2. The initial, substantial, construction authorized by this Permit to Construct must commence within 18 months from the issuance date of this permit. If substantial construction does not begin within 18 months from the issuance date of this permit, then the permit to construct shall expire. Substantial construction includes, but is not limited to, issuance of construction contracts, mobilization of equipment on site, and construction activities including installation of sedimentation and erosion control structures. The permittee may reapply for the permit to construct prior to the expiration date. The re-application will be subject to the statutes and rules in effect on that date and may be subject to additional fees.

3. Construction of all solid waste management units within this facility must be in accordance with the pertinent approved plans and only for those phases of development approved for construction as described in Attachment I, Part II List of Documents for the Approved Plan.

4. The permittee must conduct a preconstruction meeting at the facility prior to initiating construction of any unit/cell and must notify the Section at least 10 days prior to the meeting.

5. Modifications or revisions of the approved documents or changes during construction of any landfill unit/cell require approval by the Section, and may constitute a permit modification and be subject to a permitting fee.

6. The following conditions must be met prior to operation of the Phase 3:

    a. The Permittee must obtain a Permit to Operate for Phase 3 from the Section in accordance with 15A NCAC 13B .0201(d).

    b. Construction Quality Assurance (CQA) documentation as well as a certification by the project engineer that the landfill was built in accordance with approved plans and the conditions of the permit must be submitted to the Section for review and approval.

c. The Permittee must contact the appropriate regional environmental specialist and permitting engineer to determine whether the Section chooses to hold a pre-operative meeting with key landfill personnel and representatives of the Section.

d. The edge of the waste footprint must be identified with permanent physical markers.

Geologic, Ground Water and Monitoring Requirements

7. Prior to issuing the Permit to Operate, samples from new ground water monitoring wells and surface water stations shall be sampled for the Appendix I constituent list.

8. Prior to construction of the phase or cell(s) within the phase, all piezometers, borings, and groundwater monitoring wells within the footprint must be properly abandoned in accordance with 15A NCAC 2C .0113 (b)(1), entitled "Abandonment of Wells."

9. In areas where soil is to be undercut, abandoned piezometers, monitoring wells and borings must not be grouted to pregrade land surface, but to the proposed base grade surface to prevent having to cut excess grout and possibly damage the wells.

10. A Licensed Geologist must report any pertinent geological feature(s) exposed during phase or cell excavation. Prior to placing any landfill liner, the geologist must submit to the Section hydrogeologist a written report that includes an accurate description of the exposed geological feature(s) and effect of the geological feature(s) on the design, construction, and operation of the cell, phase, or unit.

11. A Licensed Geologist must supervise installation of groundwater monitoring wells and surface water sampling stations.

12. Any modification to the approved water quality monitoring, sampling, and analysis plan must be submitted to the Section Hydrogeologist for review.

13. Within 30 days of completed construction of each new groundwater monitoring well, a well construction record (GW-1 form), typical well schematic, boring log, field log and notes, and description of well development activities must be submitted to the Section.

14. The permittee must provide a plan sheet-sized, scaled topographical map, showing the location and identification of new, existing, and abandoned wells and piezometers after installation of groundwater monitoring wells.

15. Within thirty (30) days of the completed permanent abandonment of a ground-water monitoring well, the well abandonment record (GW-30 form) and any additional information included in the abandonment record) must be submitted to the Section. The well abandonment records must be submitted to the Solid Waste Section in accordance with 15A NCAC 2C .0114(b) and be certified by a Licensed Geologist.

Erosion and Sedimentation Control Requirements

16. All required sedimentation and erosion control measures must be installed and operable to mitigate excessive on-site erosion and to prevent silt from leaving the area of the landfill unit during the service life of the facility.

17. All earth disturbing activities must be conducted in accordance with the Sedimentation Pollution Control Act of 1973 (15 NCAC 4) and consistent with any other local, state or federal requirements.

18. Facility construction, operations or practices must not cause or result in a discharge of pollution, dredged material, and/or fill material into waters of the state in violation of the requirements under Sections 401 and 404 of the Clean Water Act, as amended.

19. Modifications to the approved sedimentation and erosion control activities require approval by the North Carolina Land Quality Section. The Section must be notified of any sedimentation and erosion control plan modifications.

PART II: CONSTRUCTION AND DEMOLITION DEBRIS LANDFILL UNIT SPECIFIC CONDITIONS

Not Applicable

PART III: LAND CLEARING AND INERT DEBRIS LANDFILL UNIT SPECIFIC CONDITIONS

Not Applicable

PART IV: MISCELLANEOUS SOLID WASTE MANAGEMENT SPECIFIC CONDITIONS

Not Applicable

ATTACHMENT 3
CONDITIONS OF PERMIT TO OPERATE

PART I: GENERAL FACILITY CONDITIONS

1. The Permit to Operate shall expire November 8, 2011. Pursuant to 15A NCAC 13B .0201(e), no later than July 8, 2011, the owner or operator must submit a request to the Section for permit review and must update pertinent facility plans including, but not limited to, the facility operation and waste screening plans.

2. All sedimentation and erosion control activities must be conducted in accordance with the Sedimentation Control Act N.C.G.S. 113A-50, et seq., and rules promulgated under 15A NCAC 4.

Operational Requirements

3. This facility is permitted to receive solid waste generated within Haywood County, consistent with the local government waste management plan and with local government approval and as defined in G.S. 130-290 (a)(35), except where prohibited by the N. C. General Statues Article 9 of Chapter 130A, and the rules adopted by the Commission for Health Services.

4. The facility operator must complete an approved operator training course in compliance with G.S. 130A-309.25.
   a. A responsible individual certified in landfill operations must be on-site during all operating hours of the facility at all times while open for public use to ensure compliance with operational requirements.
   b. All pertinent landfill-operating personnel must receive training and supervision necessary to properly operate the landfill units in accordance with G.S. 130A-309.25 and addressed by memorandum dated November 29, 2000.

5. The use of different alternative daily cover requires approval, prior to implementation, by the Solid Waste Section. Requests for alternative daily cover approval must include a plan detailing the comprehensive use and a demonstration of the effectiveness of the alternative daily cover. The plan must be developed according to Section guidelines. Plans which are approved by the Section will be incorporated into, and made a part of, the approved documents listed in Attachment 1.
   a. The use of a fabric tarp as an alternate daily cover is approved and subject to the terms and conditions of operation as set forth in the plan. Soil cover shall be

applied at a minimum of one time per week in accordance with Rule .1626 (2). Soil shall be applied more frequently, if needed, to control disease vectors, fires, odors, blowing litter and scavenging.

b. The use of a 3:1 Soil/Mulch mixture as an alternative daily cover is pending approval of a Demonstration Report submitted in accordance with the Alternative Cover Material (ACM) Demonstration Authorization Letter.

6. The facility must maintain records for all solid waste materials accepted as alternative cover material and used as alternate daily cover. The records must include: the date of receipt, weight of material, general description of the material, identity of the generator and transporter, and county of origin. Such records must be made available to the Solid Waste Section upon request.

Monitoring and Reporting Requirements

7. Groundwater, surface water, and methane monitoring locations must be established and monitored as identified in the approved plans.

8. A licensed geologist must be present to supervise the installation of groundwater monitoring wells. The exact locations, screened intervals, and nesting of the wells must be established after consultation with the SWS Hydrogeologist at the time of well installation.

9. Ground water monitoring wells and surface water sampling locations must be sampled for Appendix I constituents at least semi-annually according to the specifications outlined in the approved water quality monitoring plan and the current policies and guidelines of the Section in effect at the time of sampling.

10. Reports of the analytical data for each monitoring event must be submitted to the Section within 120 days of the respective sampling event. Analytical data must be submitted in a manner prescribed by the Section. Records of all groundwater, surface water, and leachate analytical data must be kept as part of the permanent facility record.

11. The four independent samples which comprise the initial baseline sampling event must be collected from each groundwater monitoring well and the report must be submitted to the Section within six months after issuance of the Permit to Operate.

12. Untreated leachate must be sampled and analyzed at least semi-annually concurrently with the groundwater water and surface water sampling, one sample per event. The leachate must be analyzed for all Appendix I constituents, pH, specific conductance, BOD, COD, nitrates, sulfates, and phosphates. Test results must be submitted to the Section along with groundwater and surface water test results. In the event leachate is recirculated, additional leachate sampling may be required.

13. A readily accessible unobstructed path must be cleared and maintained so that four-wheel vehicles may access monitoring well locations at all times.

14. A field log book which details all development, sampling, repair, and all other pertinent activities associated with each monitoring well and all sampling activities associated with each surface water and leachate sampling location must be kept as part of the permanent facility record.

15. All well construction records and soil boring logs for new wells must be submitted to the Solid Waste Section Hydrogeologist for review within 30 days of completion.

16. Copies of this permit, the approved plans, and all records required to be maintained by the permittee must be maintained at the facility and made available to the Section upon request during normal business hours.

17. The owner or operator must maintain a record of the amount of solid waste received at the landfill unit, compiled on a monthly basis. Scales must be used to weigh the amount of waste received.

18. On or before August 1 annually, the Permittee must submit an annual facility report to the Solid Waste Section, on forms prescribed by the Section.

    a. The reporting period shall be for the previous year beginning July 1 and ending June 30.

    b. The annual facility report must list the amount of waste received and landfilled in tons and be compiled:
        i) On a monthly basis.
        ii) By county, city or transfer station of origin.
        iii) By specific waste type.
        iv) By disposal location within the facility.
        v) By diversion to alternative management facilities.

    c. A measurement of volume utilized in the landfill cells must be performed during the second quarter of the calendar year. The date and volumes, in cubic yards, must be included in the report.

    d. The amount of waste, in tons from scale records, disposed in landfill cells from October 8, 1993 through the date of the annual volume survey must be included in the report.

e. The completed report must be forwarded to the Regional Waste Management Specialist for the facility by the date due on the prescribed annual facility report form.

f. A copy of the completed report must be forwarded to each county manager for each county from which waste was received at the facility. Documentation that a copy of the report has been forwarded to the county managers must be sent to the Regional Waste Management Specialist by the date due on the prescribed annual facility report form

PART II: MUNICIPAL SOLID WASTE LANDFILL UNIT SPECIFIC CONDITIONS

19. This permit approves the continued operation of Phase 2 of the municipal solid waste landfill, as well as the onsite environmental management and protection facilities as described in the approved plans.

