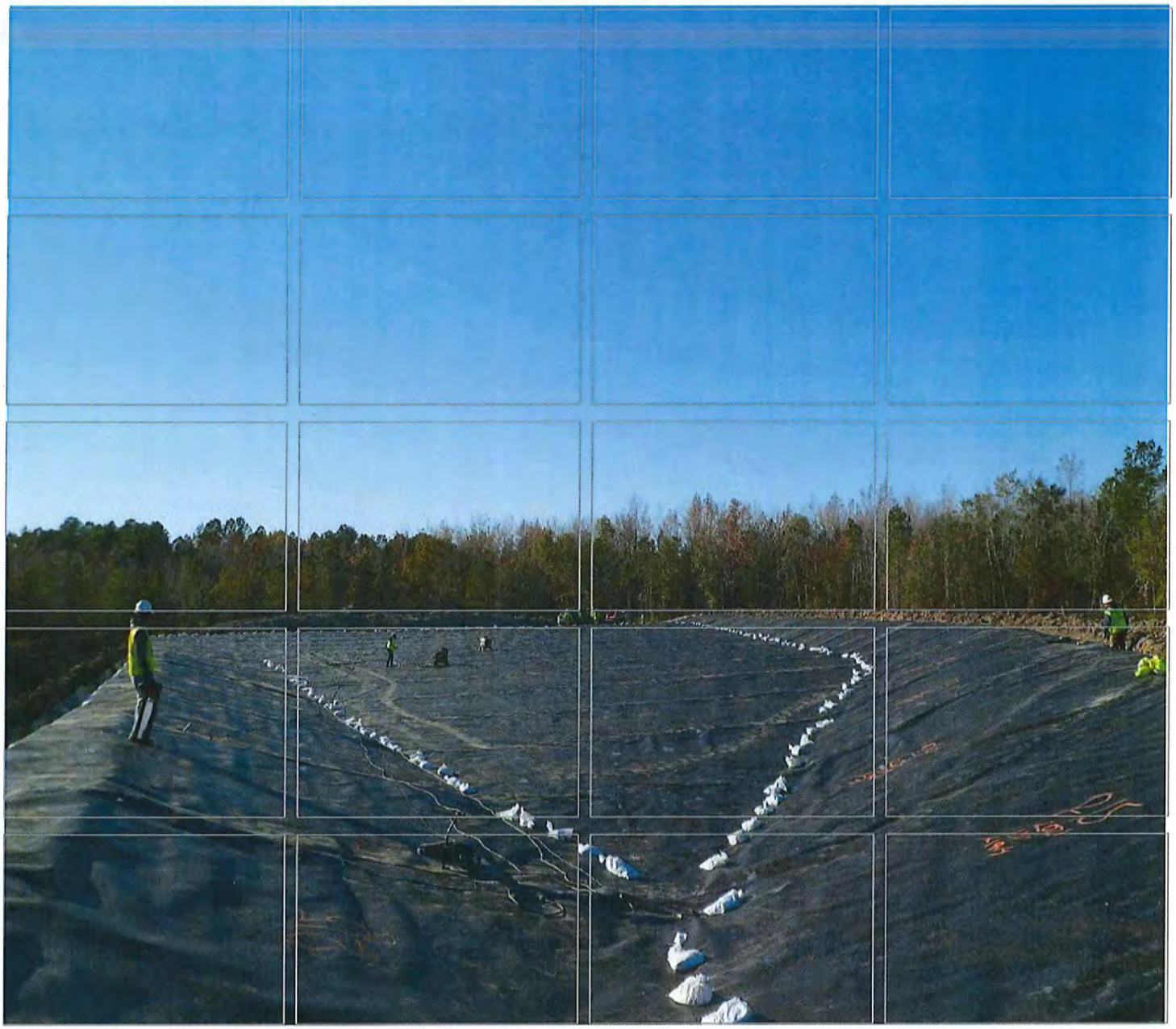

Green Recycling Solutions LLC

Application for Permit to Operate a Construction & Demolition Debris (C&D) Landfill, Permit No. 5203-CDLF-2013

Maysville, North Carolina

February 2015

NORTH CAROLINA PROFESSIONAL SEAL 20770 ENGINEER DAVID W. WABIELA

2-3-15

Rec'd 2/3/2015 DIN 23319 SWS JM

Delivering sustainable solutions in a more competitive world

ERM

ERM NC, Inc.

15720 Brixham Hill Ave.
Suite 120
Charlotte, NC 28277
(704) 541-8345
(704) 541-8416 (fax)

February 3, 2015

NCDENR - Division of Waste Management
610 East Center Avenue
Suite 301
Mooresville, NC 28115

Attention: Mr. John Murray

Reference: **Green Recycling Solutions LLC**
Application for Permit to Operate a Construction & Demolition Debris (C&D) Landfill - Permit No. 5203-CDLF-2013
Permit to Construct Phase 1 - Issued January 17, 2014
Maysville, North Carolina

Mr. Murray:

ERM NC, Inc. (ERM) has completed the necessary monitoring, inspection and testing for the construction of the Green Recycling Solutions LLC, C&D Landfill, Phase 1, Cell 1 (Facility Permit No. 5203-CDLF-2013 issued January 17, 2014). All monitoring, testing and inspections were performed and documented based on the technical specifications and Construction Quality Assurance (CQA) Plan developed by ERM as revised through October 2013 (Response to Comments submittal October 1, 2013). This submittal contains material certifications, laboratory testing, field testing and as-built survey drawings for each component of the Phase 1, Cell 1 construction. As required in the Division of Solid Waste Management Rules, copies of colored photographs of each phase of landfill cell construction are included in the submittal.

Individual sections of this report describe the materials and testing / inspection procedures used for:

- Subgrade Preparation and Structural Fill
- Compacted Soil Liner
- High Density Polyethylene (HDPE) Liner
- Geocomposite
- Drainage Layer
- Operational Cover
- Leachate Collection & Removal System
- Temporary Berm & Rainflap
- Groundwater Monitoring Wells

ENGINEER'S CERTIFICATION

The professional seal of David W. Wasiela, P.E. is affixed to this submittal to certify that the construction of Green Recycling Solutions LLC, C&D Landfill, Phase 1, Cell 1 in Maysville, North Carolina has been completed in general accordance with the approved Plans, CQA Plan and Project Technical Specifications under the observation of ERM personnel and ERM subconsultants.

If you should have any questions or require additional information concerning this submittal, please contact me at dave.wasiela@erm.com or (704) 541-8345.

Sincerely,

ERM NC, Inc.
NC License # C-2206

2-3-15

David W. Wasiela, P.E.
NC Registration No. 20770
Senior Project Engineer

cc: Mr. Ed Mussler – NCDENR – Division of Waste Management
Mr. James Maides – Green Recycling Solutions LLC

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Appendix

Appendix 1	Structural Fill Laboratory and Field Density Testing
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Appendix 3	Compacted Soil Liner Laboratory Bulk Testing
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Appendix 8	High Density Polyethylene (HDPE) Liner Conformance Testing
Appendix 9	High Density Polyethylene (HDPE) Liner CQA Forms and As-Built Drawing
Appendix 10	High Density Polyethylene (HDPE) Liner Destructive Testing Results
Appendix 11	Geocomposite Roll Certifications
Appendix 12	Geocomposite Conformance Testing
Appendix 13	Operational Cover As-Built Drawing
Appendix 14	High Density Polyethylene (HDPE) Pipe Material Certifications
Appendix 15	EPG Leachate Pumping System and Tanks
Appendix 16	Leak Detection Survey Report
Appendix 17	Background Groundwater Quality and Landfill Gas Migration Report

SECTION 1
SUBGRADE CERTIFICATION AND STRUCTURAL FILL

ERM NC, Inc. (ERM) has compiled the necessary monitoring and testing requirements for placement of subgrade structural fill soils for the construction of Green Recycling Solutions LLC, Maysville C&D Landfill, Phase 1, Cell 1. The entire Cell 1 footprint was evaluated for suitable subgrade conditions prior to placement of the structural fill. Structural Fill placement was monitored and tested on a full-time basis in general accordance with the project specifications and Construction Quality Assurance (CQA) plan prepared by ERM as revised through September 11, 2013. The following presents inspection, monitoring and testing activities for subgrade approval and structural fill placement along with associated testing results.

Site Preparation

Site preparation included the installation of silt fence in accordance with the approved Erosion & Sedimentation Control Plan. Following completion of erosion and sedimentation control measures, clearing of small trees along the access road, on site borrow area and Cell 1 footprint was completed. Cleared debris remains on site for potential use for reestablishing disturbed areas.

Subgrade Preparation

The Cell 1 footprint was prepared by removing and stripping the surficial topsoil layer within the construction limits; no excavation was required to meet proposed grades. Topsoil was stockpiled on site for future use on exterior slopes of the landfill to promote vegetation growth following construction. Prior to structural fill placement and following stripping of the Cell 1 footprint, the exposed subgrade was proofrolled under the observation of ERM personnel using a loaded tandem dump truck. The loaded truck made several passes across the subgrade while ERM personnel evaluated any areas for rutting or pumping that would indicate soft or unstable conditions. Soft or unstable areas were not encountered during proofrolling activities.

Photos of prepared subgrade prior to fill placement – October 17, 2014

Structural Fill

ECS Carolinas, LLP (ECS) provided full-time monitoring and testing during placement of structural fill soils for Cell 1 under the direction of ERM in accordance with the approved technical specifications and CQA plan as revised through September 11, 2013. In order to perform field density testing, bulk samples of fill material were collected for laboratory testing. ECS collected three bulk samples (S-1, S-2 & S-3) from within the on-site borrow area located adjacent to the C&D Landfill location. The bulk samples were transported to ECS's Wilmington, North Carolina geotechnical laboratory for standard Proctor moisture – density relationship testing (ASTM D 698) in accordance with the specifications and CQA Plan. Results of the laboratory testing are attached in Appendix 1 for review and reference. The samples collected range from a gray clayey sand to a light gray fine to medium sand with maximum dry density ranging from 106.3 to 121.6 pounds per cubic foot and optimum moisture content ranging from 11.4 to 13.0 percent. The compacted soil liner bulk sample (S-4) was also utilized during structural fill placement as an abundance of this material is present near surface and was utilized in the structural fill placement. Laboratory results for sample S-4 show a maximum dry density of 112.6 pounds per cubic foot and an optimum moisture content of 15.7%.

Results of laboratory testing were used to perform field density testing. In accordance with the project specifications and CQA Plan, field density testing was performed at a minimum frequency of 1 test per 10,000 square feet per lift (1 test per 100' X 100' grid block per lift) for placement of structural fill. For exterior berms, field density testing was performed at a minimum frequency of 1 test per lift for every 300 linear feet of berm. A total of 68 field density tests were performed using Nuclear Density Gauge test method (ASTM D-6938) not including one retest location. All 68 tests performed met or exceeded the requirement of 95 percent of maximum dry density as determined by standard Proctor moisture – density relationship. Results of field density testing and field density tests locations were completed by ECS each day testing was performed and included with testing reports in Appendix 1.

In summary, all structural fill placed within the limits of Phase 1, Cell 1 meets or exceeds the minimum requirement of 95 percent of maximum dry density based on standard Proctor moisture-density relationship. The surface of the prepared subgrade was rolled with a smooth drum compactor for preparation of the subgrade survey as-built activities.

As – Built Conditions

An as-built survey drawing was produced by Parker & Associates, Inc. for Top of Structural Fill subgrade conditions prior to placement of compacted soil liner. The Owner decided to intentionally construct the subgrade lower than plan requirements to ensure that the compacted soil liner would exceed the required 18-inch minimum thickness. The lines and grades shown on the attached Subgrade As-Built Survey drawing (Appendix 2) was used to verify the minimum clay liner thickness is constructed.

On-Site Borrow area 10-17-14

North Berm 10-17-14

West End Cell 1 – 10-17-14

Cell 1 Facing West – 10-28-14

Exterior North Berm – 10-28-14

Cell 1 Facing West – 10-28-14

SECTION 2
COMPACTED SOIL LINER

ECS Carolinas, LLP (ECS) provided full-time monitoring and testing during placement of compacted soil liner (CSL) materials under the direction of ERM in accordance with the approved technical specifications and CQA plan as revised through October 1, 2013 on top of prepared structural fill subgrade. Soil used for CSL construction was obtained from the on-site borrow area located south of Phase 1, Cell 1. Pre-construction sampling and testing were performed to validate the physical geotechnical properties of the CSL candidate soils prior to construction.

Pre-Construction Testing

Based on the technical specifications and CQA plan, one bulk sample per 5,000 cubic yards (CY) of CSL materials placed is to be collected for geotechnical laboratory testing. Phase 1, Cell 1 is approximately one (1) acre in size requiring 2,420 CY of CSL material. One bulk sample was retained from the on-site borrow area (sample S-4) representative of the CSL material used for construction. For permeability testing, remolded conditions were established at 95% of standard Proctor maximum dry density and 2 – 3% wet of optimum moisture content as the target conditions. Below are the summarized results of geotechnical laboratory testing for compacted soil liner bulk sample S-4:

- Maximum dry density(ASTM D 698) – 112.6 pcf
- Optimum Moisture content (ASTM D 698) – 15.7%
- Atterberg Limits, Plastic Limit, PL (ASTM D 4318) – 17
- Atterberg Limits, Liquid Limit, LL (ASTM D 4318) – 37
- Atterberg Limits, Plasticity Index, PI (ASTM D 4318) – 20
- Unified Soil Classification System, USCS (ASTM D 2487) – CL – Lean Clay
- Permeablity, Hydraulic Conductivity (ASTM D 5084)
    - Dry Density – 107.0 pcf (95% of max. dry density)
    - Moisture Content – 17.7% (2.0% wet of optimum)
    - Coefficient of Permeability – 1.81 X 10^{-8} cm/sec

The bulk sample testing for CSL soil materials meet or exceed the requirements of the technical specifications and CQA plan. Copies of the laboratory testing results performed by ECS are included in Appendix 3 for reference.

CSL Construction

Construction of the CSL for Phase 1, Cell 1 was performed by Morton Trucking, Inc. under the observation of ERM and CQA testing provided by ECS. In summary, the CSL soils were excavated at the borrow area using a trackhoe and loaded into off road articulating dump trucks for transportation to Cell 1. The soils were spread into approximately 12-inch thick loose lifts using a bulldozer and compacted using a smooth drum roller. This process was repeated three (3) times across the Cell 1 floor and berms to achieve a minimum CSL thickness of 18 inches constructed in three separate lifts in accordance with the approved technical specifications and

CQA plan. Due to the small size of Cell 1 and the results of bulk sample testing far exceeding CSL requirements, the construction of a CSL test strip was waived by David W. Wasiela, P.E. of ERM.

CSL Construction CQA Testing

Visual Inspection of Materials

The CSL soils were visually inspected at the borrow area and Cell 1 to validate material type and lack of roots or other large objects. The CSL soils appeared consistent with bulk sample (S-4) characteristics throughout construction in Cell 1 with removal of large roots and organic materials.

Field Density Testing

In accordance with the approved technical specifications and CQA plan, field density testing was performed by ECS at a minimum frequency of 1 test per 100-ft X 100-ft grid per lift of CSL soils placed and compacted. As stated previously, passing criteria for field density testing was established at 95% of maximum dry density and 2 – 5 % wet of optimum moisture content.