20. The following table lists the dimensions and details for the MSW landfill units. The following waste volumes include waste, daily cover, and intermediate cover, but do not include final cover.

MSW Unit	Acres	Gross capacity (cubic yards)
Phase 1	11.4	718,800
Phase 2	10.2	830,000
Total	21.6	1,548,800

21. The facility is approved to accept approximately 60,000 tons per year, approximately 164 tons per day (365 days per year), with a maximum variance in accordance with GS 130A-294(b1)(1) as listed in Attachment 1, Part II.

22. The following, at a minimum, must not be accepted for disposal at the facility: hazardous waste, yard trash, liquid wastes, regulated medical waste, sharps not properly packaged, PCB waste as defined in 40 CFR 761, and wastes banned from disposal in North Carolina by G.S. 130A-309.10(f).

23. The permittee must not knowingly dispose of any type or form of municipal solid waste that is generated within the boundaries of a unit of local government that by ordinance:

a. Prohibits generators or collectors of municipal solid waste from disposing of that type or form of municipal solid waste.

b. Requires generators or collectors of municipal solid waste to recycle that type or form of municipal solid waste.

24. The use of leachate recirculation as a leachate management tool requires approval by the Section prior to implementation. Requests for leachate recirculation approval must include a comprehensive management plan developed according to Section guidelines and which is consistent with the approved operation plan. Plans which are approved by the Section will be incorporated into, and made a part of, the approved documents listed in Attachment 1.

25. The facility is permitted to co-dispose of wastewater treatment sludge generated within the facility's approved service area, and subject to the terms and procedures of the approved plan.

26. The leachate collection system must be maintained in accordance with 15A NCAC 13B.1626(12)(a). The plan shall include provisions for periodic cleaning and visual inspection. Documentation of the inspections, and cleaning and monitoring must be included in the operating records of the facility and provided to the Department upon request.

27. Financial assurance as required by state rules and statutes must be continuously maintained for the duration of the facility in accordance with applicable rules and statutes. Closure and Post-Closure cost estimates and financial instruments must be updated annually pursuant to 15A NCAC 13B .1628.

28. Closure or partial closure of any MSWLF unit must be in accordance with the Closure Plans described in the approved plans and 15A NCAC 13B .1629. Final Closure Plans must be submitted to the Division at least 90 days prior to implementation.

PART III: CONSTRUCTION AND DEMOLITION DEBRIS LANDFILL UNIT SPECIFIC CONDITIONS

29. The C&D landfill unit stopped receiving waste June 30, 2008. Closure in accordance with Rule .0505 must be completed no later than May 30, 2009.

30. Haywood County must maintain the integrity and effectiveness of the cap system, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and prevent surface water from impounding over waste and run-on and run-off from eroding or otherwise damaging the cap system.

31. Post-closure use of the property is subject to review and approval by the Division and must not disturb the integrity of the cap system, or the function of the monitoring systems. The Division may approve any other disturbance if the owner or operator demonstrates that disturbance of the cap system, including any removal of waste, will not increase the potential threat to human health or the environment.

32. For the closed C&D landfill unit, the permittee must conduct groundwater and surface water sampling in accordance with the post-closure water quality monitoring plan of the approved Closure Plan, Document 11, Part II, Attachment 1. Ground water monitoring wells and surface water sampling location(s) must be sampled on a semi-annual basis, for a minimum of five years from closure (five years from July 2008). After five years of monitoring, the Solid Waste Section will determine if further monitoring will be required.

33. The permittee must maintain a record of all monitoring events and analytical data. Reports of the sampling events and analytical data must be submitted to the Section in a timely manner.

34. Any proposed expansion to the closed C&D landfill unit will be considered a new landfill for purposes of Solid Waste Management permitting.

PART IV: LAND CLEARING AND INERT DEBRIS LANDFILL UNIT SPECIFIC CONDITIONS

General

35. The land clearing and inert debris landfill is permitted to receive for disposal only land-clearing waste, concrete, brick, concrete block, uncontaminated soil, gravel and rock, untreated and unpainted wood, and yard trash, in accordance with Rule .0101 (22) and .1010 (23).

36. This permit is for the construction and operation of the landfill in accordance with the approved plans, Attachment 1, Part II, Document 8. Any revision to the construction or operation of the facility requires written approval by the North Carolina Solid Waste Section. Construction or operation of future cells or phases will require written approval of the Section.

Pre-Operational

37. The following requirements shall be met prior to receiving solid waste at the unit:
    a. A site inspection and pre-operative meeting shall be conducted by a representative of the Solid Waste Section. The permittee shall notify the Section's Waste

Management Specialist and make arrangements for the site inspection and pre-operative meeting.

b. A sign shall be posted at the unit as required by the NC Solid Waste Management Rules Operational Requirements, 15A NCAC 13B .0566 (16).

c. A certification letter, from a Registered Professional Engineer, shall be submitted to the Section stating that the facility has been constructed in accordance with the approved plans.

d. Survey stakes shall be installed to delineate the approved limits of the waste.

Operational

38. This facility shall conform to the operational requirements of the NC Solid Waste Management Rules, 15A NCAC 13B .0566, and to the operational plan identified in Attachment 1, Part II, Document 8.

PART V: MISCELLANEOUS SOLID WASTE MANAGEMENT SPECIFIC CONDITIONS

General Conditions

39. Wastes received and product stored shall be maintained in reasonably sized piles with adequate fire breaks and lanes in accordance with the approved operational plans and the pertinent rules.

40. Surface water shall be diverted from all operational and storage areas to prevent standing water in operational areas and under or around storage piles. Water that comes in contact with solid waste shall be contained on-site or properly treated prior to discharge.

41. These areas shall be operated and maintained with sufficient dust control measures to minimize airborne emissions and to prevent dust from becoming a nuisance or safety hazard.

42. These areas shall be operated and maintained in a manner so as to minimize odors, prevent the creation of a nuisance, potential health hazard, or a potential fire hazard.

43. Effective vector control measures shall be applied as necessary to control flies, rodents, insects, or vermin.

Operational Conditions – Treatment & Processing (Wood Grinding)

44. The facility is permitted to operate a treatment and processing facility as defined in 15A NCAC 13B, Rule .0101(49).

45. The facility is permitted to receive land clearing waste as defined in 15A NCAC 13B, Rule .0101(23).

46. The facility is permitted to receive wooden pallets constructed of unpainted and untreated natural wood.

47. The facility is permitted to receive yard trash as defined in 15A NCAC 13B, Rule .0101(55). However, this ground material containing yard trash may not be distributed to the public unless it has been composted in accordance with Rule .1400.

48. The facility must manage the treatment and processing according to the Operation Plan included in Attachment 1, Part II: "List of Documents for the Approved Plan". This document is included in the approved plan. Any revisions to the approved plan shall be approved by the Section, prior to implementation.

Operational Conditions – Type 2 Composting Unit

49. The facility is permitted to operate a compost facility as defined in 15A NCAC 13B, Rule .0101(7).

50. The facility is only permitted to receive waste materials described in 15A NCAC 13B, Rule .1402(f)(1) and (2).

51. The facility must monitor and maintain records to demonstrate the requirements of 15A NCAC 13B, Rule .1406 are continually being met. In addition, the facility is required to maintain records on the following information:

    a. The amount of waste received into the facility,
    b. the amount of compost land applied as a soil amendment,
    c. the area of land compost was applied to as a soil amendment, and
    d. the amount and final termination of any remaining compost.

52. The facility must analyze, classify and distribute the compost material in accordance with 15A NCAC 13B, Rules .1407 and .1408.

53. The use of compost as a soil amendment is pending approval of a Demonstration Report submitted in accordance with the Soil Amendment Demonstration Authorization letter. The compost may only be broadcast and incorporated at a rate not to exceed 100 tons per acre.

- *End of Permit Conditions –*

Appendix VIII

Appendix VIII – Record Drawings

ALOIS CALLEMYN, PLS
PROFESSIONAL LAND SURVEYOR #L-2544
3500 JUSTAMERE FARM RD.
HILLSBOROUGH, NC 27278

April 30, 2010

Chris Haverstrom
Thalle Construction Co.
900 Hwy 86 north
Hillsborough, NC 27278

RE: Survey – White Oak MSW Landfill, Phase 3

Dear Chris:

Attached to this cover letter is a spreadsheet showing the different elevations at each grid point taken at each stage of this job. The three stages are; subgrade, clay liner and protective cover. The exact location of each grid point is shown with the north and east coordinates and is plotted on three plats by me entitled "White Oak MSW Landfill, Phase 3".

The columns labeled "PT #" are the point numbers for each grid location measurement. The column labeled "SEPARATION" is the separation in feet of each stage.

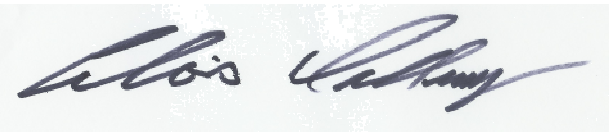
Furthermore:

ALL COORDINATE DATA AND ELEVATIONS SHOWN ON THE ATTACHED SPREADSHEETS ARE TIED TO NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 1983 (HORIZONTAL) AND NAVD-88 (VERTICAL).

AND

I, ALOIS CALLEMYN, PLS, CERTIFY THAT THE ATTACHED INFORMATION WAS COMPUTED UNDER MY SUPERVISION, FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS INFORMATION WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA, AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS DAY OF JANUARY, 2010.

(SIGN AND SEAL)



ALOIS CALLEMYN,
PLS LICENSE NO. L-2544

WHITE OAK LANDFILL

HAYWOOD COUNTY NC

THALLE CONSTRUCTION CO, INC.

GRID COMPARISON

Thalle Grid Pt. Number & Coordinates			Cohesive Soil Liner DESIGN	SUBGRADE		CLAY LINER				PROTECTIVE COVER		
PT. #	NORTH	EAST	ELEV	ELEV	Separation	PT. #	ELEV.	Dev. from Design	SEP.	PT#	ELEV.	SEP.
1000	721842.98	811439.89	2530.05	2528.0	2.1	1000	2530.05	0.0	2.1	1000	2532.24	2.2
1001	721846.81	811489.54	2522.42	2520.4	2.0	1001	2522.33	-0.1	1.9	1001	2524.35	2.02
1002	721785.42	811343.83	2539.56	2537.5	2.1	1002	2539.65	0.1	2.2	1002	2541.69	2.04
1003	721789.27	811393.68	2530.59	2528.5	2.1	1003	2530.60	0.0	2.1	1003	2532.65	2.05
1004	721793.11	811443.53	2519.14	2517.1	2.0	1004	2519.10	0.0	2.0	1004	2521.24	2.14
1005	721796.96	811493.39	2508.45	2506.4	2.0	1005	2508.45	0.0	2.0	1005	2510.45	2.00
1006	721800.80	811543.24	2510.51	2508.3	2.2	1006	2510.50	0.0	2.2	1006	2512.63	2.13
1007	721731.72	811297.82	2536.00	2534.0	2.0	1007	2536.02	0.0	2.1	1007	2538.05	2.03
1008	721735.55	811347.63	2533.20	2531.3	1.9	1008	2533.22	0.0	1.9	1008	2535.24	2.02
1009	721739.43	811397.51	2526.54	2524.6	1.9	1009	2526.60	0.1	2.0	1009	2528.63	2.03
1010	721743.26	811447.37	2515.27	2513.3	1.9	1010	2515.35	0.1	2.0	1010	2517.40	2.05
1011	721747.19	811497.19	2505.04	2503.0	2.0	1011	2505.04	0.0	2.0	1011	2507.04	2.00
1012	721750.95	811547.08	2498.81	2496.8	2.0	1012	2498.90	0.1	2.1	1012	2500.94	2.04
1013	721754.79	811596.93	2506.24	2504.2	2.0	1013	2506.26	0.0	2.1	1013	2508.30	2.04
1014	721681.86	811301.65	2536.76	2534.7	2.1	1014	2536.82	0.1	2.1	1014	2538.82	2.00
1015	721685.72	811351.52	2533.36	2531.4	2.0	1015	2533.31	-0.1	2.0	1015	2535.45	2.14
1016	721689.57	811401.37	2524.29	2522.2	2.1	1016	2524.36	0.1	2.1	1016	2526.36	2.00
1017	721693.48	811451.18	2514.95	2512.9	2.0	1017	2515.01	0.1	2.1	1017	2517.02	2.01
1018	721697.25	811501.07	2505.56	2503.5	2.1	1018	2505.66	0.1	2.2	1018	2507.68	2.02
1019	721701.10	811550.93	2498.61	2493.6	5.0	1019	2498.61	0.0	5.0	1019	2500.62	2.01
1020	721704.94	811600.78	2496.00	2494.0	2.0	1020	2496.00	0.0	2.0	1020	2498.14	2.10
1021	721708.79	811650.63	2502.68	2500.6	2.1	1021	2502.64	0.0	2.1	1021	2504.85	2.21
1022	721712.63	811700.48	2515.91	2513.9	2.1	1022	2515.99	0.1	2.1	1022	2518.10	2.11
1023	721628.15	811255.76	2540.00	2538.2	1.8	1023	2540.09	0.1	1.9	1023	2542.14	2.05
1024	721632.00	811305.55	2537.71	2535.7	2.0	1024	2537.75	0.0	2.1	1024	2539.78	2.03
1025	721635.85	811355.36	2531.38	2529.3	2.1	1025	2531.44	0.1	2.2	1025	2533.46	2.02
1026	721639.67	811405.18	2524.22	2522.3	2.0	1026	2524.29	0.1	2.0	1026	2526.32	2.03
1027	721643.55	811455.07	2514.36	2512.4	2.0	1027	2514.41	0.0	2.0	1027	2516.45	2.04
1028	721647.39	811504.88	2505.48	2503.6	1.9	1028	2505.50	0.0	1.9	1028	2507.56	2.06
1029	721651.25	811554.77	2498.93	2496.9	2.0	1029	2498.99	0.1	2.1	1029	2501.03	2.04
1030	721655.09	811604.63	2497.39	2495.3	2.1	1030	2497.44	0.1	2.1	1030	2499.46	2.02
1031	721658.97	811654.62	2498.99	2496.9	2.1	1031	2499.00	0.0	2.1	1031	2501.08	2.08
1032	721662.84	811704.21	2513.48	2511.4	2.1	1032	2513.50	0.0	2.2	1032	2515.52	2.02
1033	721666.63	811754.18	2528.90	2526.9	2.0	1033	2528.85	-0.1	1.9	1033	2530.99	2.14
1034	721578.31	811259.52	2540.45	2538.5	1.9	1034	2540.50	0.1	2.0	1034	2542.51	2.01
1035	721582.16	811309.33	2538.42	2536.4	2.0	1035	2538.44	0.0	2.0	1035	2540.46	2.02

GRID COMPARISON

Thalle Grid Pt. Number & Coordinates			Cohesive Soil Liner DESIGN	SUBGRADE		CLAY LINER				PROTECTIVE COVER		
PT. #	NORTH	EAST	ELEV	ELEV	Separation	PT. #	ELEV.	Dev. from Design	SEP.	PT#	ELEV.	SEP.
1036	721586.01	811359.22	2532.25	2530.2	2.0	1036	2532.25	0.0	2.0	1036	2534.31	2.06
1037	721589.85	811409.04	2523.88	2521.9	2.0	1037	2523.89	0.0	2.0	1037	2525.93	2.04
1038	721593.72	811458.90	2513.80	2511.8	2.0	1038	2513.85	0.0	2.1	1038	2515.89	2.04
1039	721597.48	811508.78	2505.58	2503.6	2.0	1039	2505.60	0.0	2.0	1039	2507.65	2.05
1040	721601.41	811558.61	2500.09	2498.2	1.9	1040	2500.12	0.0	1.9	1040	2502.17	2.05
1041	721605.24	811608.47	2499.45	2497.5	2.0	1041	2499.51	0.1	2.0	1041	2501.54	2.03
1042	721609.09	811658.31	2506.60	2504.4	2.2	1042	2506.65	0.1	2.2	1042	2508.74	2.09
1043	721612.77	811707.72	2521.24	2519.1	2.2	1043	2521.25	0.0	2.2	1043	2523.26	2.01
1044	721616.77	811758.03	2534.29	2532.2	2.1	1044	2534.33	0.0	2.1	1044	2536.37	2.04
1045	721528.47	811263.35	2542.10	2540.2	1.9	1045	2542.08	0.0	1.9	1045	2544.18	2.10
1046	721532.33	811313.16	2539.27	2537.3	2.0	1046	2539.33	0.1	2.0	1046	2541.35	2.02
1047	721536.16	811363.06	2532.89	2530.9	2.0	1047	2532.89	0.0	2.0	1047	2534.90	2.01
1048	721540.03	811412.91	2523.09	2521.1	2.0	1048	2523.15	0.1	2.1	1048	2525.17	2.02
1049	721543.83	811462.76	2513.20	2511.2	2.0	1049	2513.25	0.1	2.1	1049	2515.27	2.02
1051	721547.70	811512.61	2505.85	2503.9	2.0	1051	2505.91	0.1	2.0	1051	2507.91	2.00
1052	721551.52	811562.49	2502.05	2500.1	1.9	1052	2502.08	0.0	1.9	1052	2504.13	2.05
1053	721555.39	811612.32	2501.81	2499.9	2.0	1053	2501.87	0.1	2.0	1053	2503.88	2.01
1054	721559.30	811662.31	2514.43	2512.2	2.2	1054	2514.49	0.1	2.3	1054	2516.56	2.07
1055	721562.97	811712.04	2529.16	2527.0	2.2	1055	2529.20	0.0	2.2	1055	2531.22	2.02
1056	721566.99	811761.93	2540.80	2538.1	2.7	1056	2540.21	-0.6	2.1	1056	2542.32	2.11
1057	721478.62	811267.20	2543.16	2541.1	2.1	1057	2543.10	-0.1	2.0	1057	2545.25	2.15
1058	721482.46	811317.05	2540.25	2538.2	2.1	1058	2540.25	0.0	2.1	1058	2542.30	2.05
1059	721486.31	811366.90	2532.01	2530.0	2.0	1059	2531.98	0.0	2.0	1059	2534.09	2.11
1060	721490.15	811416.75	2522.29	2520.2	2.1	1060	2522.33	0.0	2.1	1060	2524.38	2.05
1061	721494.00	811466.61	2512.48	2510.0	2.5	1061	2512.54	0.1	2.5	1061	2514.54	2.00
1062	721497.89	811516.47	2506.50	2504.5	2.0	1062	2506.50	0.0	2.0	1062	2508.52	2.02
1063	721501.71	811566.32	2504.05	2502.1	1.9	1063	2504.08	0.0	1.9	1063	2506.09	2.01
1064	721505.50	811616.23	2506.02	2503.8	2.2	1064	2506.10	0.1	2.3	1064	2508.10	2.00
1065	721509.33	811666.03	2521.29	2519.1	2.2	1065	2521.29	0.0	2.2	1065	2523.33	2.04
1066	721513.17	811715.85	2536.91	2534.7	2.2	1066	2536.93	0.0	2.2	1066	2539.09	2.16
1067	721428.77	811271.04	2544.24	2542.2	2.0	1067	2544.20	0.0	2.0	1067	2546.24	2.04
1068	721432.61	811320.89	2540.02	2538.0	2.0	1068	2540.10	0.1	2.1	1068	2542.14	2.04
1069	721436.46	811370.75	2530.94	2528.9	2.0	1069	2530.99	0.0	2.1	1069	2533.02	2.03
1070	721440.30	811420.60	2521.40	2519.4	2.0	1070	2521.44	0.0	2.0	1070	2523.47	2.03
1071	721444.15	811470.45	2512.33	2510.3	2.0	1071	2512.36	0.0	2.1	1071	2514.39	2.03
1072	721447.99	811520.30	2507.41	2505.5	1.9	1072	2507.50	0.1	2.0	1072	2509.52	2.02
1073	721451.85	811570.14	2506.44	2504.6	1.9	1073	2506.50	0.1	1.9	1073	2508.50	2.00
1074	721455.70	811619.96	2510.78	2508.6	2.2	1074	2510.80	0.0	2.3	1074	2512.85	2.05
1075	721459.52	811669.85	2526.69	2524.5	2.2	1075	2526.72	0.0	2.2	1075	2528.80	2.08
1076	721463.19	811719.83	2542.48	2540.1	2.4	1076	2542.50	0.0	2.4	1076	2544.51	2.01
1077	721378.91	811274.89	2544.47	2542.4	2.1	1077	2544.49	0.0	2.1	1077	2546.51	2.02