From October 30, 2014 through November 10, 2014, ECS performed a total of thirty six (36) field density test were performed at the approved testing frequency listed above. Field density testing was performed utilizing the Nuclear Density Gauge test method (ASTM D 6938). Five (5) of the field density tests failed due to high moisture content or low dry density requiring retests at these locations. A total of thirty one (31) passing field density test were performed and recorded with a minimum of twenty four (24) required to meet or exceed the testing requirements. During construction of the CSL, several rain events occurred to cause construction stoppage and reworking. Following each event, the surface of the CSL was inspected to identify areas requiring rework and retesting. The locations of the field density tests and corresponding results are included in Appendix 4 for reference.

Undisturbed Sampling

In accordance with the approved technical specifications and CQA plan, undisturbed sampling using a 3-inch diameter Shelby tube was performed at the frequency of 1 sample per acre per lift. The location of undisturbed sampling was selected near the sump area due to several rain events during construction coupled with the concern for potential “oversaturation” of the CSL soils in this area. A 3-inch diameter Shelby tube was advanced using a hydraulic jack, extracted, sealed with wax on each end and transported to ECS’s geotechnical laboratory for testing. Results of the permeability testing are summarized below:

- First lift; ST-1 – Coefficient of Permeability, $k = 1.16 \times 10^{-7}$ cm/sec
- Second lift; ST-2 – Coefficient of Permeability, $k = 2.73 \times 10^{-6}$ cm/sec
- Third lift; ST-3 - Coefficient of Permeability, $k = 6.25 \times 10^{-7}$ cm/sec

Copies of the geotechnical laboratory permeability testing conducted in accordance with ASTM D 5084 are meet or exceed the project requirements and are included in Appendix 5 for reference.

As-Built Conditions

An as-built survey drawing was produced by Parker & Associates, Inc. for Top of CSL grades prior to placement of high density polyethylene (HDPE) liner. These as-built conditions were used for comparison with the previous Top of Subgrade as-built conditions to verify a minimum of eighteen (18) inches of compacted soil liner were constructed across the Phase1, Cell 1 limits. The as-built survey drawing prepared and sealed by Parker & Associates is included in Appendix 6 for reference shown with the top of subgrade elevations.

Borrow Area – 11-06-14

Cell 1 CSL Facing West – 11-06-14

CSL on North Berm – 11-06-14

Cell 1 CSL Sump Area – 11-06-14

CSL Cell 1 Facing West – 11-10-14

Cell 1 CSL on South Berm – 11-10-14

CSL Anchor Trench – 11-18-14

Cell 1 CSL Facing Northeast – 11-18-14

SECTION 3
HIGH DENSITY POLYEHTYLENE (HDPE) LINER

ERM provided full-time monitoring and testing for the installation of the Phase 1, Cell 1HDPE liner system. A textured 60-mil HDPE liner supplied by Agru-America, Inc. was used for the Cell 1 installation. Installation of the HDPE liner was performed by Chesapeake Containment Systems, Inc. (CCSI). A copy of the roll certifications, resins and pre-shipping testing is included in Appendix 7. Conformance sampling and testing for the HDPE liner materials was performed in accordance with the approved specifications and CQA plan. A copy of the conformance testing results performed by Geotechnics, Inc. is included in Appendix 8. All materials used for the HDPE liner system installation meet or exceed the requirements of the project specifications and CQA Plan.

HDPE Panel Deployment

Prior to placing HDPE liner material, ERM personnel and CCSI representatives inspected the surface of the subgrade for suitability.

HDPE panels were deployed using a boom and spear on an excavator; pulling the sheet material from the roll using a low ground pressure utility vehicle and manpower. The HDPE liner panels were deployed directly on top of the CSL. Each panel was inspected by ERM personnel during deployment, assigned a sequential panel number and measured for dimensions. HDPE panels were deployed within Cell1 on November 19, 2014 with installation completed in one day. A copy of the panel deployment records is included in Appendix 9 for reference. The HDPE Liner As-Built Drawing is presented in Appendix 9 for reference.

HDPE Panel Seaming

At the beginning of each work day during HDPE liner installation, trial seams were performed (fusion and / or extrusion) to test the integrity of the welding machine and welding technician. Following completion of the trial seams, destructive testing specimens were cut from the trial seams and tested using the Installer's tensiometer. In order to accept a trial seam, the failure mode for both peel adhesion and bonded shear strength must be Film Tear Bond (FTB). Subsequent trial seams were performed throughout the day for approximately every 4 hours of seaming or if a new welder or technician was used. A copy of the trail seam reports is included in Appendix 9.

ERM personnel provided full-time monitoring during seaming of HDPE panels. The majority of field seaming was accomplished using double hot wedge fusion welding equipment and techniques. Seaming of the temporary berm rainflap was extrusion welded. Each seam was assigned a sequential number in accordance with the project specifications. ERM provided full-time monitoring for non-destructive testing of field seams; air pressure testing for double hot wedge fusion welds and vacuum box testing for extrusion welds. A copy of the Seam Inspection Reports documenting non-destructive testing results completed by CCSI personnel and reviewed by ERM personnel is included in Appendix 9 for reference.

The locations of all HDPE panels and subsequent seams are shown on the HDPE Liner As-Built Drawing included in Appendix 9 for review and reference.

Destructive Testing

The destructive testing program for Cell 1 included Laboratory Destructive testing. Laboratory destructive testing sampling was performed for approximately every 500 linear feet of field seaming. The locations of the Laboratory Destructive samples were determined by ERM personnel and are identified in the Geomembrane Seam Destructive Test Log in Appendix 9 denoted by DT-#. A total of four (4) destructive testing samples were procured to meet or exceed the testing requirements in the approved technical specifications and CQA Plan. Three 1-inch wide specimens were taken from the destructive testing samples in the field and tested using the Installer's tensiometer for Peel Adhesion using Film Tear Bond as passing criteria. Once passing results were achieved in the field, the remainder of the sample was sent to Geotechnics,

Inc. in Pittsburgh, Pennsylvania for Laboratory Destructive testing. A copy of the Laboratory Destructive testing results is included in Appendix 10 for review. The destructive samples passed laboratory destructive testing criteria for the Phase 1, Cell 1 project.

Repairs

Five (5) repairs were necessary for the Phase 1, Cell 1 HDPE liner installation. Each of the four destructive sample locations required a repair and one "burn out" location at the south end of seam 12/13 required a repair. The repairs were performed using extrusion welding techniques followed with vacuum box testing for repair certification. The locations of repairs are shown on the HDPE Liner As-Built Drawing included in Appendix 9 for reference. A description of the repairs is included on the Repair Log included in Appendix 9 for reference. All repairs were monitored and tested in accordance with the approved technical specifications and CQA Plan.

Final Acceptance

Prior to placing geocomposite for the leachate collection system above the HDPE liner, ERM and CCSI personnel inspected the entire Phase 1, Cell 1 HDPE liner to inspect for any further defects requiring repair. At this time, documentation was also reviewed for compliance with the project specifications and CQA Plan. Once there were no further defects found and documentation was deemed complete, the liner installation was accepted for placement of geocomposite.

11-19-14 – First Panels on West end

11-19-14 – Double Hot Wedge Welder

11-19-14 – Sample of Panel ID Information

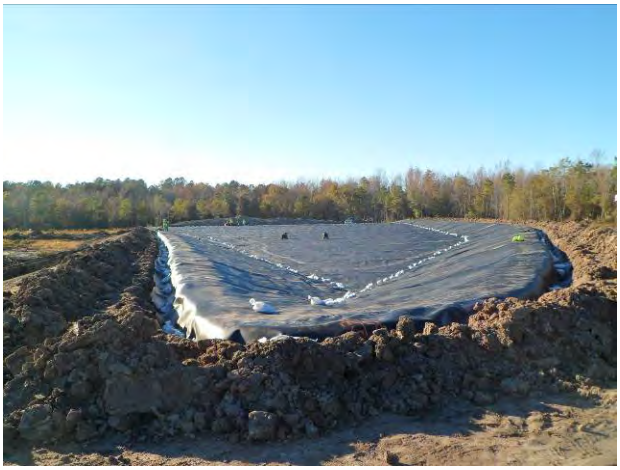
11-19-14 – Install at Middle of Cell 1

11-19-14 – Facing West, Sump area lined

11-19-14 – Pressure Testing of Seam

11-19-14 – Repair at Destruct Location

11-19-14 –Vacuum Box Testing Repair



11-19-14 – HDPE Liner Installed ***11-20-14 –HDPE Liner Installed***

SECTION 4
GEOCOMPOSITE

ERM personnel provided full time monitoring and inspection for the geocomposite materials and installation. A double sided 6-ounce geocomposite was used to install the drainage layer for Phase 1, Cell 1. The material was supplied through Agru-America, Inc. by Skapps Industries. A copy of the material roll certifications is included in Appendix 11 for reference. A conformance sample of the geocomposite was shipped to Geotechnics, Inc. for Ply Adhesion and Transmissivity testing. A copy of the conformance testing results is included in Appendix 12 for reference and meets or exceeds the requirements in the approved technical specifications and CQA Plan.

Rolls of geocomposite were deployed using manpower and appropriately overlapped along the panel sides and ends. The panels of geocomposite were temporarily joined using plastic "zip ties" and then sewn together with nylon thread. Installation of the geocomposite meets or exceeds the requirements in the approved technical specifications and CQA Plan.

11-21-14 – Deploying Geocomposite ***11-21-14 –Sewing Geocomposite***

11-21-14 –Geocomposite Installed

11-21-14 – Geocomposite at Sump Area

SECTION 5
OPERATIONAL COVER

ERM personnel provided monitoring and inspection for the placement of operational cover above the liner section geocomposite. In summary, a 24-inch thick minimum layer of sandy soils were placed across the Phase 1, Cell 1 limits of liner. Placement of the drainage layer began at the upgradient west end of Cell 1and progressed to the east end (sump area). The sandy soil was imported from the on-site borrow area. The thickness of the drainage layer was physically measured during placement and verification of a minimum of 24-inch thickness verified by Parker & Associates with an As-Built survey drawing included in Appendix 13 for reference.

1-13-15 – Facing West, Operational Cover Along north side berm

1-13-15 –Facing East, Operational Cover Along leachate line, north side

1-13-15 – Facing North, Operational Cover Along west rain flap

1-13-15 –Facing East, Operational Cover Along south rain flap

SECTION 6
LEACHATE COLLECTION & REMOVAL

ERM personnel provided monitoring and inspection for the installation of leachate collection and removal components. A single perforated 6-inch diameter HDPE leachate collection pipe traverses Phase 1, Cell 1 from west to east beginning at the topographically high west end and passing through the sump area to the east. Material certifications for the HDPE pipe are included in Appendix 14 for reference. The pipe was butt fusion welded by CSSI the entire length of the leachate collection pipe. The collection pipe rests on the geocomposite above the liner system and is surrounded by a column of #57 washed stone. The stone column is surrounded by a 6-ounce geocomposite material to separate the operational cover and drainage layer soils from the stone column. The top of the stone column was left exposed due to the small size of the Cell 1 area and intent to begin operations soon.

The 6-inch diameter collection pipe discharges into a 24-inch diameter, perforated sump with sidewall riser at the lowest point in the east corner of Cell 1. The sump and sidewall riser section were pre-fabricated by CCSI and transported to Phase 1, Cell 1 for installation. The sump is also surrounded by #57 washed stone. An EPG Companies stainless steel pump with transducers and control panel has been installed at the sidewall riser for leachate removal. The EPG pump discharge hose is connected to a “quick connect” fitting inside the 24-inch diameter sidewall riser for discharge to two side by side double lined, 20,000 gallon steel tanks. The steel tanks are hydraulically connected for storage purposes and contain a float switch to turn the pumping system off in the event of storage capacity exceedance. A copy of the EPG pumping system, control panel and tank diagrams are included in Appendix 15 for reference.

12-16-14 – Facing West, Leachate Collection Pipe with Stone

12-16-14 – Facing East, Leachate Collection Pipe with Stone

12-16-14 – Leachate containment tanks

1-13-14 – Leachate Tank Connection

12-16-14 – Sidewall Riser Quick Connect

12-16-14 – Leachate Tanks, Sidewall Riser & Control Panel

SECTION 7
TEMPORARY BERM & RAINFLAP

In order to encapsulate leachate within Phase 1, Cell 1 and prevent the migration of stormwater into the newly constructed cell, a temporary berm and HDPE rainflap was installed along the western perimeter and a portion of the southern perimeter near the west end (in accordance with the approved plans). In summary, a temporary berm was constructed using protective cover soils beginning approximately 3 feet within the certification limits. The berm was constructed to rise approximately 3 feet above the top of protective cover or 5 feet above the liner system. The location of the berm within the certification limits allows for a 3-foot "run-out" section for connecting the liner and geocomposite layers for future Phase 1 and Phase 2 Cell construction. 60-mil HDPE liner was placed over the temporary berm and extrusion welded to the primary HDPE liner for Phase 1, Cell 1 within the certification limits on the outside (west and south sides) of the berm. The entire length of the rainflap weld was monitored, inspected and tested under the full-time observation of ERM personnel. Trial Seams dated November 20, 2014 for the rainflap are presented in Appendix 9.

The western rainflap will be removed following construction of Phase 1, Cell 2 to allow for appropriate leachate collection throughout Phase 1. The southern portion of the rainflap will be extended with the construction of Phase 1, Cell 2.

11-21-14 – Temporary Rain Flap Welded on West End

11-21-14 – Temporary Rain Flap Welded on South side, West End

SECTION 8
LEAK DETECTION TESTING

Following placement of operational cover and installation of the leachate collection system, a leak detection survey was performed in accordance with ASTM D 7007 in accordance with the approved permit conditions. The survey was performed by Bunnell-Lammons Engineering of Greenville, South Carolina. An isolation trench was excavated along the perimeter of Cell 1 perimeter berms to isolate the liner section from potential false readings. A copy of the complete leak detection survey report including photographs of the survey process is included in Appendix

16 for reference. In summary, results of the testing revealed no leaks in the HDPE liner following placement of operational cover and leachate collection removal system.

SECTION 9
LEACHATE COLLECTION LINE CAMERA SURVEY

Following placement of operational cover and leak detection survey, a camera video survey was conducted for the entire length of the leachate collection line. The camera survey was performed by Mortec with a video file of the camera survey supplied to ERM. Based on the camera survey, the leachate line was not adversely impacted by the placement of operational cover and surrounding stone and the line was not obstructed with any noticeable debris or sediments. A copy of the video file is maintained on site for archive purposes.

SECTION 10
GROUNDWATER MONITORING WELLS

Background groundwater monitoring sampling and analytical testing was performed by Atlantic GeoScience, Ltd. under separate contract with Green Recycling Solutions LLC. Results of the background sampling were electronically submitted to Elizabeth Werner with Division of Waste Management on January 29, 2015. A copy of the submittal is attached in Appendix 17 for reference. In summary, downgradient wells indicate elevated levels of arsenic and iron likely attributed to former agricultural practices and logging operations historically known to have occurred on site.

Appendix 1

Structural Fill Laboratory and Field Density Testing

(Services provided by ECS Carolinas LLP)

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

September 23, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
	Permits:
	Location: **Hwy 17** **Maysville, NC**
ATTN: Mr. Tim Morton	

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes

ENCL:

As requested, ECS Carolinas, LLP (ECS) has performed the laboratory testing on the proposed fill material (S-1) picked up from the above referenced project site in Maysville, North Carolina.

The sample was tested in accordance with test procedures ASTM D-698 entitled "Laboratory Compaction Characteristics of Soil Using Standard Effort". The Proctor curve for the sample is attached.

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

This report (and any included attachments) shall not be reproduced, except in full, without the prior written approval of ECS.