GRID COMPARISON

Thalle Grid Pt. Number & Coordinates			Cohesive Soil Liner DESIGN	SUBGRADE		CLAY LINER				PROTECTIVE COVER		
PT. #	NORTH	EAST	ELEV	ELEV	Separation	PT. #	ELEV.	Dev. from Design	SEP.	PT#	ELEV.	SEP.
1078	721382.76	811324.74	2539.54	2537.5	2.0	1078	2539.55	0.0	2.1	1078	2541.57	2.02
1079	721386.60	811374.59	2530.15	2528.1	2.1	1079	2530.15	0.0	2.1	1079	2532.21	2.06
1080	721390.45	811424.44	2520.83	2518.8	2.0	1080	2520.85	0.0	2.0	1080	2522.86	2.01
1081	721394.30	811474.30	2512.46	2510.4	2.1	1081	2512.48	0.0	2.1	1081	2514.50	2.02
1082	721398.15	811524.15	2509.31	2507.3	2.0	1082	2509.31	0.0	2.0	1082	2511.39	2.08
1083	721402.00	811573.94	2509.44	2507.5	1.9	1083	2509.50	0.1	2.0	1083	2511.53	2.03
1084	721405.57	811623.79	2516.59	2514.5	2.1	1084	2516.68	0.1	2.1	1084	2518.69	2.01
1085	721409.66	811673.71	2530.96	2528.5	2.4	1085	2530.99	0.0	2.5	1085	2533.00	2.01
1086	721413.20	811723.44	2547.25	2544.7	2.5	1086	2547.31	0.1	2.6	1086	2549.41	2.10
1087	721329.06	811278.73	2545.05	2543.0	2.1	1087	2545.06	0.0	2.1	1087	2547.14	2.08
1088	721332.91	811328.59	2539.04	2537.0	2.0	1088	2539.08	0.0	2.1	1088	2541.10	2.02
1089	721336.75	811378.44	2529.74	2527.7	2.0	1089	2529.72	0.0	2.0	1089	2531.80	2.08
1090	721340.60	811428.29	2520.28	2518.2	2.1	1090	2520.26	0.0	2.1	1090	2522.29	2.03
1091	721344.44	811478.14	2514.00	2512.0	2.0	1091	2514.00	0.0	2.0	1091	2516.02	2.02
1092	721348.26	811528.03	2512.48	2510.5	2.0	1092	2512.55	0.1	2.0	1092	2514.59	2.04
1093	721352.52	811577.52	2518.34	2516.2	2.2	1093	2518.36	0.0	2.2	1093	2520.46	2.10
1094	721356.03	811627.74	2529.35	2527.3	2.1	1094	2529.40	0.1	2.2	1094	2531.41	2.01
1095	721359.62	811677.89	2538.77	2536.7	2.1	1095	2538.82	0.1	2.1	1095	2540.87	2.05
1096	721363.66	811727.36	2551.10	2548.9	2.2	1096	2551.13	0.0	2.2	1096	2553.19	2.06
1097	721279.25	811282.72	2545.89	2544.3	1.6	1097	2545.82	-0.1	1.6	1097	2547.84	2.02
1098	721283.11	811332.42	2538.55	2536.5	2.1	1098	2538.57	0.0	2.1	1098	2540.61	2.04
1099	721286.84	811382.18	2529.75	2527.7	2.1	1099	2529.70	-0.1	2.0	1099	2531.74	2.04
1100	721290.79	811432.15	2520.37	2518.9	1.5	1100	2520.43	0.1	1.5	1100	2522.44	2.01
1101	721294.52	811481.99	2517.11	2514.8	2.3	1101	2517.15	0.0	2.4	1101	2519.15	2.00
1102	721298.43	811531.99	2517.19	2515.4	1.8	1102	2517.22	0.0	1.8	1102	2519.24	2.02
1103	721302.26	811581.75	2529.35	2527.2	2.2	1103	2529.43	0.1	2.3	1103	2531.43	2.00
1104	721306.08	811631.67	2541.76	2539.6	2.2	1104	2541.81	0.0	2.2	1104	2543.85	2.04
1105	721309.96	811681.42	2552.80	2550.8	2.0	1105	2552.86	0.1	2.1	1105	2554.97	2.11
1106	721313.91	811731.30	2561.39	2559.0	2.4	1106	2561.39	0.0	2.4	1106	2563.43	2.04
1107	721317.69	811781.03	2567.11	2565.1	2.0	1107	2567.02	-0.1	1.9	1107	2569.06	2.04
1108	721229.22	811287.33	2546.73	2544.7	2.0	1108	2546.75	0.0	2.1	1108	2548.75	2.00
1109	721233.22	811336.18	2538.48	2536.5	2.0	1109	2538.55	0.1	2.1	1109	2540.59	2.04
1110	721236.80	811386.04	2530.03	2527.8	2.2	1110	2530.10	0.1	2.3	1110	2532.13	2.03
1111	721240.83	811436.10	2521.68	2520.0	1.7	1111	2521.68	0.0	1.7	1111	2523.74	2.06
1112	721244.84	811485.78	2519.17	2517.0	2.2	1112	2519.18	0.0	2.2	1112	2521.25	2.07
1113	721248.61	811535.65	2523.99	2521.6	2.4	1113	2524.05	0.1	2.5	1113	2526.11	2.06
1114	721252.44	811585.62	2538.44	2536.4	2.1	1114	2538.47	0.0	2.1	1114	2540.54	2.07
1115	721256.77	811635.03	2552.45	2550.2	2.3	1115	2552.50	0.1	2.3	1115	2554.55	2.05
1116	721260.20	811685.24	2565.33	2563.2	2.1	1116	2565.51	0.2	2.3	1116	2567.52	2.01
1117	721179.73	811290.49	2547.57	2545.5	2.1	1117	2547.60	0.0	2.1	1117	2549.62	2.02
1118	721183.37	811340.25	2538.32	2536.3	2.0	1118	2538.32	0.0	2.0	1118	2540.36	2.04