COMPACTION TEST REPORT

Curve No.: S-1

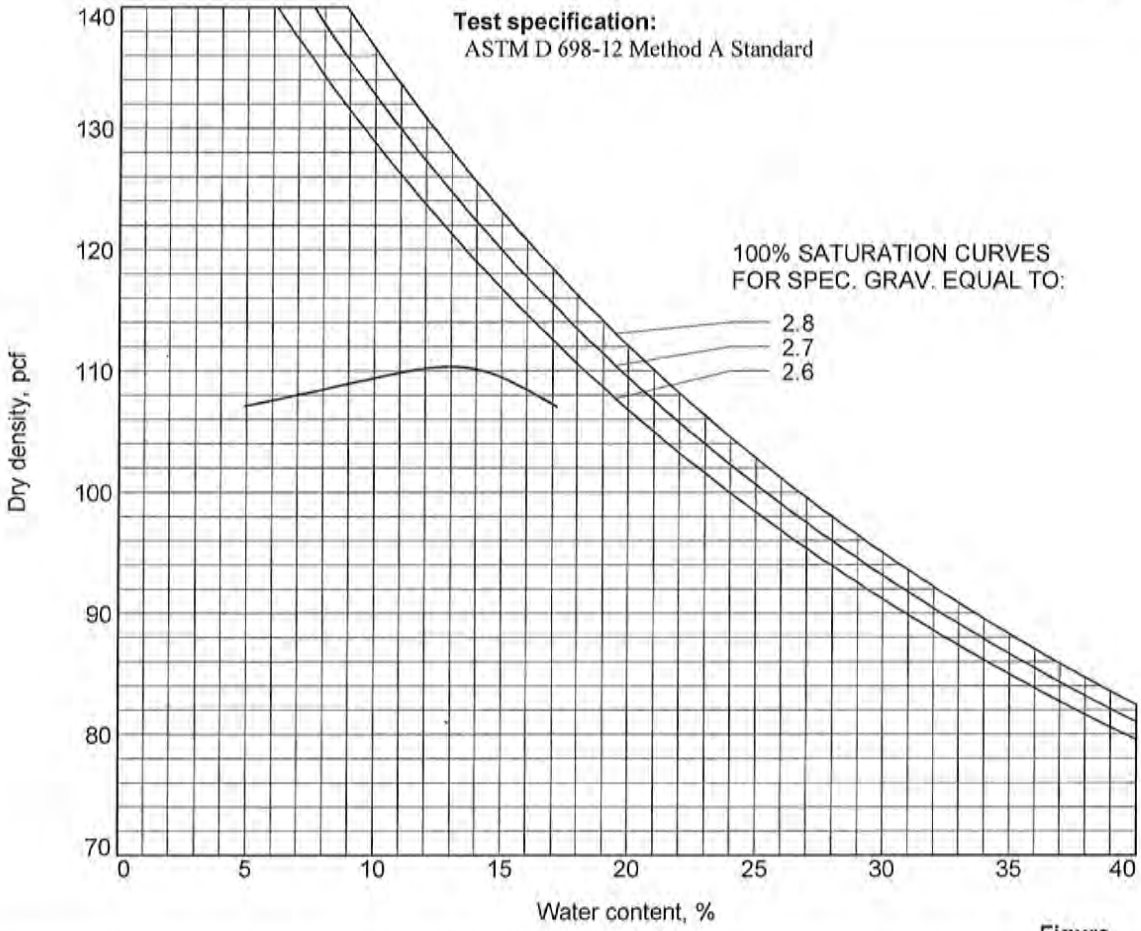
Project No.: 20747-A **Date:** 9/22/14
Project: C & D Landfill Cell Work
Client: Morton Trucking
Source of Sample: Backfill **Depth:** 0.00-0.00
Sample Number: S-1
Remarks:

MATERIAL DESCRIPTION

Description: Very Dark Gray, Silty Sand

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =** 2.60
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 110.3 pcf
Optimum moisture = 13.0 %



Figure

ECS Carolinas, LLP

Tested By: EG **Checked By:** KEL

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

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We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes

ENCL:

As requested, ECS Carolinas, LLP (ECS) has performed the laboratory testing on the proposed fill material (S-2) picked up from the above referenced project site in Maysville, North Carolina.

The sample was tested in accordance with test procedures ASTM D-698 entitled "Laboratory Compaction Characteristics of Soil Using Standard Effort". The Proctor curve for the sample is attached.

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

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COMPACTION TEST REPORT

Curve No.: S-2

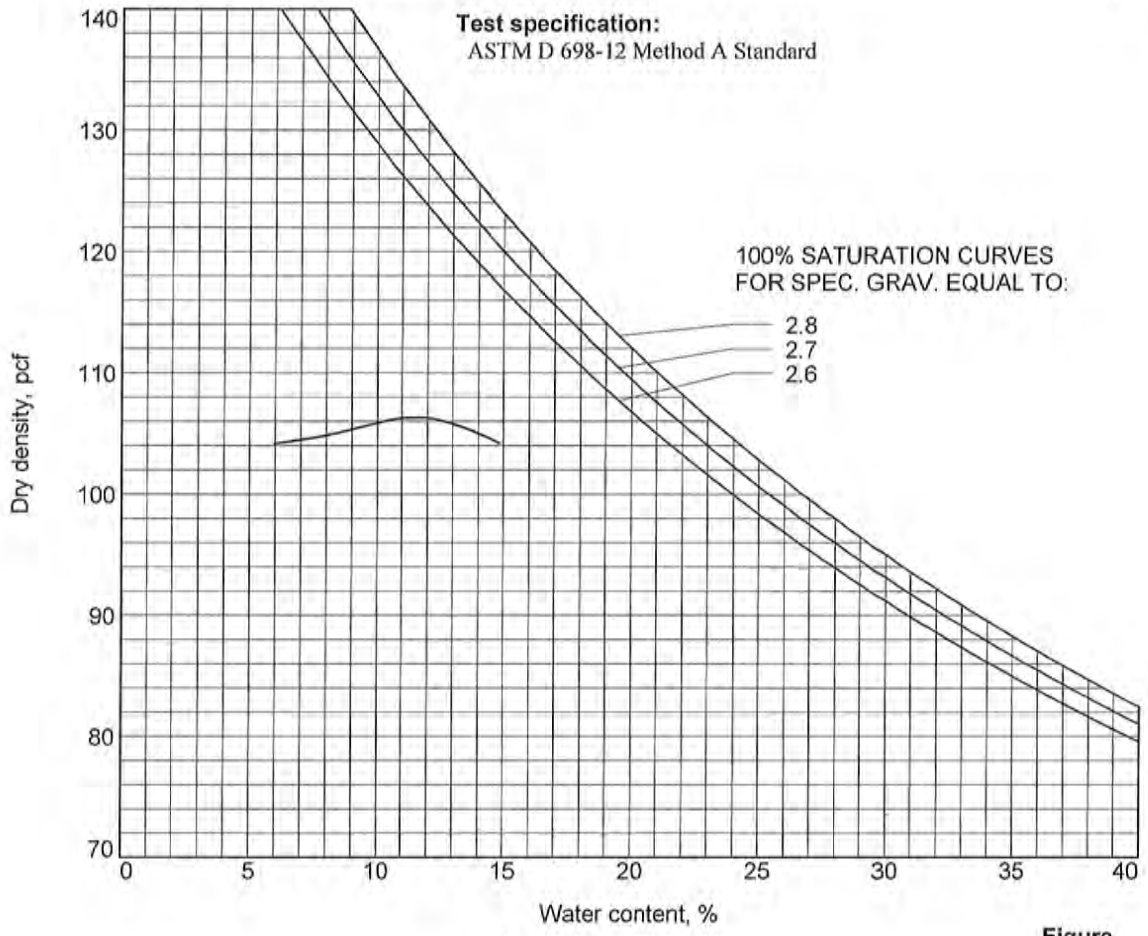
Project No.: 20747-A **Date:** 9/22/14
Project: C & D Landfill Cell Work
Client: Morton Trucking
Source of Sample: Backfill **Depth:** 0.00-0.00
Sample Number: S-2
Remarks:

MATERIAL DESCRIPTION

Description: Pale Gray, Fine to Medium Sand

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =** 2.60
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 106.3 pcf
Optimum moisture = 11.5 %



Figure

ECS Carolinas, LLP

Tested By: EG **Checked By:** KEL

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

September 23, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
	Permits:
	Location: **Hwy 17** **Maysville, NC**
ATTN: Mr. Tim Morton	

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes

ENCL:

As requested, ECS Carolinas, LLP (ECS) has performed the laboratory testing on the proposed fill material (S-3) picked up from the above referenced project site in Maysville, North Carolina.

The sample was tested in accordance with test procedures ASTM D-698 entitled "Laboratory Compaction Characteristics of Soil Using Standard Effort". The Proctor curve for the sample is attached.

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

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COMPACTION TEST REPORT

Curve No.: S-3

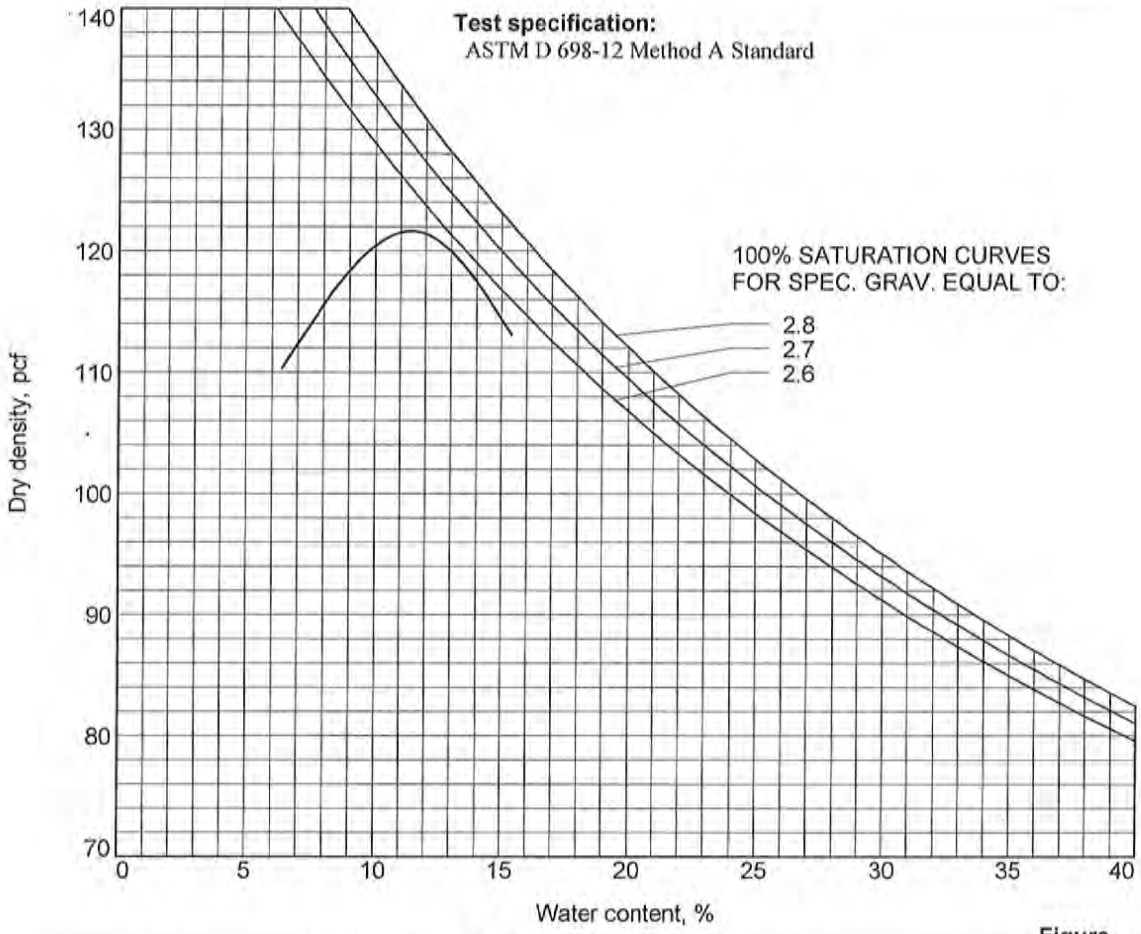
Project No.: 20747-A **Date:** 9/22/14
Project: C & D Landfill Cell Work
Client: Morton Trucking
Source of Sample: Backfill **Depth:** 0.00-0.00
Sample Number: S-3
Remarks:

MATERIAL DESCRIPTION

Description: Gray, Clayey Sand

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =** 2.60
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 121.6 pcf
Optimum moisture = 11.4 %



Figure

ECS Carolinas, LLP

Tested By: EG **Checked By:** KEL

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

October 9, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
	Permits:
	Location: **Hwy 17** **Maysville, NC**
ATTN: Mr. Tim Morton	

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes

ENCL:

As requested, ECS Carolinas, LLP (ECS) has performed the laboratory testing on the proposed clay liner fill material (S-4) picked up from the above referenced project site in Maysville, North Carolina.

The sample was tested in accordance with test procedures ASTM D-698 entitled "Laboratory Compaction Characteristics of Soil Using Standard Effort". The Proctor curve for the sample is attached.

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

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COMPACTION TEST REPORT

Curve No.: S-4

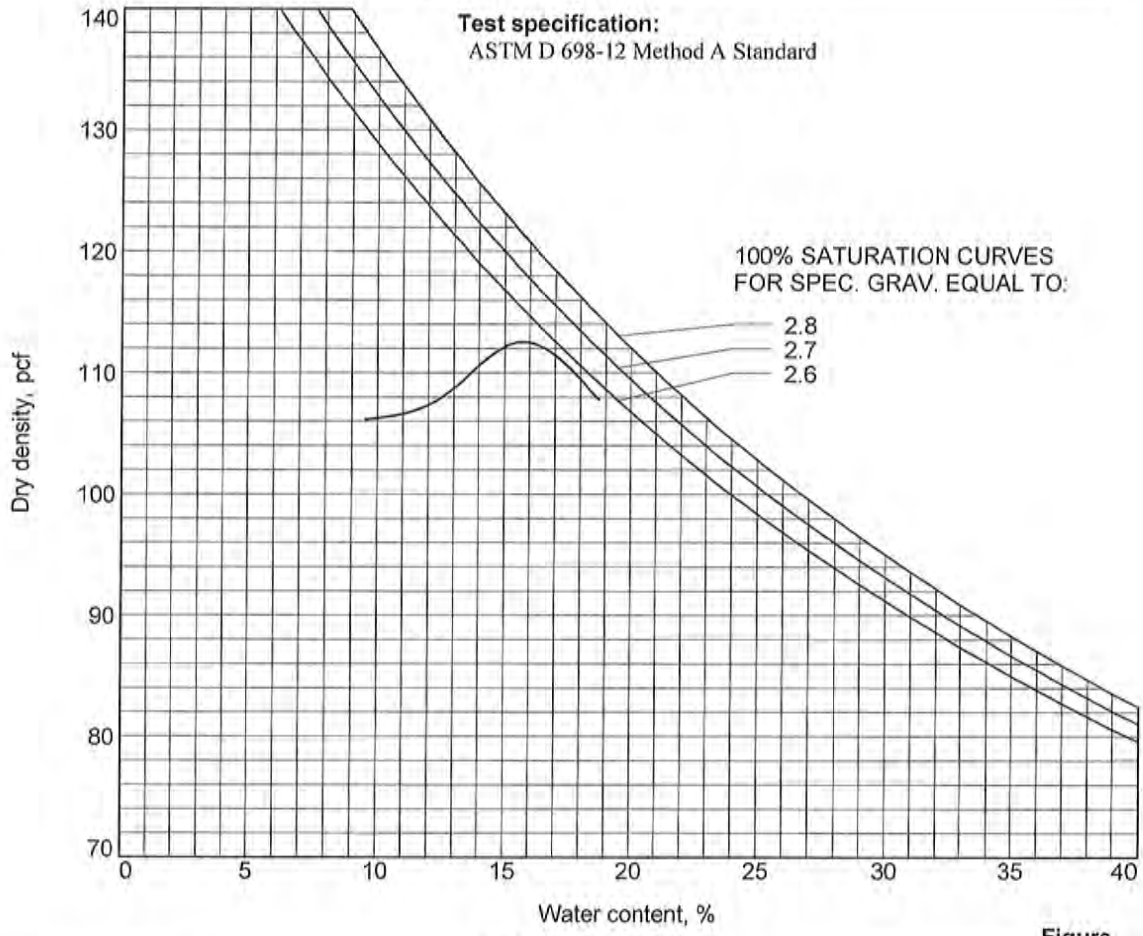
Project No.: 20747-A **Date:** 10/9/14
Project: C & D Landfill Cell Work
Client: Morton Trucking
Source of Sample: Clay Liner **Depth:** 0.00-0.00
Sample Number: S-4
Remarks:

MATERIAL DESCRIPTION

Description: Gray, Sandy Clay

Classifications - **USCS:** **AASHTO:**
Nat. Moist. = **Sp.G. =** 2.60
Liquid Limit = **Plasticity Index =**
% < No.200 =

TEST RESULTS
Maximum dry density = 112.6 pcf
Optimum moisture = 15.7 %



Figure

ECS Carolinas, LLP

Tested By: EG **Checked By:** KEL

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

October 26, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
	Permits:
	Location: **Hwy 17** **Maysville, NC**
ATTN: Mr. Tim Morton	

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 4 10/24/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	4
Day & Date	Friday 10/24/2014
Weather	73°/ Sunny
On-Site Time	8.00
Lab Time	0.50
Travel Time*	1.00
Total	9.50
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of	Arrival	Departure
	07:00A	03:00P

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to observe the placement and compaction of soils for Berm northwest area in the truck entrance. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear Density Gauge test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at the areas and depths tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor Method (ASTM D-698).

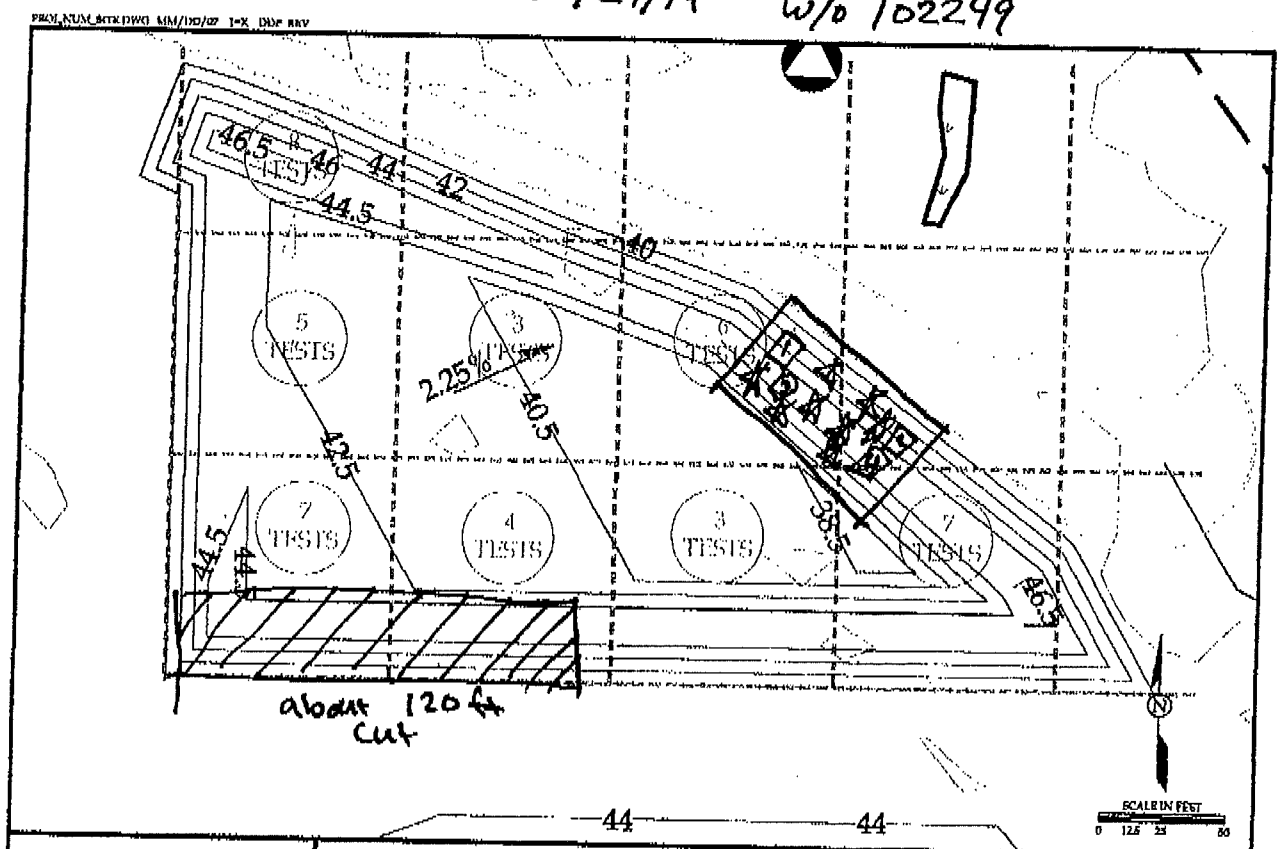
The Berm northwest area in the truck entrance will be finished on Monday. Also the final structural fill testing for the bottom will performed on this coming Monday.

120 linear feet of the berm on the west end going East was removed down to the 3 foot lift.

By **Robert E. de la Cour** 1700

1034546

Rob de la Cour 10/24/14 w/o 102249



ERM NC, INC.	STRUCTURAL FILL TESTING GREEN RECYCLING SOLUTIONS MAYSVILLE, NORTH CAROLINA	FIGURE 1

Key

[#] = Test Area

[////] = Cut Area

[..] = Fill Area

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D6938

Project No: 20747-A Project Name: C & D Landfill Cell work Date: 10/24/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

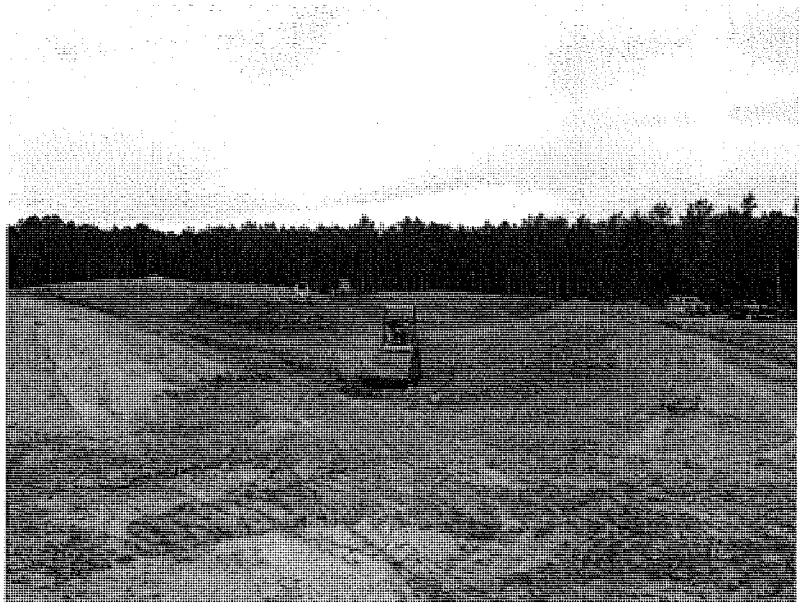
Test Method ASTM D6938			
Nuclear Gauge No. 19			
Make		Density Std	2779
Model		Moisture Std	850
Ser. No.	1671		

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-1	Very Dark Gray, Silty Sand	Standard Proctor Method (ASTM D-698)	110.30	13.00
S-2	Pale Gray, Fine to Medium Sand	Standard Proctor Method (ASTM D-698)	106.30	11.50
S-3	Gray, Clayey Sand	Standard Proctor Method (ASTM D-698)	121.60	11.40
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Test Data: Dry Density (pcf)	Test Data: Moisture Content (%)	Test Data: Percent Comp. (%)	P / F	Comments
1	DT	6	Berm northwest area in the truck entrance. Right s	1st/ 1ft	S-4	0.00	112.60	15.70	131.0	110.7	18.4	98.3	P	
2	DT	6	Berm northwest area in the truck entrance. Left si	1st/ 1ft	S-4	0.00	112.60	15.70	127.3	108.0	17.8	95.9	P	
3	DT	6	Berm northwest area in the truck entrance. Right s	2st/ 2ft	S-4	0.00	112.60	15.70	128.7	108.2	18.9	96.1	P	
4	DT	6	Berm northwest area in the truck entrance. Left si	2st/ 2ft	S-4	0.00	112.60	15.70	126.8	109.2	16.2	97.0	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ATTACHMENTS



Attachment No. 1
C&D Landfill Cell 1 Eastend looking West 10-24-14

Attachment No. 2
Tuck entrance C&D Landfill 10-24-14

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

October 24, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
	Permits:
	Location: **Hwy 17** **Maysville, NC**
ATTN: Mr. Tim Morton	

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 3 10/23/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	3
Day & Date	Thursday 10/23/2014
Weather	66°/ Sunny
On-Site Time	10.00
Lab Time	0.50
Travel Time*	1.23
Total	11.73
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* 40.00 Mileage* 50

Chargeable Items

Time of	Arrival	Departure
	07:00A	05:00P

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to observe the placement and compaction of soils for the cell bottom and berms. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear Density Gauge test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at the areas and depths tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor Method (ASTM D-698). The one failing test from the previous day was re-tested and passed today.

ECS was not present during the building of the berms until 10/22/14. The approximate suitability of the previously placed soils was checked by using the Dynamic Cone Penetrometer test equipment (ASTM STP-399). This was performed at two locations.

A density test was performed at the current grade of approximately 6 feet. Then a DCP test was performed at the same grade. This was done to correlate density to DCP values. We then performed a test at 1 foot intervals down through the fill to the original subgrade. The data from these tests are included for review by the Engineer for acceptance. The DCP data at location 600' was high due to the surface soils being dry and baked.

By **Robert E. de la Cour** 1700

1034498

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/23/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D6938			
Nuclear Gauge No. 19			
Make		Density Std	2782
Model		Moisture Std	850
Ser. No.	1671		

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-1	Very Dark Gray, Silty Sand	Standard Proctor Method (ASTM D-698)	110.30	13.00
S-2	Pale Gray, Fine to Medium Sand	Standard Proctor Method (ASTM D-698)	106.30	11.50
S-3	Gray, Clayey Sand	Standard Proctor Method (ASTM D-698)	121.60	11.40
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)	P / F	Comments
1	DT	6	On bottom in middle of cell	1 lift	S-4	0.00	112.60	15.70	128.0	107.0	19.6	95.0	P	
2	DT	6	On bottom in middle right of cell	1 lift	S-4	0.00	112.60	15.70	129.8	108.5	19.7	96.4	P	
3	DT	6	On bottom in middle left of cell	1 lift	S-4	0.00	112.60	15.70	127.2	111.7	13.9	99.2	P	
4	DT	6	On bottom in westend (backend) right of cell	2 lift	S-4	0.00	112.60	15.70	130.4	110.1	18.5	97.8	P	
5	DT	6	On bottom in westend (backend) middle of cell	2 lift	S-4	0.00	112.60	15.70	130.4	112.5	15.9	99.9	P	
6	DT	6	On bottom in westend (backend) left of cell	2 lift	S-4	0.00	112.60	15.70	131.2	112.3	16.9	99.7	P	
7	DT	6	On berm in westend (backend) left of cell/ retest	3 lift/ 3f	S-4	0.00	112.60	15.70	128.7	108.2	19.0	96.1	P	This is a retest of Berm at 3ft
8	DT	6	On bottom in middle right of cell	2 lift	S-4	0.00	112.60	15.70	129.2	111.3	16.1	98.8	P	
9	DT	6	On bottom in middle of cell	2 lift	S-4	0.00	112.60	15.70	131.5	112.7	16.7	100	P	
10	DT	6	On bottom in middle left of cell	2 lift	S-4	0.00	112.60	15.70	127.9	109.1	17.2	96.9	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

Field Compaction Summary, ASTM D6938

ECS CAROLINAS, LLP

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/23/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D6938			
Nuclear Gauge No. 19			
Make		Density Std	2782
Model		Moisture Std	850
Ser. No.	1671		

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data				P / F	Comments
									Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)		
11	DT	6	On Berm at 600 linear feet	6 ft	S-4	0.00	112.60	15.70	132.3	114.5	15.6	102	P	
12	DT	6	On Berm at 140 linear feet	6 ft	S-3	0.00	121.60	11.40	131.5	115.8	13.6	95.2	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ECS Carolinas, LLP
7211 Ogden Business Park, Suite 201
Wilmington, NC 28411
(910) 686-9114 Phone
(910) 686-9666 Fax

DYNAMIC CONE PENETROMETER TEST REPORT

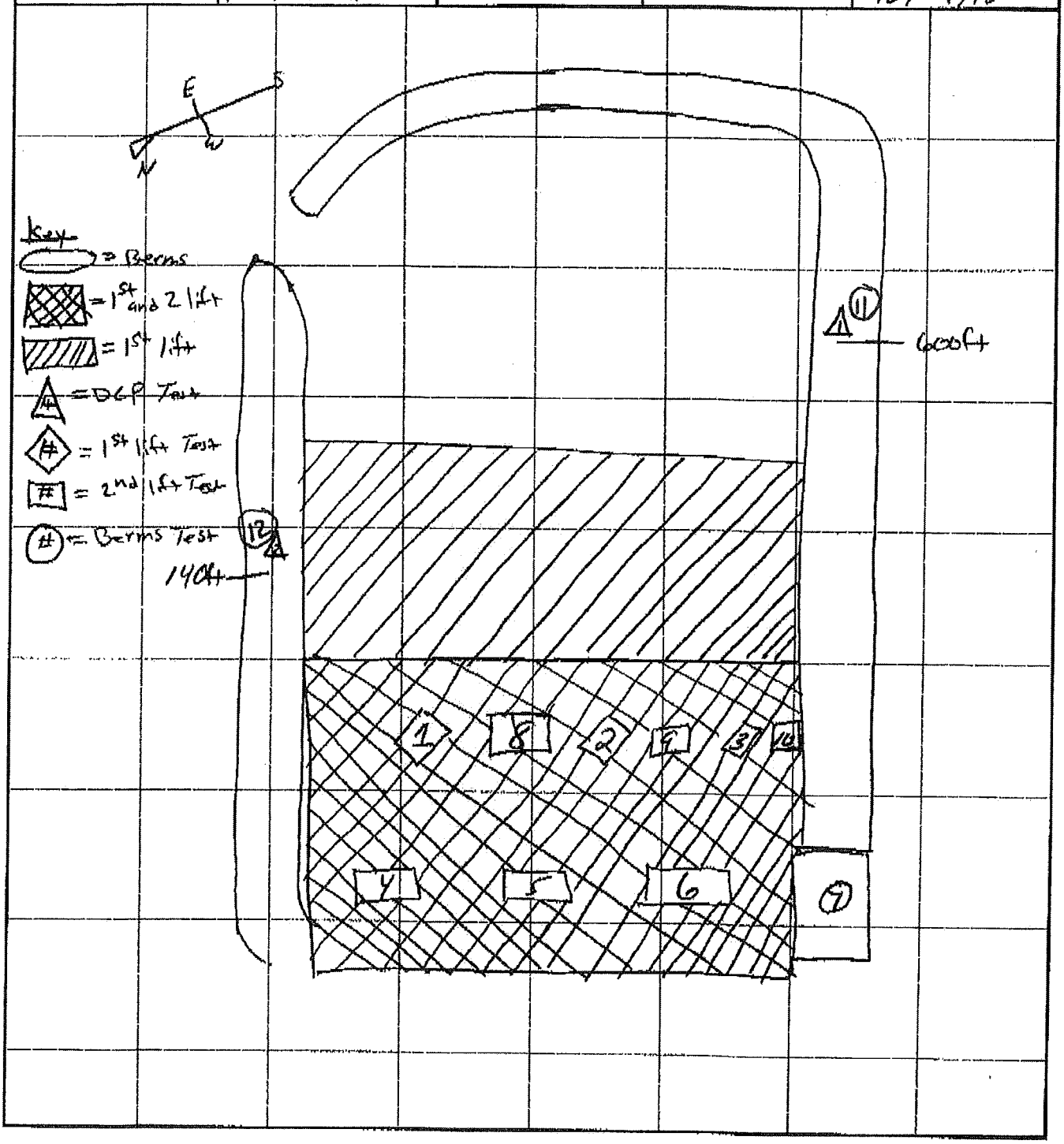
W/O 102182

Project: C & D Landfill	Fill or Native Material: Native Material	Average Criteria: blows for psf	
Project #: 20747-A	Weather/Temperature: 66° Sunny	Design Bearing For Column: psf	
Technician: Rob De la Cruz	Elevation Provided By:	Design Bearing For Wall: psf	
Date: 10/23/14	Bearing Preasure Provided By:	Design Bearing For Other: psf	