GRID COMPARISON

Thalle Grid Pt. Number & Coordinates			Cohesive Soil Liner DESIGN	SUBGRADE		CLAY LINER				PROTECTIVE COVER		
PT. #	NORTH	EAST	ELEV	ELEV	Separation	PT. #	ELEV.	Dev. from Design	SEP.	PT#	ELEV.	SEP.
1119	721187.15	811389.96	2530.61	2528.6	2.0	1119	2530.56	-0.1	2.0	1119	2532.61	2.05
1120	721191.20	811439.91	2524.29	2522.2	2.1	1120	2524.36	0.1	2.1	1120	2526.38	2.02
1121	721194.89	811489.68	2521.86	2519.8	2.1	1121	2521.88	0.0	2.1	1121	2523.92	2.04
1122	721198.71	811539.60	2529.74	2527.6	2.2	1122	2529.87	0.1	2.3	1122	2531.88	2.01
1123	721202.53	811589.32	2545.68	2543.4	2.3	1123	2545.70	0.0	2.3	1123	2547.74	2.04
1124	721206.39	811639.14	2561.16	2559.0	2.2	1124	2561.21	0.1	2.2	1124	2563.25	2.04
1125	721129.65	811294.11	2548.78	2546.8	2.0	1125	2548.68	-0.1	1.9	1125	2550.78	2.10
1126	721133.44	811343.92	2538.94	2536.7	2.3	1126	2539.02	0.1	2.4	1126	2541.03	2.01
1127	721137.38	811393.83	2531.72	2529.9	1.8	1127	2531.79	0.1	1.9	1127	2533.84	2.05
1128	721141.23	811443.52	2525.97	2524.1	1.9	1128	2526.06	0.1	2.0	1128	2528.15	2.09
1129	721145.04	811493.52	2524.55	2522.5	2.1	1129	2524.61	0.1	2.1	1129	2526.62	2.01
1130	721148.96	811543.46	2531.14	2529.0	2.2	1130	2531.23	0.1	2.3	1130	2533.29	2.06
1131	721152.86	811593.29	2547.83	2545.7	2.2	1131	2547.85	0.0	2.2	1131	2549.93	2.08
1132	721156.54	811643.29	2564.62	2562.6	2.0	1132	2564.63	0.0	2.1	1132	2566.72	2.09
1133	721079.80	811297.96	2550.34	2548.3	2.0	1133	2550.33	0.0	2.0	1133	2552.39	2.06
1134	721083.58	811347.74	2540.80	2539.1	1.8	1134	2540.79	0.0	1.7	1134	2542.81	2.02
1135	721087.50	811397.61	2533.64	2531.4	2.2	1135	2533.63	0.0	2.2	1135	2535.66	2.03
1136	721091.46	811447.47	2528.57	2526.9	1.7	1136	2528.49	-0.1	1.6	1136	2530.52	2.03
1137	721095.18	811497.37	2527.33	2525.4	1.9	1137	2527.36	0.0	1.9	1137	2529.39	2.03
1138	721099.03	811547.22	2530.90	2529.0	2.0	1138	2530.95	0.0	2.0	1138	2532.95	2.00
1139	721102.87	811597.07	2547.62	2545.4	2.2	1139	2547.72	0.1	2.3	1139	2549.77	2.05
1140	721106.68	811646.91	2564.45	2562.5	1.9	1140	2564.51	0.1	2.0	1140	2566.56	2.05
1141	721029.95	811301.80	2551.83	2549.8	2.0	1141	2551.84	0.0	2.1	1141	2553.87	2.03
1142	721033.63	811351.70	2543.28	2541.6	1.7	1142	2543.36	0.1	1.8	1142	2545.38	2.02
1143	721037.83	811401.39	2536.23	2534.1	2.1	1143	2536.33	0.1	2.2	1143	2538.33	2.00
1144	721041.47	811451.33	2531.71	2529.9	1.8	1144	2531.76	0.1	1.9	1144	2533.78	2.02
1145	721045.34	811501.21	2529.91	2527.8	2.1	1145	2529.96	0.1	2.2	1145	2531.97	2.01
1146	721049.18	811551.05	2533.35	2531.1	2.2	1146	2533.40	0.1	2.3	1146	2535.41	2.01
1147	721053.01	811600.91	2548.53	2546.3	2.3	1147	2548.62	0.1	2.4	1147	2550.64	2.02
1148	721056.89	811650.76	2564.53	2562.5	2.1	1148	2564.52	0.0	2.1	1148	2566.69	2.17
1149	721060.71	811700.62	2579.16	2577.1	2.1	1149	2579.10	-0.1	2.0	1149	2581.14	2.04
1150	720983.97	811355.51	2546.51	2544.6	1.9	1150	2546.54	0.0	2.0	1150	2548.55	2.01
1151	720987.79	811405.33	2540.51	2538.3	2.2	1151	2540.66	0.1	2.3	1151	2542.68	2.02
1152	720991.61	811455.24	2538.08	2536.0	2.1	1152	2538.10	0.0	2.1	1152	2540.56	2.46
1153	720995.48	811505.06	2539.51	2537.5	2.0	1153	2539.55	0.0	2.1	1153	2541.59	2.04
1154	720999.33	811554.91	2544.22	2542.2	2.0	1154	2544.23	0.0	2.0	1154	2546.25	2.02
1155	721003.17	811604.76	2554.40	2552.4	2.0	1155	2553.56	-0.8	1.2	1155	2555.73	2.17
1156	720934.02	811359.42	2552.46	2550.5	2.0	1156	2552.51	0.1	2.0	1156	2554.64	2.13
1157	720937.93	811409.18	2551.13	2549.3	1.9	1157	2551.21	0.1	1.9	1157	2553.21	2.00

GRID COMPARISON

Thalle Grid Pt. Number & Coordinates			Cohesive Soil Liner DESIGN	SUBGRADE		CLAY LINER				PROTECTIVE COVER		
PT. #	NORTH	EAST	ELEV	ELEV	Separation	PT. #	ELEV.	Dev. from Design	SEP.	PT#	ELEV.	SEP.
Break Points												
31	721680	811273	2537.91	2536.0	2.0	31	2537.95	0.0	2.0	31	2539.99	2.0
32	721700	811531	2500.00	2498.0	2.0	32	2500.05	0.1	2.1	32	2502.14	2.1
33	721706	811617	2496.00	2494.0	2.0	33	2496.05	0.1	2.1	33	2498.20	2.1
34	721714	811718	2520.84	2518.8	2.0	34	2520.82	0.0	2.0	34	2522.81	2.0
35	721634	811336	2536.00	2534.0	2.0	35	2536.08	0.1	2.1	35	2538.16	2.1
36	721650	811539	2500.00	2498.0	2.0	36	2500.08	0.1	2.1	36	2502.06	2.0
37	721669	811790	2537.79	2535.7	2.1	37	2539.82	2.0	4.1	37	2541.87	2.1
38	721583	811316	2538.00	2536.0	2.0	38	2538.03	0.0	2.0	38	2540.01	2.0
39	721607	811634	2500.00	2498.1	1.9	39	2500.08	0.1	2.0	39	2502.06	2.0
40	721618	811771	2536.59	2534.5	2.1	40	2536.67	0.1	2.2	40	2538.72	2.0
41	721549	811527	2504.10	2502.2	1.9	41	2504.11	0.0	1.9	41	2506.24	2.1
42	721566	811750	2540.00	2538.0	2.0	42	2539.98	0.0	2.0	42	2542.03	2.0
43	721495	811480	2510.01	2508.0	2.0	43	2510.33	0.3	2.3	43	2512.44	2.1
44	721516	811747	2544.15	2542.1	2.1	44	2544.24	0.1	2.1	44	2546.30	2.1
45	721516	811757	2545.88	2543.8	2.1	45	2545.98	0.1	2.2	45	2548.00	2.0
46	721445	811482	2510.00	2508.0	2.0	46	2510.07	0.1	2.1	46	2512.13	2.1
47	721455	811608	2508.41	2506.5	1.9	47	2508.45	0.0	2.0	47	2510.65	2.2
48	721466	811757	2551.10	2549.1	2.0	48	2551.23	0.1	2.1	48	2553.36	2.1
49	721403	811592	2510.08	2508.2	1.9	49	2510.15	0.1	1.9	49	2512.23	2.1
50	721416	811762	2556.63	2554.6	2.0	50	2556.71	0.1	2.1	50	2558.80	2.1
51	721351	811559	2514.14	2511.8	2.3	51	2514.20	0.1	2.4	51	2516.32	2.1
52	721366	811761	2560.10	2558.1	2.0	52	2560.21	0.1	2.1	52	2562.36	2.1
53	721367	811771	2562.03	2560.0	2.0	53	2562.07	0.0	2.1	53	2564.16	2.1
54	721316	811759	2565.25	2563.2	2.1	54	2565.30	0.1	2.1	54	2567.39	2.1
55	721248	811522	2520.00	2518.0	2.1	55	2522.24	2.2	4.3	55	2524.39	2.2
56	721262	811704	2569.60	2567.6	2.0	56	2569.69	0.1	2.1	56	2571.74	2.0
57	721263	811722	2567.70	2565.7	2.0	57	2567.96	0.3	2.3	57	2569.95	2.0
58	721197	811522	2524.81	2522.5	2.3	58	2524.80	0.0	2.3	58	2526.93	2.1
59	721209	811677	2571.22	2569.2	2.0	59	2571.42	0.2	2.2	59	2573.60	2.2
60	721210	811688	2571.38	2569.3	2.1	60	2571.50	0.1	2.2	60	2573.67	2.2
61	721147	811524	2526.16	2524.0	2.1	61	2526.18	0.0	2.2	61	2528.24	2.1
62	721158	811665	2571.48	2571.5	0.0	62	2573.68	2.2	2.2	62	2575.71	2.0
63	721159	811679	2572.17	2570.1	2.1	63	2572.25	0.1	2.1	63	2574.49	2.2
64	721090	811427	2529.95	2528.3	1.7	64	2529.90	0.0	1.6	64	2532.02	2.1
65	721109	811682	2574.45	2572.4	2.0	65	2574.62	0.2	2.2	65	2576.78	2.2
66	721110	811692	2575.15	2573.1	2.1	66	2575.20	0.0	2.1	66	2577.32	2.1
67	721060	811692	2579.01	2577.0	2.0	67	2578.88	-0.1	1.9	67	2580.92	2.0
68	721039	811702	2577.99	2575.9	2.1	68	2576.10	-1.9	0.2	68	2578.09	2.0
69	721026	811653	2567.75	2565.7	2.1	69	2567.89	0.1	2.2	69	2569.91	2.0
70	720980	811307	2552.96	2550.9	2.1	70	2553.24	0.3	2.4	70	2555.25	2.0

GRID COMPARISON

Thalle Grid Pt. Number & Coordinates			Cohesive Soil Liner DESIGN	SUBGRADE		CLAY LINER				PROTECTIVE COVER		
PT. #	NORTH	EAST	ELEV	ELEV	Separation	PT. #	ELEV.	Dev. from Design	SEP.	PT#	ELEV.	SEP.
71	721008	811604	2554.75	2552.7	2.1	71	2554.61	-0.1	1.9	71	2556.60	2.0
72	721005	811623	2558.84	2553.8	5.0	72	2558.81	0.0	5.0	72	2560.87	2.1

I, ALOIS CALLEMYN, PLS, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION, FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA, AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 5 DAY OF JANUARY, 2010.