Test Location	Water Table Depth	Test Depth	Footing Dimensions	Penetrometer Blow Counts 1 3/4"	1 3/4"	1 3/4"	Average	Remarks/Soil Descriptions
140ft.		6ft		3	2	1	1.5	Gray, Clayey Sand
95.2%		5ft		4	3	3	3	
		4ft		3	4	6	5	
		3ft		4	5	4	4.5	
		2ft		14	9	6	7.5	
		1ft		12	15	16	15.5	
~~[illegible]~~		0		10	10	12	11	
101.6%	60ft	6		18	—	—	18	Gray, Sand Clay
		5		3	3	3	3	
		4		4	4	4	4	
		3		4	3	3	3	
		2		4	3	3	3	
		1		6	7	9	8	
		0		10	11	12	11	

10/24/2014 06:15 FAX 001

ECS	PROJECT: C & D Landfill		SHEET NO: 1
	TITLE: Density on berms and bottom of cell		PROJ. NO: 20747-A
			SCALE: NTS
	BY: Rob de la Cour	DATE:	APPROVED:	DATE: 10/24/15



ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

October 28, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
ATTN: Mr. Tim Morton	Permits: Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 5 10/27/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	5
Day & Date	Monday 10/27/2014
Weather	81°/ Sunny
On-Site Time	9.50
Lab Time	0.50
Travel Time*	1.00
Total	11.00
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of	Arrival	Departure
	07:00A	04:30P

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

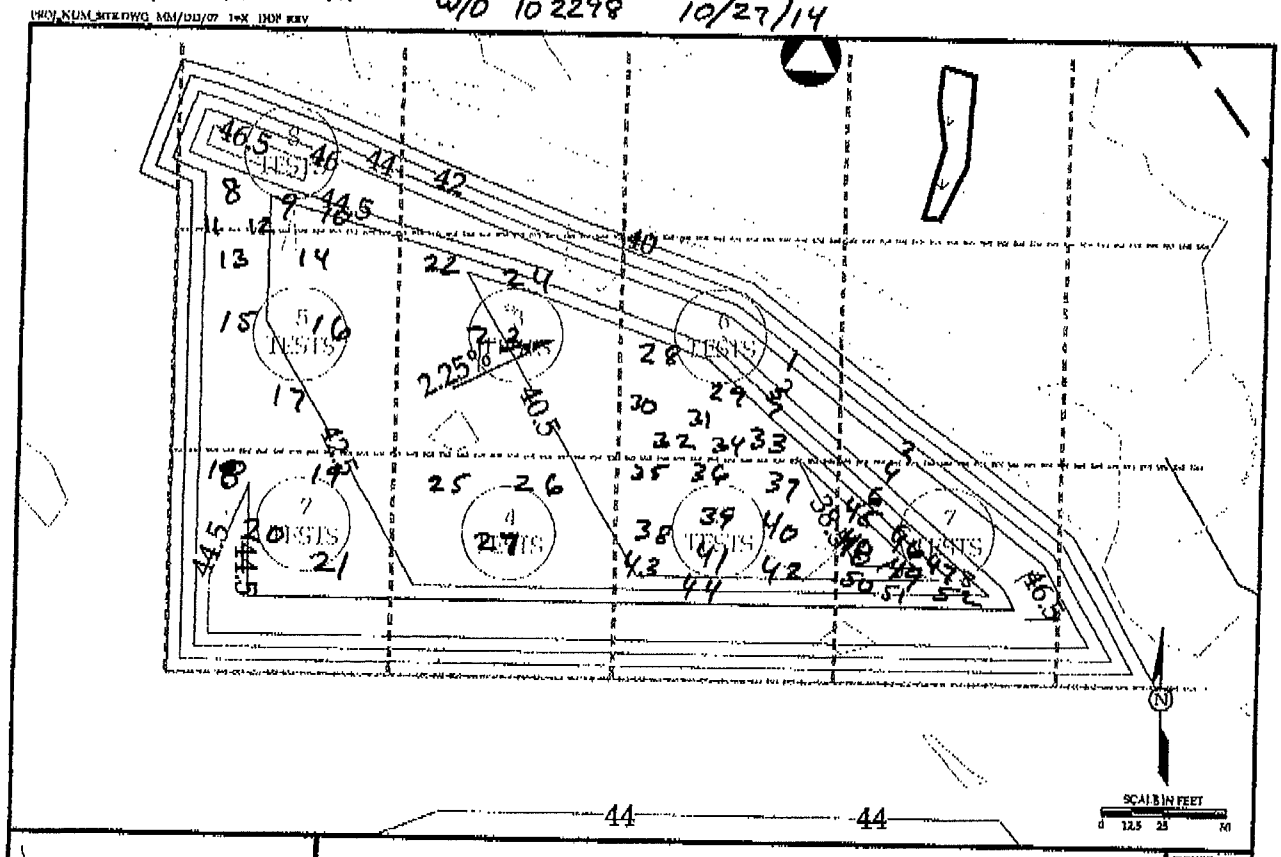
The undersigned arrived on site, as requested, to observe the placement and compaction of soils for the berm and bottom floor of cell. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear Density Gauge test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at the areas and depths tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor Method (ASTM D-698).

By **Robert E. de la Cour** 1800

1034704

Rob de la Cour W/O 102298 10/27/14



ERM NC, INC.	STRUCTURAL FILL TESTING GREEN RECYCLING SOLUTIONS MAYSVILLE, NORTH CAROLINA	FIGURE 1

Key
Number = Test

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A Project Name: C & D Landfill Cell work Date: 10/27/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3487
Model	3440	Moisture Std	879
Ser. No.	500		

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-1	Very Dark Gray, Silty Sand	Standard Proctor Method (ASTM D-698)	110.30	13.00
S-3	Gray, Clayey Sand	Standard Proctor Method (ASTM D-698)	121.60	11.40
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)	P / F	Comments
1	DT	6	Berm on 3rd lfit at 3 feet. on the right side.	3/ 3ft	S-4	0.00	112.60	15.70	119.6	108.5	10.2	96.4	P	
2	DT	6	Berm on 3rd lfit at 3 feet. on the left side.	3/ 3ft	S-4	0.00	112.60	15.70	126.9	108.6	16.8	96.4	P	
4	DT	6	Berm on 4th lfit at 4 feet. on the right side.	4/ 4ft	S-4	0.00	112.60	15.70	129.9	109.8	18.2	97.5	P	
5	DT	6	Berm on 4th lfit at 4 feet. on the left side.	4/ 4ft	S-4	0.00	112.60	15.70	129.9	109.4	18.8	97.2	P	
6	DT	6	Berm on 5th lfit at 5 feet(final lift). on the ri	5/ 5ft	S-4	0.00	112.60	15.70	125.9	107.4	17.3	95.4	P	
7	DT	6	Berm on 5th lfit at 5 feet(final). on the left si	5 / 5ft	S-4	0.00	112.60	15.70	127.3	108.8	17.0	96.6	P	
8	DT	6	NorthWest Bottom Floor	-1	S-4	0.00	112.60	15.70	130.2	111.3	17.0	98.8	P	
9	DT	6	NorthWest Bottom Floor	-1	S-4	0.00	112.60	15.70	129.7	112.0	15.8	99.5	P	
10	DT	6	NorthWest Bottom Floor	-1	S-4	0.00	112.60	15.70	125.8	108.8	15.7	96.6	P	
11	DT	6	NorthWest Bottom Floor	-1	S-4	0.00	112.60	15.70	130.0	111.7	16.4	99.2	P	
12	DT	6	NorthWest Bottom Floor	-1	S-4	0.00	112.60	15.70	127.2	108.0	17.8	95.9	P	
13	DT	6	West Bottom Floor	-1	S-4	0.00	112.60	15.70	129.2	112.4	14.9	99.8	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/27/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3487
Model	3440	Moisture Std	879
Ser. No.	500		

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data				P / F	Comments
									Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)		
14	DT	6	West Bottom Floor	-1	S-4	0.00	112.60	15.70	128.6	113.8	13.1	101	P	
15	DT	6	West Bottom Floor	-1	S-4	0.00	112.60	15.70	130.3	113.4	14.9	101	P	
16	DT	6	West Bottom Floor	-1	S-4	0.00	112.60	15.70	130.2	111.5	16.8	99.0	P	
17	DT	6	West Bottom Floor	-1	S-4	0.00	112.60	15.70	123.6	107.0	15.5	95.0	P	
18	DT	6	Southwest Bottom Floor	-1	S-4	0.00	112.60	15.70	129.3	111.2	16.2	98.8	P	
19	DT	6	Southwest Bottom Floor	-1	S-4	0.00	112.60	15.70	129.1	111.6	15.7	99.1	P	
20	DT	6	Southwest Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	129.1	110.2	17.1	97.9	P	
21	DT	6	Southwest Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	129.3	112.3	15.2	99.7	P	
22	DT	6	Northwest Middle Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	127.8	110.0	16.1	97.7	P	
23	DT	6	Northwest Middle Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	124.6	107.3	16.1	95.3	P	
24	DT	6	Northwest Middle Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	126.7	107.9	17.4	95.8	P	
25	DT	6	Southwest Middle Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	129.6	110.6	17.1	98.2	P	
26	DT	6	Southwest Middle Bottom Floor	Botto	S-4	0.00	112.60	15.70	127.5	109.3	16.6	97.1	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A Project Name: C & D Landfill Cell work Date: 10/27/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3487
Model	3440	Moisture Std	879
Ser. No.	500		

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)	P / F	Comments
				m Flo										
27	DT	6	Southwest Middle Bottom Floor	Botto m Flo	S-4	0.00	112.60	15.70	128.4	109.1	17.6	96.9	P	
28	DT	4	Northeast Middle Bottom floor	Botto m Flo	S-3	0.00	121.60	11.40	137.3	120.2	14.2	98.8	P	
29	DT	4	Northeast Middle Bottom floor	Botto m Flo	S-3	0.00	121.60	11.40	134.2	118.0	13.7	97.0	P	
30	DT	2	Northeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	124.6	107.0	16.5	97.0	P	
31	DT	2	Northeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	128.0	109.1	17.4	98.9	P	
32	DT	2	Northeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	129.1	111.8	15.4	101	P	
33	DT	2	Northeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	125.8	110.2	14.1	99.9	P	
34	DT	2	Northeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	127.0	109.3	16.2	99.1	P	
35	DT	2	Northeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	126.8	110.0	15.3	99.7	P	
36	DT	2	Northeast Middle Bottom floor	Botto	S-1	0.00	110.30	13.00	127.7	111.6	14.4	101	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/27/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3487
Model	3440	Moisture Std	879
Ser. No.	500		

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data				P / F	Comments
									Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)		
				m Flo										
37	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	128.3	113.2	13.3	103	P	
38	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	127.0	109.4	16.1	99.2	P	
39	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	126.2	109.5	15.3	99.3	P	
40	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	127.2	110.9	14.7	101	P	
41	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	125.4	109.3	14.7	99.1	P	
42	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	126.9	112.9	12.4	102	P	
43	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	130.5	112.1	16.4	102	P	
44	DT	2	Southeast Middle Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	129.7	112.6	15.2	102	P	
45	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	125.8	111.1	13.3	101	P	
46	DT	2	East Bottom floor	Botto	S-1	0.00	110.30	13.00	124.1	109.2	13.6	99.0	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/27/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3487
Model	3440	Moisture Std	879
Ser. No.	500		

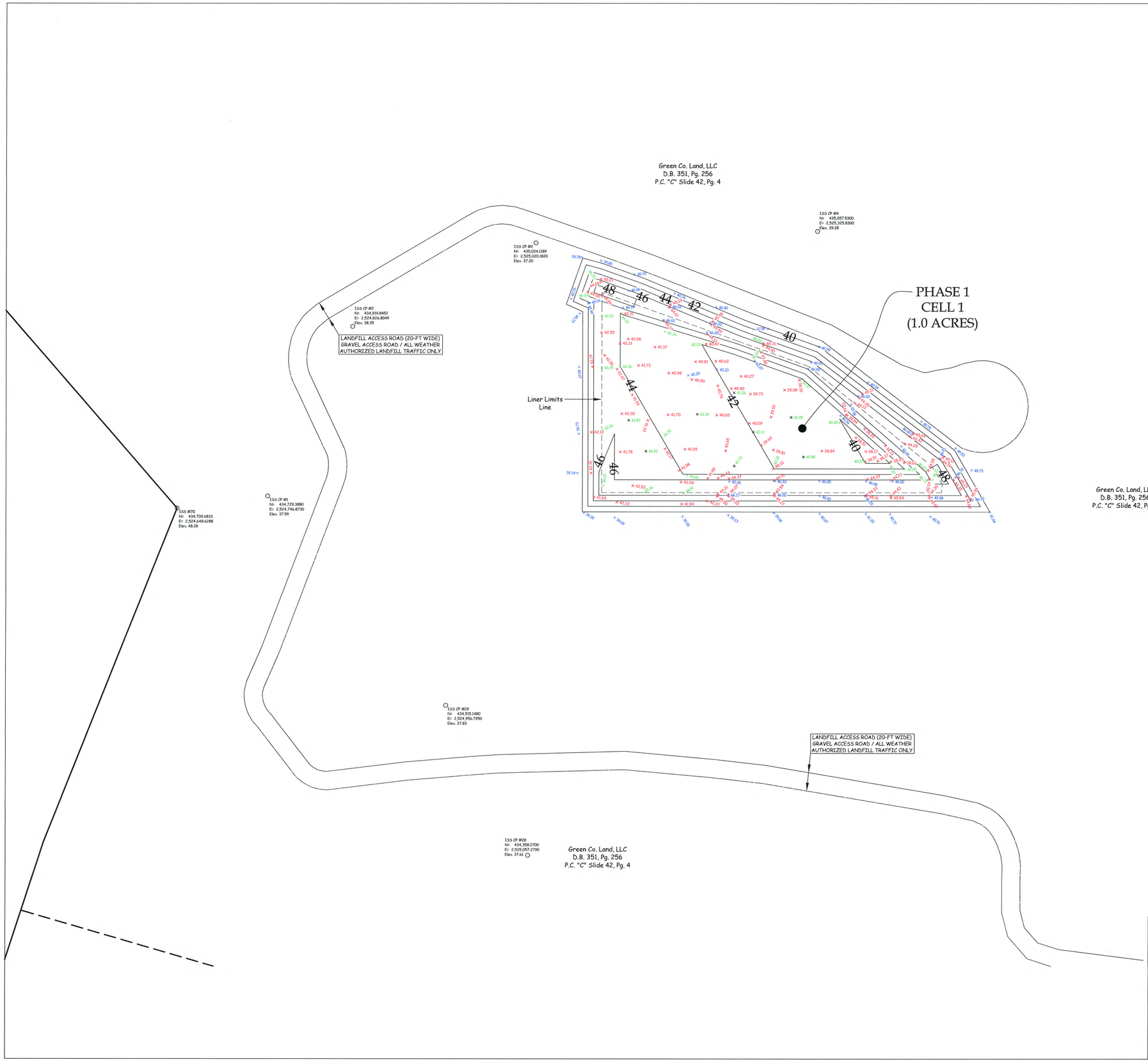
Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data				P / F	Comments
									Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)		
				m Flo										
47	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	123.5	107.5	15.0	97.5	P	
48	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	122.0	108.4	12.6	98.3	P	
49	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	126.9	110.0	15.4	99.7	P	
50	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	118.7	106.5	11.5	96.6	P	
51	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	124.4	105.4	18.0	95.6	P	
52	DT	2	East Bottom floor	Botto m Flo	S-1	0.00	110.30	13.00	123.8	108.1	14.6	98.0	P	