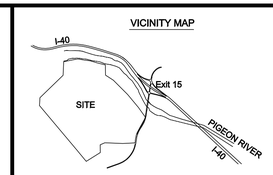
ALOIS CALLEMYN, PLS LICENSE NO. L-2544

NORTH CAROLINA PROFESSIONAL SEAL L-2544 LAND SURVEYOR ALOIS CALLEMYN

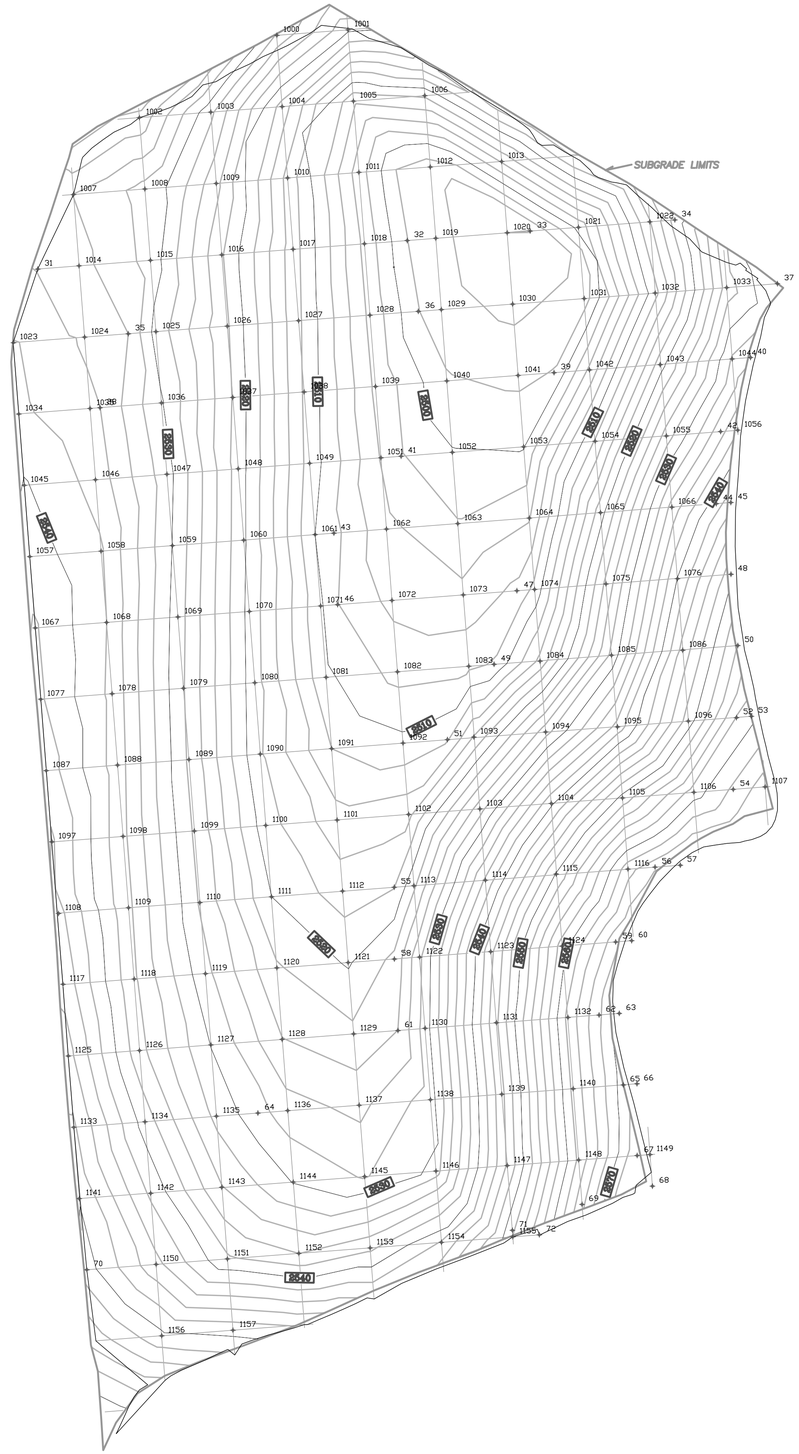
NOTE:
EXISTING TOPOGRAPHICAL INFORMATION AND CONTROL DATA INFORMATION TAKEN FROM PLANS ENTITLED "WHITE OAK MSW LANDFILL CONSTRUCTION DRAWINGS, MSW PHASE 3", DATED MARCH, 2009 BY MCGILL ASSOCIATES.

ALL NEW DATA AND ASBUILT CONTOUR LINES SHOWN ON THIS SURVEY ARE TIED TO NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 1983 (HORIZONTAL) AND NAVD-88 (VERTICAL).

VICINITY MAP



NOT TO SCALE



ASBUILT FOR CELL SUBGRADE

WHITE OAK MSW LANDFILL, PHASE 3"

HAYWOOD COUNTY, NORTH CAROLINA
FIELD WORK PERFORMED NOVEMBER, 2009
NAME OF CLIENT
THALLE CONSTRUCTION CO.

SCALE 1" = 50'
50 0 50 100

LEGEND:
- IRON PIN SET
- EXISTING IRON/NAIL/ROCK
- CONC. MONUMENT SET
- EXISTING CONC. MON.
- MATHEMATICAL POINT

ALOIS CALLEMYN
PROFESSIONAL LAND SURVEYOR

3500 JUSTAMERE FARM ROAD
HILLSBOROUGH, NC 27278
919-732-3354
ALOIS@CALLEMYN.COM

I, ALOIS CALLEMYN, PLS, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION, FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA, AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 5 DAY OF JANUARY, 2010

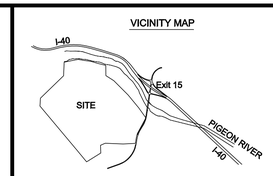
ALOIS CALLEMYN, PLS LICENSE NO. L-2544

NORTH CAROLINA PROFESSIONAL SEAL L-2544 LAND SURVEYOR ALOIS CALLEMYN

NOTE:
EXISTING TOPOGRAPHICAL INFORMATION AND CONTROL DATA INFORMATION TAKEN FROM PLANS ENTITLED "WHITE OAK MSW LANDFILL CONSTRUCTION DRAWINGS, MSW PHASE 3", DATED MARCH, 2009 BY MCGILL ASSOCIATES.

ALL NEW DATA AND ASBUILT CONTOUR LINES SHOWN ON THIS SURVEY ARE TIED TO NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 1983 (HORIZONTAL) AND NAVD-88 (VERTICAL).

VICINITY MAP



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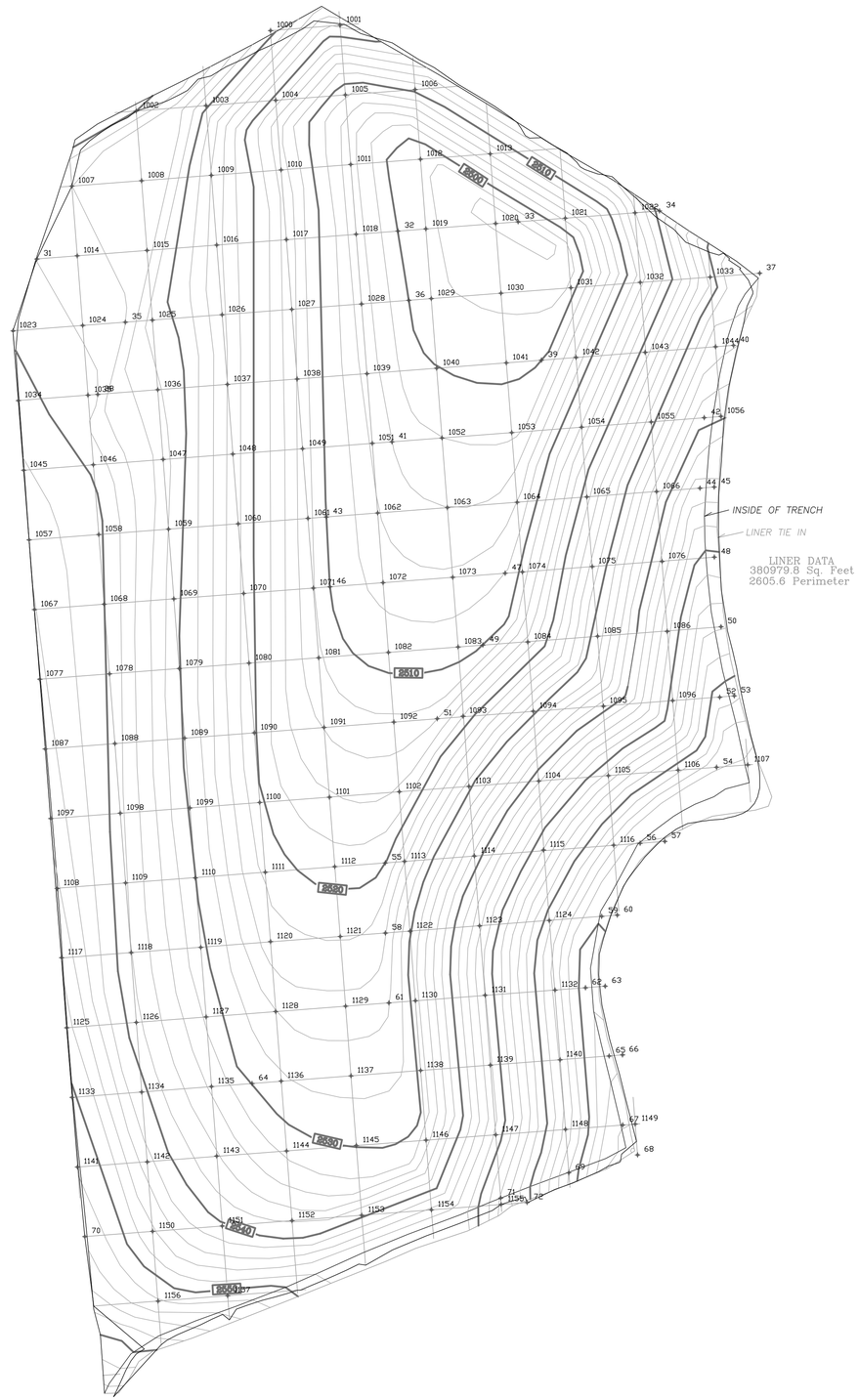


ASBUILT FOR CELL CLAY LINER

WHITE OAK MSW LANDFILL, PHASE 3"

HAYWOOD COUNTY, NORTH CAROLINA
FIELD WORK PERFORMED DECEMBER, 2009
NAME OF CLIENT
THALLE CONSTRUCTION CO.