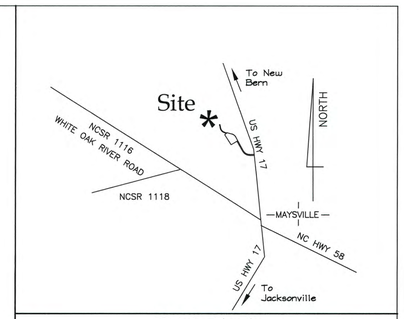
Test Mode: DT = Direct Transmission BS = Back Scatter

Appendix 2

Structural Fill / Subgrade As-Built Drawing

(Services provided by Parker & Associates, Inc.)





Vicinity Sketch

Not to Scale

As-Built Legend:

- 41.78 - Elevations shots taken 10/27/14 for base
- 42.23 - Elevations shots taken 11/12/14 for barrier layer
- 44.55 - Elevations shots taken 11/16/14 for barrier layer

CP - Control Point
D.B. - Deed Book
E - Easting
ISS - Iron Stake Set
N - Northing
PC - Plat Cabinet
Pg. - Page

NORTH CAROLINA PROFESSIONAL SEAL L-2884 LAND SURVEYOR EDWIN N. FOLEY

I, Edwin N. Foley, certify that this project was completed under my supervision, from an actual ground survey under my supervision; that the survey was completed on 10/27/14, 11/12/14, and again on 11/16/14; and all coordinates are based on GPS Grid North, NAD '83: 2007 Adjustment.

12/10/14

Edwin N. Foley, P.L.S., L-2884

Notes:

1. All distances are horizontal ground, U.S. survey feet.
2. Elevations per NAVD '88 Datum.
3. Horizontal per GPS Grid North, NAD '83, 2007 Adjustment.
4. No Register of Deed search done by or furnished to surveyor regarding deed or covenant restrictions.
5. Survey of Phase 1, Cell 1 on 10/27/14, 11/12/14, & 11/16/14.
6. The GPS portion of the boundary work was performed to third order, Class I, FGCC specifications, The coordinates were obtained by Real Time Kinematic Differential GPS Observations using Trimble Survey Grade 5800 GPS Unit, NCGS RTK Network Adjustments to NC Grid NAD' 83, 2007 Adjustments.
7. This map is prepared from an electronic overlay of the design plan prepared by ERM NC, INC. dated February 2012, and signed 1-6-14.

Topographic Survey Map

MAYSVILLE C&D LANDFILL
PHASE 1, CELL 1

Maysville Twp., Jones Co., North Carolina

For:
Green Recycling Solutions, LLC
11710 Hwy 17
Maysville, North Carolina 28555
(910) 938-5900

Parker & Associates, Inc.
Consulting Engineers – Land Surveyors – Land Planners
P.O. Box 976 – 28541-0976
306 New Bridge Street – 28540
Jacksonville, North Carolina
Phone (910) 455-2414 – Fax (910) 455-3441
Firm License Number: F-0100

Shaping Horizons

Date	Scale	Filename	Disk	Sheet No.	Designed	Drawn	Job No.
12/10/14	1"=50'	C&D worksheet.dwg	Acad 2402	1 of 1		JJS	S140507-5796

Z:\Land Projects 3\C&D Landfill Boundary-Control\.dwg\Phase 1 Cell 1 As-Built.dwg, 1/26/2015 9:07:21 AM, JJS

Appendix 3

Compacted Soil Liner Laboratory Bulk Testing

(Services provided by ECS Carolinas LLP)

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

October 24, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
ATTN: Mr. Tim Morton	Permits: Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

As requested, ECS Carolinas, LLP (ECS) has performed the laboratory testing on the proposed fill material (S-4) picked up from the above referenced project site in Maysville, North Carolina.

The sample was tested in accordance with test procedures in accordance with ASTM D-698 entitled "Laboratory Compaction Characteristics of Soil Using Standard Effort, Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D-4318), Classification of Soils for Engineering Purposes (ASTM D-2487), Amount of Material in Soils Finer Than the No. 200 Sieve (ASTM D-1140). The Proctor curve, atterberg limits, and the grain size analysis for the sample are attached.

Kris J. Stamm
Branch Manager/Principal

Harry Slater, Jr.
Project Manager

This report (and any included attachments) shall not be reproduced, except in full, without the prior written approval of ECS.

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	11.3	28.8	24.3	35.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	100.0		
#10	99.8		
#20	98.5		
#40	88.5		
#60	78.0		
#100	67.6		
#200	59.7		
0.0309 mm.	52.0		
0.0200 mm.	46.9		
0.0118 mm.	41.7		
0.0085 mm.	39.1		
0.0061 mm.	36.5		
0.0043 mm.	34.7		
0.0030 mm.	32.8		
0.0013 mm.	29.5		

* (no specification provided)

Soil Description

Gray, Sandy Lean CLAY

Atterberg Limits

PL= 17 LL= 37 PI= 20

Coefficients

D_{90}= 0.4615 D_{85}= 0.3529 D_{60}= 0.0779
D_{50}= 0.0259 D_{30}= 0.0015 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

F.M.=0.57

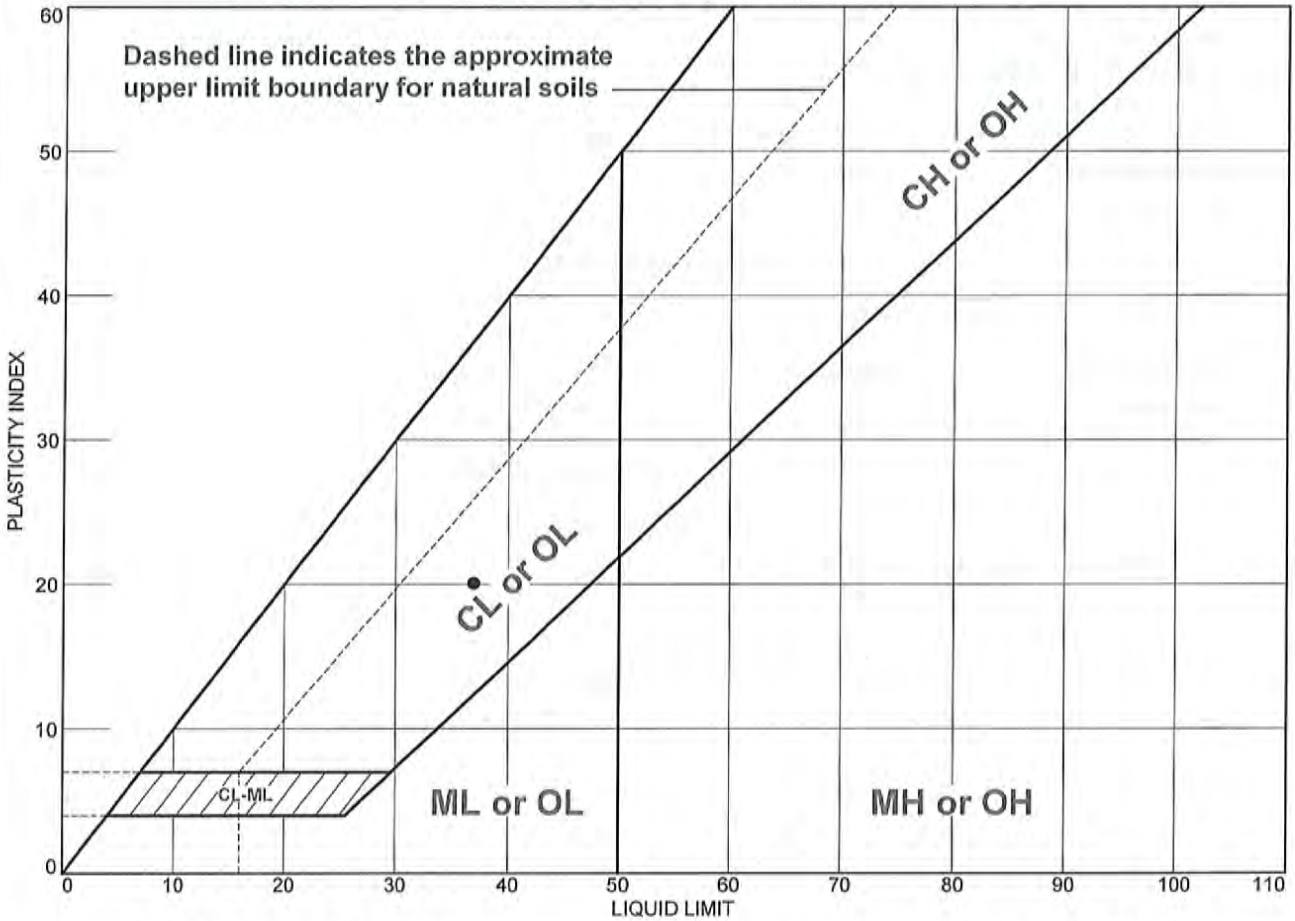
Source of Sample: Clay Liner **Depth:** 0.00-1.00
Sample Number: S-4 **Date:** 10/24/14

ECS CAROLINAS, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Client: Morton Trucking
Project: C & D Landfill Cell work
Project No: 20747-A **Figure**

Tested By: KEL

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray, Sandy Lean CLAY	37	17	20	88.5	59.7	CL

Project No. 20747-A **Client:** Morton Trucking

Project: C & D Landfill Cell work

●**Source of Sample:** Clay Liner **Depth:** 0.00-1.00 **Sample Number:** S-4

Remarks:

ECS CAROLINAS, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666

Figure

Tested By: KEL

COMPACTION TEST REPORT

Curve No.: S-4

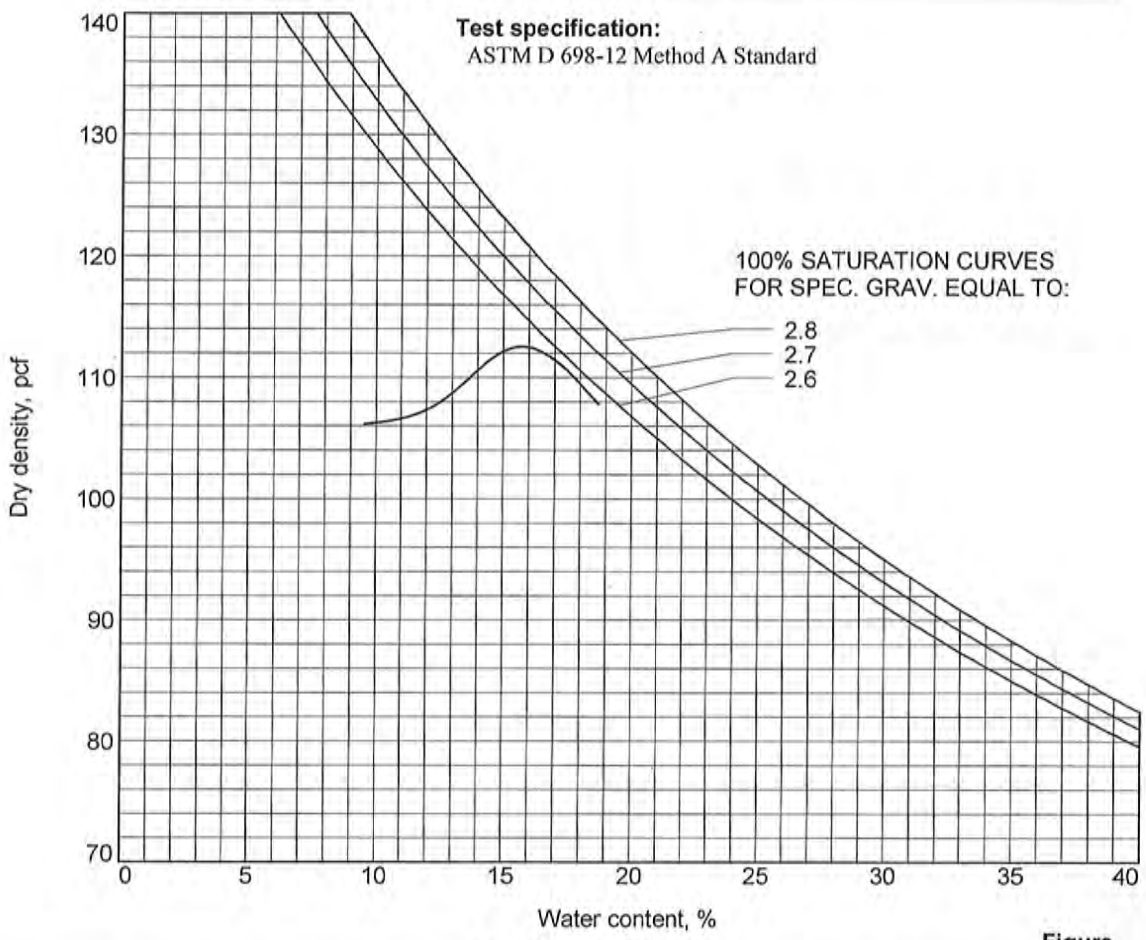
Project No.: 20747-A **Date:** 10/9/14
Project: C & D Landfill Cell work
Client: Morton Trucking
Source of Sample: Clay Liner **Depth:** 0.00-1.00
Sample Number: S-4
Remarks:

MATERIAL DESCRIPTION

Description: Gray, Sandy Lean CLAY

Classifications - **USCS:** CL **AASHTO:** A-6(9)
Nat. Moist. =
Liquid Limit = 37
Sp.G. = 2.60
Plasticity Index = 20
% < No.200 = 59.7 %

TEST RESULTS
Maximum dry density = 112.6 pcf
Optimum moisture = 15.7 %



Figure

ECS Carolinas, LLP

Tested By: EG **Checked By:** KEL

ECS CAROLINAS, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

Letter of Transmittal

Date: October 16, 2014

To:

Mr. Curtis Morton
Morton Trucking
121 Garnett Lane
Jacksonville, NC 28546

Re: Hydraulic Conductivity Testing
ECS Job # 22:20747-A — C & D Landfill Cell work

We are enclosing:

- [X] Attached
- [ ] Under separate cover via _____ the following items:
- [X] Reports [ ] Prints [ ] Boring Logs [ ] Specifications
- [ ] _____

These are transmitted:

[ ] For Approval [X] For Your Use [ ] As Requested [ ] For Review & Comment

Remarks:

Attached you will find the results of the laboratory testing perfomed on a sample of material proposed for use as a clay liner obtained from the above referenced project site.
Testing was conducted in accordance with ASTM D698 "Laboratory Compaction Characteristics of Soil using Standard Effort" and ASTM D5084 "Hydraulic Conductivity of Saturated Pourous Materials using a Flexible Wall Permeameter"

The standard proctor and hydraulic conductivity results are attached.

Kenneth E. Leimer, BA Env. Science
Lab Manager

MEASUREMENT OF HYDRAULIC CONDUCTIVITY USING A FLEXIBLE WALL PERMEAMETER
ASTM D5084 METHOD C

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666
www.ecslimited.com

PROJECT INFORMATION

NAME: C&D Landfill Cell Work
NUMBER: 20747-A
DATE: 10/15/2014
ENGINEER:
Remarks:

SAMPLE INFORMATION

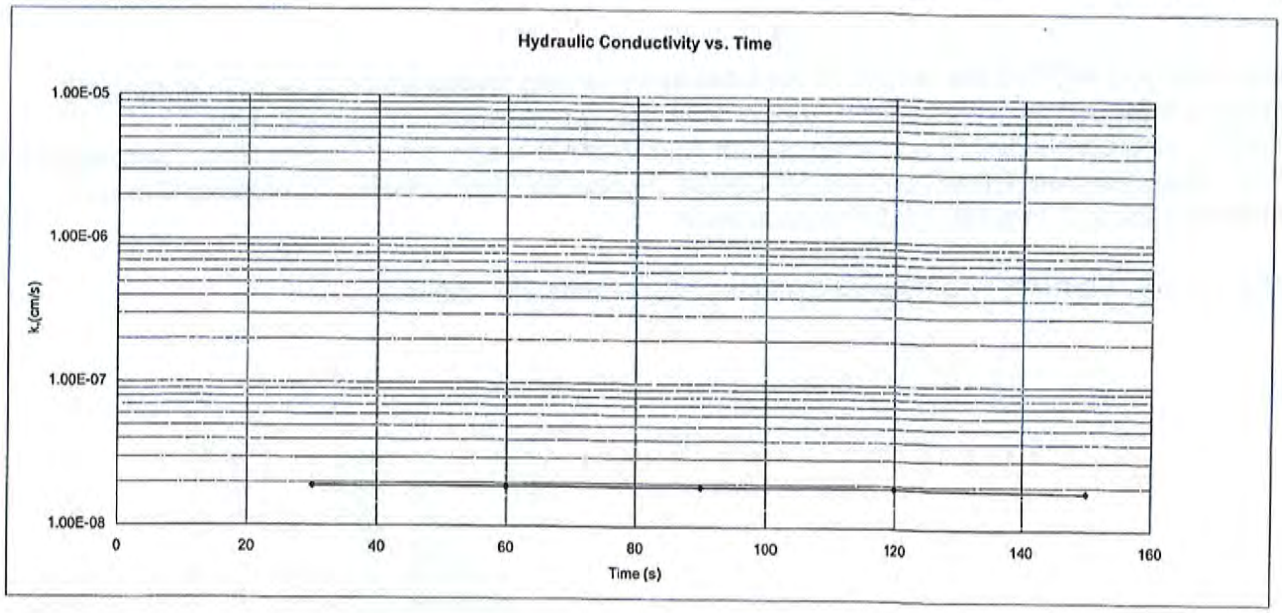
DESCRIPTION: Gray, Sandy Clay
SOURCE: Morton Pit
DEPTH: Tube: N/A Sample: S-4
PREPARATION: Remolded to 95% MDD per ASTM D698

Sample Properties	Initial	Final
Diameter (in)	2.871	2.886
Height (in)	5.999	6.066
Area (in²)	6.469	6.540
Volume (ft³)	0.0225	0.0230
Mass (g)	1283.25	1323.44
Water Content (%)	17.7%	21.1%
Dry Density (pcf)	107.0	104.8
Saturation (%)	89%	100%

Testing Data		
Cell Pressure (psi)	70	Specific Gravity (assumed) 2.6
Base Pressure / Sample Pressure (psi)	67	Area of Burette Tubes (cm²) 0.881
Top Pressure (psi)	60	Permeant Liquid Drinking Water

Test Results
Hydraulic Conductivity (k) (cm/sec) 1.84E-08
(k) (cm/sec) @ 20.0°C
1.81E-08

DATE	TIME	READINGS (Inflow)	READINGS (Outflow)	ELAPSED TIME (sec)	TOTAL ELAPSED TIME	OUTFLOW/INFLOW RATIO	HYDRAULIC CONDUCTIVITY (k)
10/14/2014	14:00:00	3.0	23.0	0	0	0.0	
10/14/2014	14:30:00	3.5	22.5	1800	1800	1.0	1.89E-08
10/14/2014	15:00:00	4.0	22.0	1800	3600	1.0	1.89E-08
10/14/2014	15:30:00	4.5	21.5	1800	5400	1.0	1.89E-08
10/14/2014	16:00:00	5.0	21.0	1800	7200	1.0	1.89E-08
10/14/2014	16:30:00	5.4	20.6	1800	9000	1.0	1.81E-08
10/14/2014	17:00:00	5.8	20.2	1800	10800	1.0	1.76E-08
10/14/2014	17:30:00	6.3	19.7	1800	12600	1.0	1.78E-08
						AVERAGE	1.84E-08



Appendix 4

Compacted Soil Liner Field Density Testing

(Services provided by ECS Carolinas LLP)

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

November 6, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
ATTN: Mr. Tim Morton	Permits: Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 9 11/04/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	9
Day & Date	Tuesday 11/04/2014
Weather	62°/ Sunny
On-Site Time	3.50
Lab Time	0.50
Travel Time*	2.00
Total	6.00
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of	Arrival	Departure
	08:30A	12:00P

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived onsite, as requested, to perform compaction testing for the cell bottom. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear Method (ASTM D 6938) to check the compaction of the soil, compaction tests at the areas tested, met the project requirements of 95 percent of the maximum dry density as determined in our laboratory using the Standard Proctor Method (ASTM D-698) except for two tests 5 & 6 at the west side of the lift tested. The general contractor's representative Paul Murphy was notified and it was recommended to scarify the west side to allow the material to dry. Retests of this area will be performed at a later date.

By **Brett L. Folsom, — CMT Project Manager** 1800

1035162

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

October 31, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
ATTN: Mr. Tim Morton	Permits: Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 7 10/31/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	**22:20747-A**
Report No.	**7**
Day & Date	**Friday 10/31/2014**
Weather	**66°/ Sunny**
On-Site Time	**8.00**
Lab Time	**0.50**
Travel Time*	**1.00**
Total	**9.50**
Re Obs.Time	**0.00**

Project	**C & D Landfill Cell work**
Location	**Maysville, NC**
Client	**Morton Trucking - Tim Morton**
Contractor	**Morton Trucking - Jill Howard**

Remarks

Trip Charges* Tolls/Parking* Mileage* **50**

Chargeable Items

Time of	Arrival	Departure
	08:00A	**04:00P**

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to test the compaction of soils for the first lift of clay for the cell bottom. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear Density Gauge test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at three areas tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor Method (ASTM D-698). The majority of the areas did not meet the requirements, they were above optimum moisture content.

By **Robert E. de la Cour** 1800

1034903

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/30/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3474
Model	3440	Moisture Std	879
Ser. No.	500		

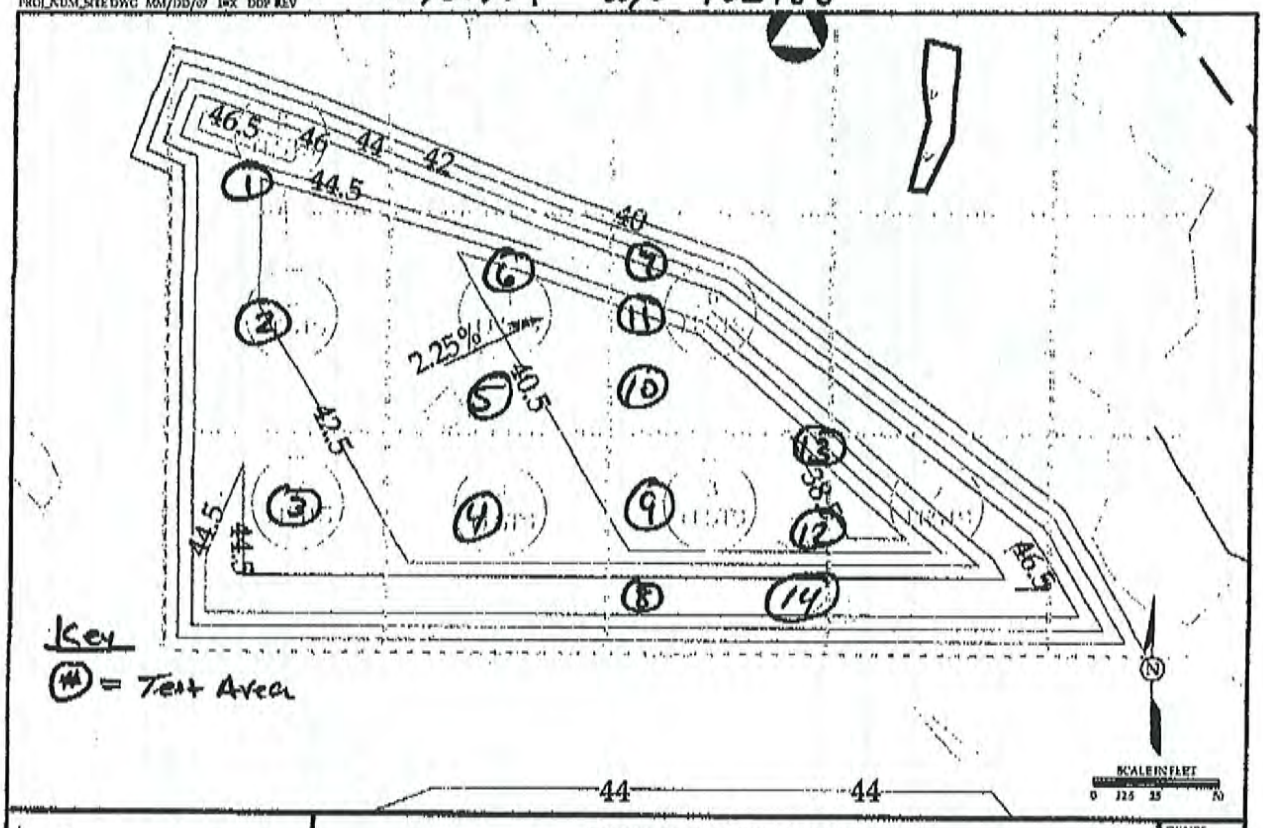
Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-3	Gray, Clayey Sand	Standard Proctor Method (ASTM D-698)	121.60	11.40
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Test Data: Dry Density (pcf)	Test Data: Moisture Content (%)	Test Data: Percent Comp. (%)	P / F	Comments
1	DT	4	Bottom of cell Northwest area	6in lift	S-4	0.00	112.60	15.70	128.5	107.2	19.8	95.2	P	
2	DT	4	Bottom of cell West area	6in lift	S-4	0.00	112.60	15.70	127.9	109.2	17.1	97.0	P	
3	DT	4	Bottom of cell Southwest area	6in lift	S-4	0.00	112.60	15.70	127.2	108.7	17.0	96.5	P	
4	DT	4	Bottom of cell Southwest middle area	6in lift	S-4	0.00	112.60	15.70	127.1	108.2	17.4	96.1	P	
5	DT	4	Bottom of cell West middle area	6in lift	S-4	0.00	112.60	15.70	127.6	107.4	18.8	95.4	P	
6	DT	4	Bottom of cell Northwest middle area	6in lift	S-4	0.00	112.60	15.70	131.1	115.9	13.1	103	P	
7	DT	4	On top of North facing berm at 300 feet.	6in lift	S-4	0.00	112.60	15.70	126.6	107.6	17.6	95.6	P	
8	DT	4	On top of South facing berm at 600 feet.	6in lift	S-4	0.00	112.60	15.70	131.1	110.0	19.2	97.7	P	
9	DT	4	Bottom of cell Southeast middle area	6in lift	S-4	0.00	112.60	15.70	129.3	109.7	17.9	97.4	P	
10	DT	4	Bottom of cell East middle area	6in lift	S-4	0.00	112.60	15.70	125.1	108.3	15.5	96.2	P	
11	DT	4	Bottom of cell Northeast middle area	6in lift	S-4	0.00	112.60	15.70	130.4	111.6	16.8	99.1	P	
12	DT	4	Bottom of cell East area	6in lift	S-4	0.00	112.60	15.70	126.6	109.7	15.5	97.4	P	
13	DT	4	Bottom of cell East area	6in lift	S-3	0.00	121.60	11.40	133.5	117.3	13.8	96.5	P	
14	DT	4	On top of South facing berm at 600 feet. 2nd lift	2/ 12in	S-4	0.00	112.60	15.70	127.2	107.1	18.8	95.1	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

Robert de la Cour 10/31/14 w/o 102458

PROJ_NUM_SITE DWG MM/DD/07 IWX DDP REV



ERM NC, INC.	STRUCTURAL FILL TESTING GREEN RECYCLING SOLUTIONS MAYSVILLE, NORTH CAROLINA	FIGURE 1

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

November 1, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
ATTN: Mr. Tim Morton	Permits: Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 8 10/30/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	8
Day & Date	Thursday 10/30/2014
Weather	66°/ Sunny
On-Site Time	7.75
Lab Time	0.50
Travel Time*	0.70
Total	8.95
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of	Arrival	Departure
	07:00A	02:45P

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to observe the placement and compaction of soils for the clay liner at the bottom of the cell and the berm. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear Density Gauge test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at the areas and depths tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor Method (ASTM D-698).