SCALE 1" = 50'
50 0 50 100

LEGEND:
- IRON PIN SET
- EXISTING IRON/NAIL/ROCK
- CONC. MONUMENT SET
- EXISTING CONC. MON.
- MATHEMATICAL POINT

ALOIS CALLEMYN
PROFESSIONAL LAND SURVEYOR

3500 JUSTAMERE FARM ROAD
HILLSBOROUGH, NC 27278
919-732-3354
ALOIS@CALLEMYN.COM

I, ALOIS CALLEMYN, PLS, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION, FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA, AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 25 DAY OF APRIL, 2010

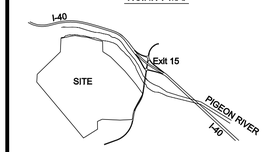
ALOIS CALLEMYN, PLS LICENSE NO. L-2544

NORTH CAROLINA PROFESSIONAL SEAL L-2544 LAND SURVEYOR ALOIS CALLEMYN

NOTE:
EXISTING TOPOGRAPHICAL INFORMATION AND CONTROL DATA INFORMATION TAKEN FROM PLANS ENTITLED "WHITE OAK MSW LANDFILL CONSTRUCTION DRAWINGS, MSW PHASE 3", DATED MARCH, 2009 BY MCGILL ASSOCIATES.

ALL NEW DATA AND ASBUILT CONTOUR LINES SHOWN ON THIS SURVEY ARE TIED TO NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 1983 (HORIZONTAL) AND NAVD-88 (VERTICAL).

VICINITY MAP



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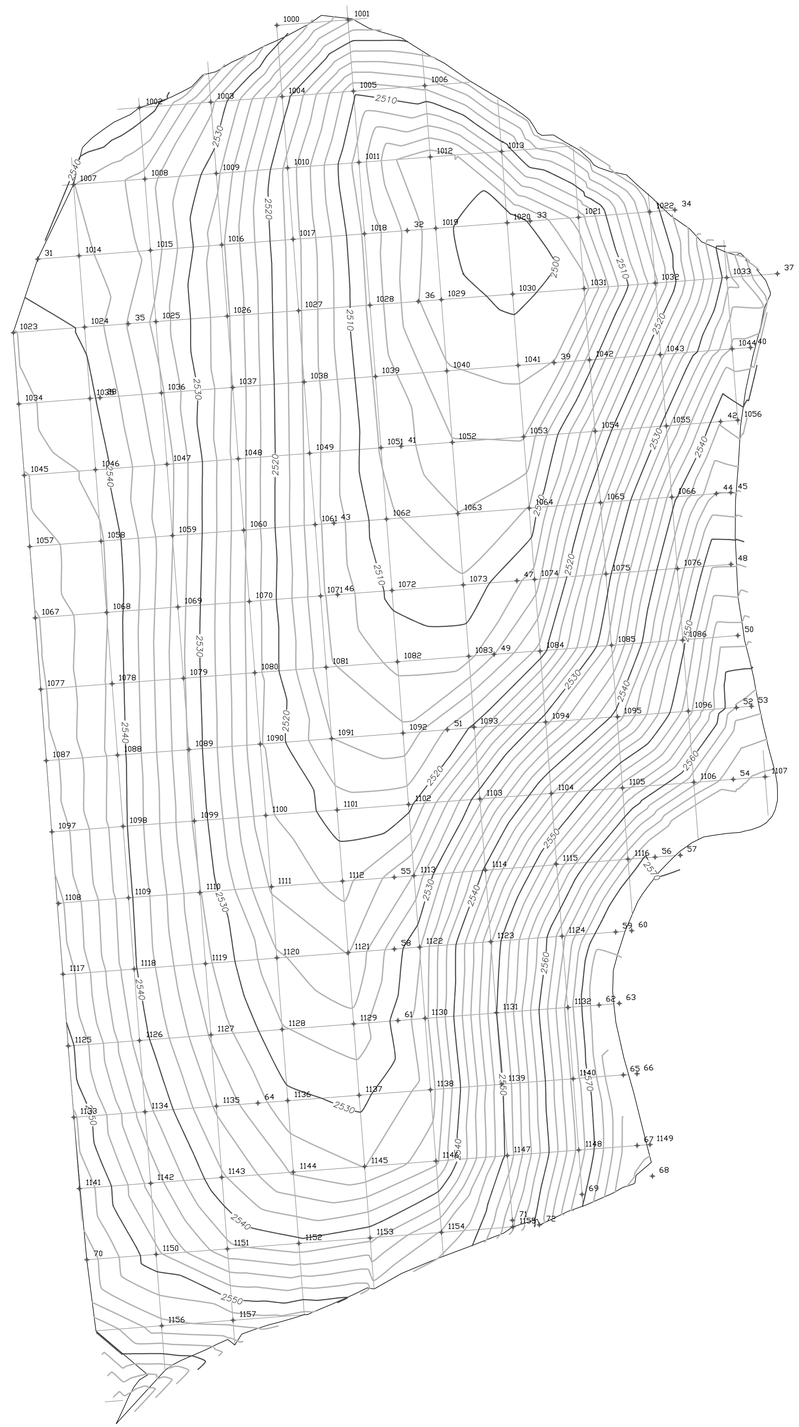


ASBUILT FOR CELL PROTECTIVE COVER

WHITE OAK MSW LANDFILL, PHASE 3"

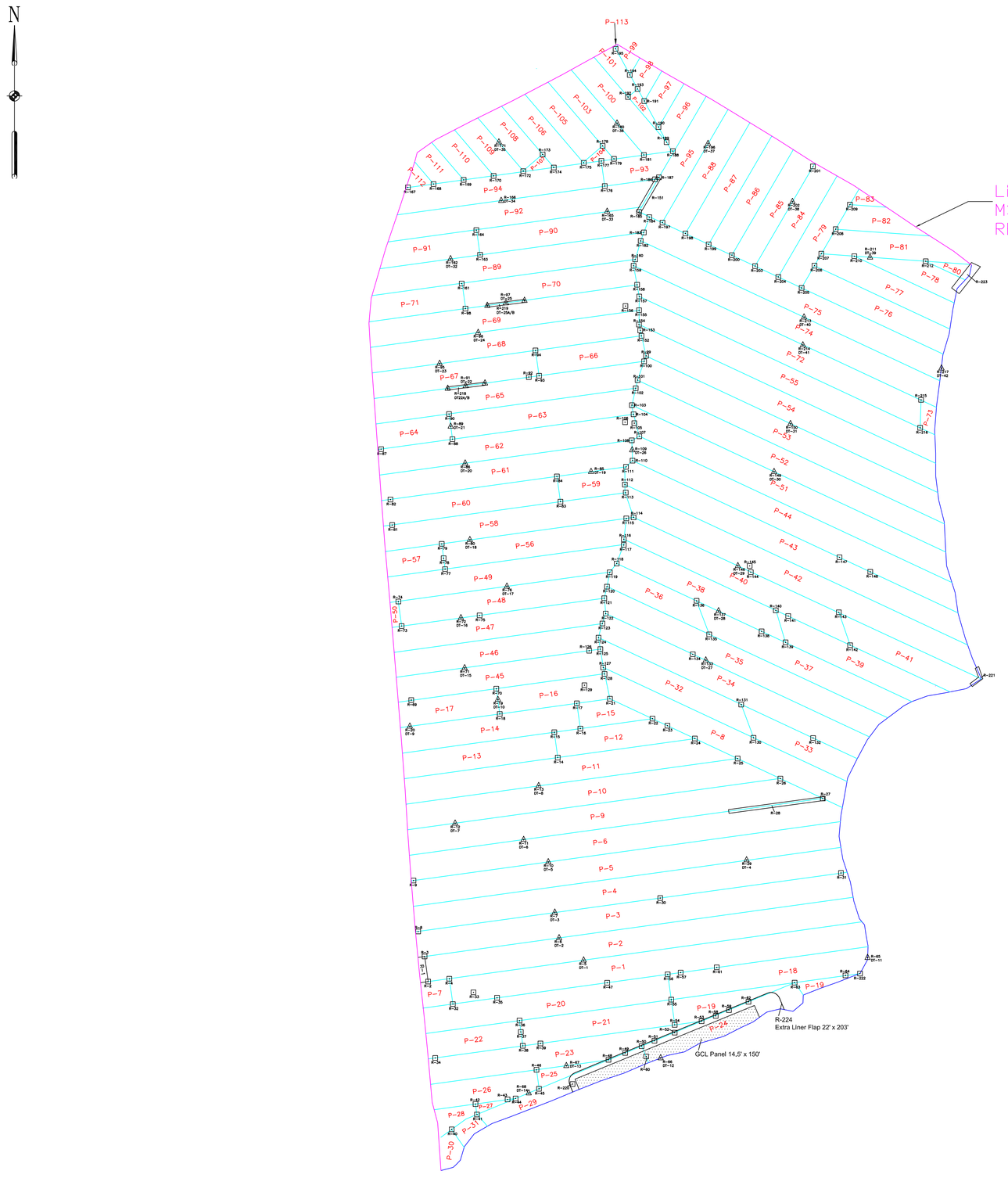
HAYWOOD COUNTY, NORTH CAROLINA
FIELD WORK PERFORMED APRIL, 2010
NAME OF CLIENT
THALLE CONSTRUCTION CO.

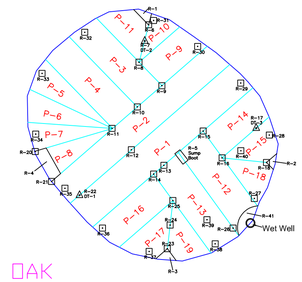
SCALE 1" = 50'
50 0 50 100

LEGEND:
- IRON PIN SET
- EXISTING IRON/NAIL/ROCK
- CONC. MONUMENT SET
- EXISTING CONC. MON.
- MATHEMATICAL POINT

ALOIS CALLEMYN
PROFESSIONAL LAND SURVEYOR

3500 JUSTAMERE FARM ROAD
HILLSBOROUGH, NC 27278
919-732-3354
ALOIS@CALLEMYN.COM





= Limit of Liner
= Liner Panel Seams
P-00 = Liner Panel Numbers
= Destructive Test Location
= Liner Repair Location

*Record Drawing Surveyed & Prepared by Hallaton, Inc. via Trimble GeoXH Datalogger

50 0 50 100 200
Graphic Scale in Feet
1" = 50'

REVISIONS

NO.	Date.	By:	Description:
A	1/5/10	KHG	Corrections made to repair locations
B	6/8/10	KHG	Corrections to Limits of Liner (N & W Boundries)

WHITE OAK MSW LANDFILL PHASE 3 CONSTRUCTOIN
HAYWOOD COUNTY, NC

Geomembrane Record Drawing

Hallaton, Inc.
Containment Linings
1206 Sparks Road - Sparks, MD 21152
(410) 583-7700 - (410) 583-7720 Fax

Drawn by:	KHG
Date:	12/15/09
Scale:	1" = 50'
Job Number:	0932-8009
Drawing Number:	002B

I, ALOIS CALLEMYN, PLS, CERTIFY THAT THIS PLAT WAS DRAWN UNDER MY SUPERVISION, FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS PLAT WAS PREPARED IN ACCORDANCE WITH THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA, AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 25 DAY OF APRIL, 2010

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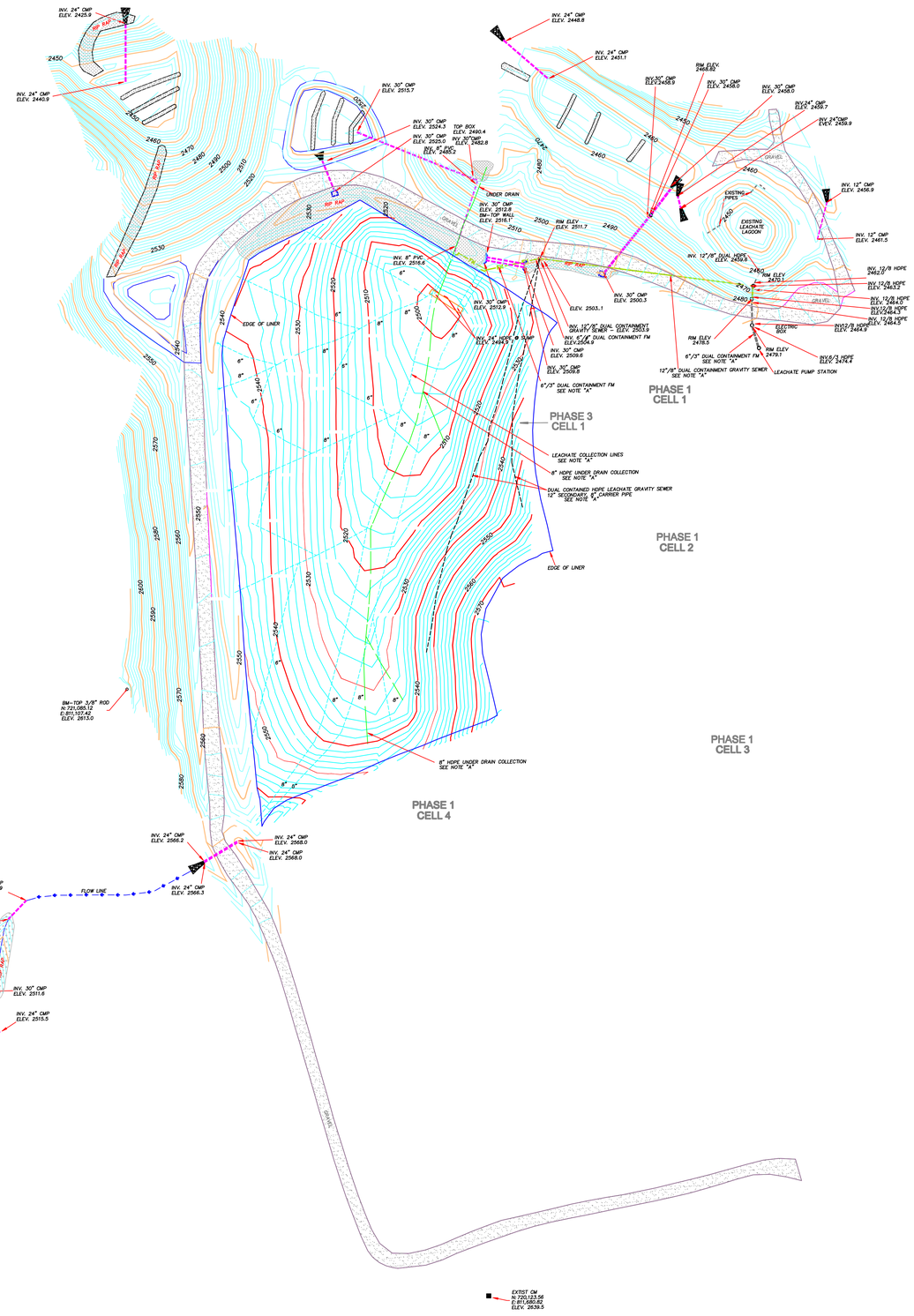
ALOIS CALLEMYN, PLS LICENSE NO. L-2544

NORTH CAROLINA PROFESSIONAL SEAL L-2544 LAND SURVEYOR ALOIS CALLEMYN

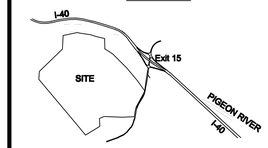
THE UNDERSIGNED HEREBY CERTIFIES THAT HE/SHE IS A PROFESSIONAL ENGINEER/PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF NORTH CAROLINA AND THAT HE/SHE HAS BEEN EMPLOYED BY THALLE CONSTRUCTION CO. TO DESIGN _____ IN ACCORDANCE WITH SPECIFICATION SECTION _____ FOR THE "WHITE OAK MSW LANDFILL, PHASE 3". THE UNDERSIGNED FURTHER CERTIFIES THAT HE/SHE HAS PERFORMED THE DESIGN OF THE _____, THAT SAID DESIGN IS IN CONFORMANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES, RULES AND REGULATIONS, AND THAT HIS/HER SIGNATURE AND P.E/P.L.S STAMP HAS BEEN AFFIXED TO ALL CALCULATIONS AND DRAWINGS USED IN, AND RESULTING FROM, THE DESIGN.

THE UNDERSIGNED HEREBY AGREES TO MAKE ALL ORIGINAL DESIGN DRAWINGS AND CALCULATIONS AVAILABLE TO HAYWOOD COUNTY OR OWNER'S REPRESENTATIVE WITHIN FIVE WORKING DAYS FOLLOWING WRITTEN REQUEST THEREFOR BY THE OWNER.

ALOIS CALLEMYN, PLS
3500 JUSTAMERE FARM ROAD, HILLSBOROUGH, NC 27278



VICINITY MAP



NOT TO SCALE

NOTE:
EXISTING TOPOGRAPHICAL INFORMATION AND CONTROL DATA INFORMATION TAKEN FROM PLANS ENTITLED "WHITE OAK MSW LANDFILL CONSTRUCTION DRAWINGS, MSW PHASE 3", DATED MARCH, 2009 BY MCGILL ASSOCIATES.

ALL NEW DATA AND ASBUILT CONTOUR LINES SHOWN ON THIS SURVEY ARE TIED TO NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 1983 (HORIZONTAL) AND NAVD-88 (VERTICAL).

NOTE "A"
THE LOCATION OF UNDERGROUND UTILITIES AS SHOWN ARE BASED ON VISIBLE EVIDENCE AND DRAWINGS PROVIDED TO THIS SURVEYOR. ALL DASHED LINES SHOWN HEREON WERE DRAWN FROM DATA SUPPLIED BY THALLE SURVEY DEPARTMENT.

NOTE "B"
ALL DISTANCES ARE HORIZONTAL GROUND, EXCEPT THOSE SHOWN AS GRID AND AREA IS BY COORDINATE COMPUTATIONS.

NOTE "C"
ALL FIELD DATA AND CADD FILES WERE REVIEWED AND APPROVED AS CORRECTLY SHOWING THE EXISTING CONDITIONS BY BOB WEISSE AND EVAN MONROE OF THALLE SURVEY DEPARTMENT.

RECORD DRAWING FOR

WHITE OAK MSW LANDFILL, PHASE 3"

HAYWOOD COUNTY, NORTH CAROLINA

APRIL, 2010

THALLE CONSTRUCTION CO.

SCALE 1" = 100'
100' 0 100' 200'

ALOIS CALLEMYN
PROFESSIONAL LAND SURVEYOR

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