By **Robert E. de la Cour** 1700

1034972

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D-6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 10/31/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Robert E. de la Cour

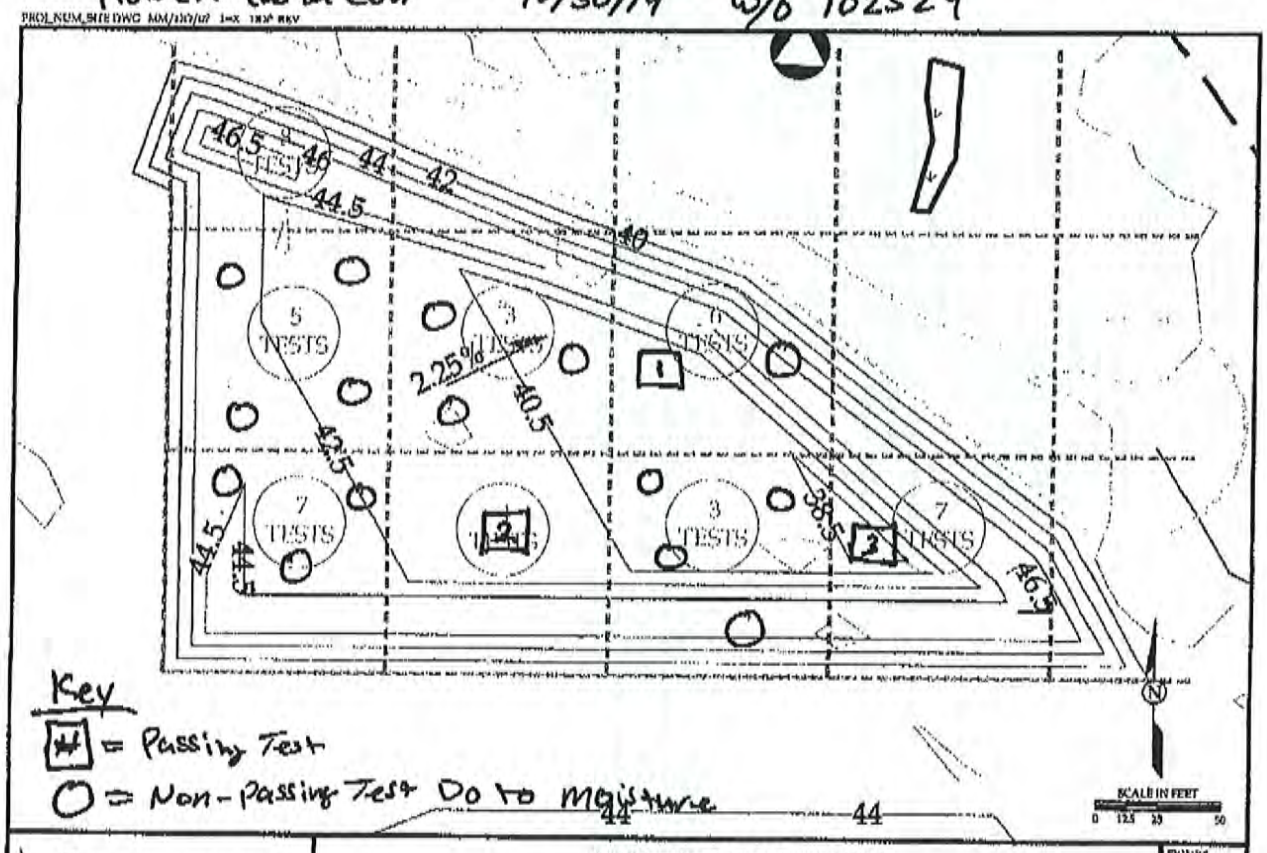
Test Method ASTM D-6938			
Nuclear Gauge No. 11			
Make	Troxler	Density Std	3492
Model	3440	Moisture Std	878
Ser. No.	500		

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Test Data: Dry Density (pcf)	Test Data: Moisture Content (%)	Test Data: Percent Comp. (%)	P / F	Comments
1	DT	4	Bottom floor of cell, Northeast middle.	6in lift	S-4	0.00	112.60	15.70	131.0	111.4	17.6	98.9	P	
2	DT	4	Bottom floor of cell, Southwest middle.	6in lift	S-4	0.00	112.60	15.70	128.9	107.5	19.9	95.5	P	
3	DT	4	Bottom floor of cell, East side of cell.	6in lift	S-4	0.00	112.60	15.70	129.5	115.1	12.5	102	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

Robert de la Cour 10/30/14 w/o 102524



ERM	ERM NC, INC.	STRUCTURAL FILL TESTING GREEN RECYCLING SOLUTIONS MAYSVILLE, NORTH CAROLINA	FIGURE 1

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

November 7, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
ATTN: Mr. Tim Morton	Permits: Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 11 11/05/2014

Kris J. Stamm
Branch Manager/Principal

NOV 6 2014

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	11
Day & Date	Wednesday 11/05/2014
Weather	50°/ Cloudy
On-Site Time	2.00
Lab Time	0.50
Travel Time*	1.00
Total	3.50
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of Arrival 08:00A Departure 10:00A

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to check the compaction of soils for the western and eastern parts of the cell bottom and the northern berm. Please see the attached sketch for the approximate density test locations.

Utilizing the Nuclear test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at the areas and depths tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor method ASTM D-698, except the re-tests at locations 1 and 2 and the first test at location 3.

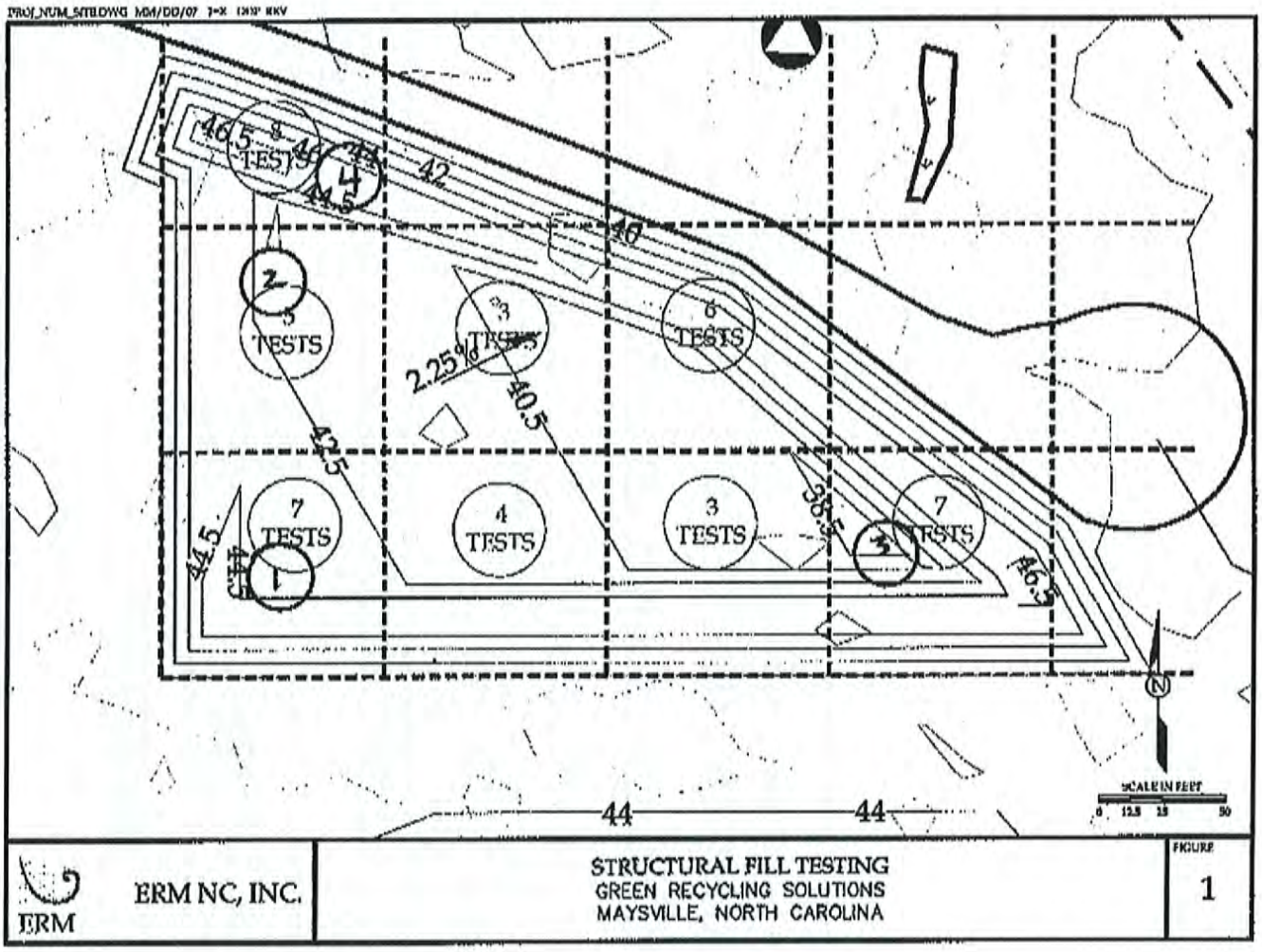
The 3 failing areas did not pass due to high moisture content.

By **Joe M. Sonnier** 1700

1035236

C&D Landfill Cell Work Density Testing Joe Sannier 11/5/14 Project# 20747-A

W/O# 102708



2 Density Test Locations

ECS CAROLINAS, LLP

Field Compaction Summary, ASTM D6938

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 11/05/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Joe M. Sonnier

Test Method ASTM D6938			
Nuclear Gauge No. 18			
Make		Density Std	2914
Model		Moisture Std	807
Ser. No.	1204		

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Test Data: Dry Density (pcf)	Test Data: Moisture Content (%)	Test Data: Percent Comp. (%)	P / F	Comments
1	DT	6	Western part of the cell	2nd lift,	S-4	0.00	112.60	15.70	126.1	104.2	20.9	92.5	F	retest
2	DT	6	Western part of the cell	2nd lift,	S-4	0.00	112.60	15.70	122.7	99.6	23.2	88.5	F	retest
3	DT	6	Eastern part of the cell	3rd lift,	S-4	0.00	112.60	15.70	118.2	96.5	22.5	85.7	F	
4	DT	6	Northern berm	2nd lift,	S-4	0.00	112.60	15.70	116.9	108.1	8.1	96.0	P	

Test Mode: DT = Direct Transmission BS = Back Scatter

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

November 12, 2014

Morton Trucking
121 Garnett Lane
Jacksonville, NC 28546

ATTN: Mr. Tim Morton

RE: **C & D Landfill Cell work**

ECS Job # **22:20747-A**

Permits:
Location: **Hwy 17**
Maysville, NC

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 12 11/10/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	12
Day & Date	Monday 11/10/2014
Weather	41°/ Sunny
On-Site Time	2.50
Lab Time	0.50
Travel Time*	1.00
Total	4.00
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of Arrival 07:30A Departure 10:00A

* Travel time and mileage will be billed in accordance with the contract.

Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to check the compaction of the final lift of the clay liner for cell #1. Please see the attached sketch for the approximate density test locations.

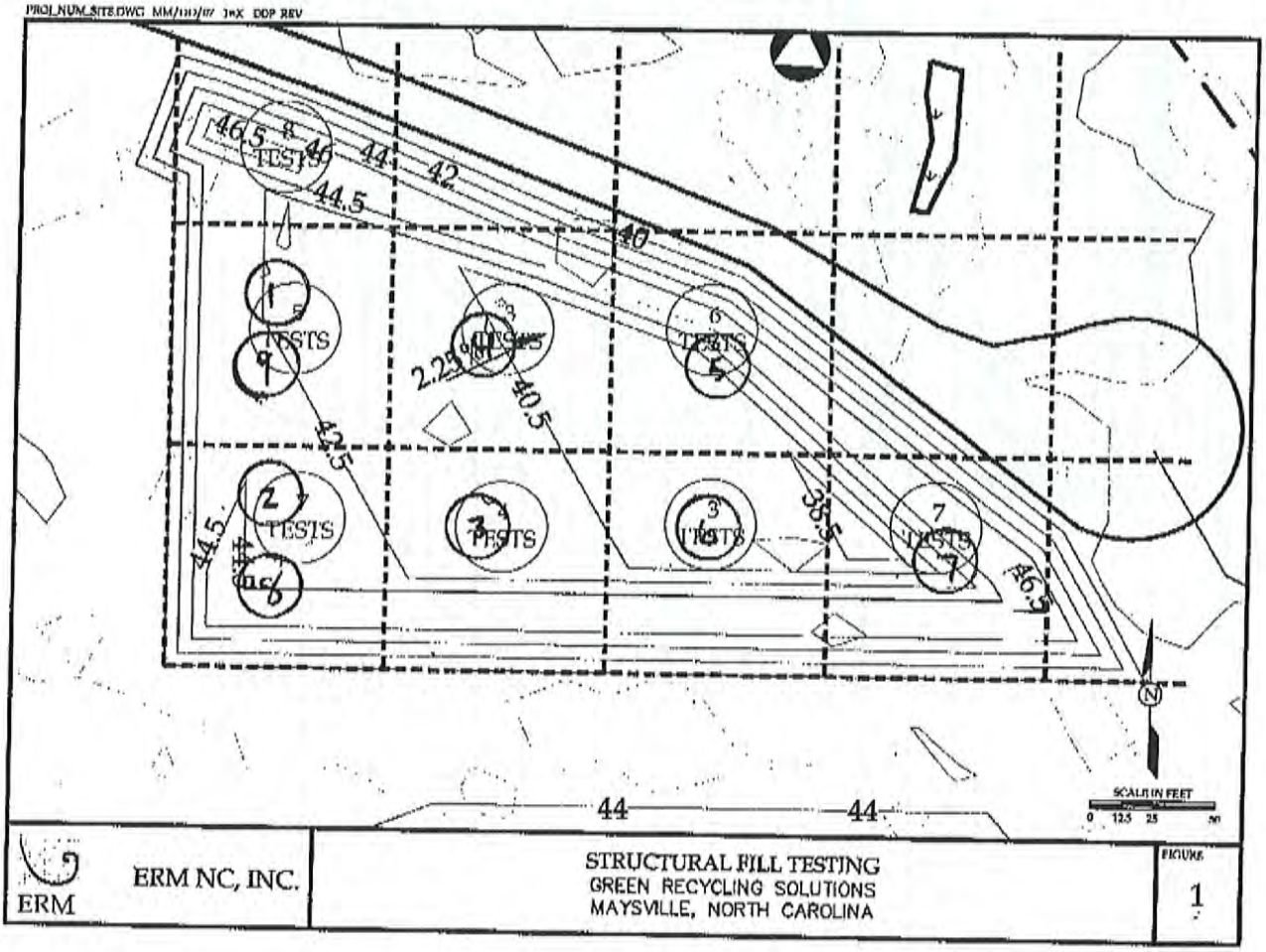
Utilizing the Nuclear test method (ASTM D-6938) to check the compaction of soils; test results indicated that the compacted material, at the areas and depths tested, met the project requirements of 95% of the maximum dry density as obtained in our laboratory using the Standard Proctor method ASTM D-698. Tests 7, 8, and 9 were retests from previously failing days.

By **Joe M. Sonnier** 1700

1035638

C&D Landfill Cell Work Joe Sonnier 11/10/14 Density Testing w/o# 102872 Job# 20747-A

◯ = Density Test Locations



ERM ERM NC, INC.	STRUCTURAL FILL TESTING GREEN RECYCLING SOLUTIONS MAYSVILLE, NORTH CAROLINA	FIGURE 1

Field Compaction Summary, ASTM D6938

ECS CAROLINAS, LLP

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 11/10/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Joe M. Sonnier

Test Method ASTM D6938			
Nuclear Gauge No. 11			
Make		Density Std	3476
Model		Moisture Std	867
Ser. No.	500		

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
S-4	Gray, Sandy Clay	Standard Proctor Method (ASTM D-698)	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data: Wet Density (pcf)	Test Data: Dry Density (pcf)	Test Data: Moisture Content (%)	Test Data: Percent Comp. (%)	P / F	Comments
1	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	122.9	107.7	14.1	95.6	P	
2	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	122.7	107.2	14.5	95.2	P	
3	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	131.5	115.8	13.6	103	P	
4	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	125.1	107.7	16.1	95.6	P	
5	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	127.2	110.3	15.4	98.0	P	
6	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	129.1	112.4	14.8	99.8	P	
7	DT	6	Cell #1	3rd lift,	S-4	0.00	112.60	15.70	129.1	112.8	14.5	100	P	retest
8	DT	6	Cell #1	2nd lift,	S-4	0.00	112.60	15.70	134.4	115.1	16.8	102	P	retest
9	DT	6	Cell #1	2nd lift,	S-4	0.00	112.60	15.70	129.0	112.0	15.2	99.5	P	retest

Test Mode: DT = Direct Transmission BS = Back Scatter

Field Compaction Summary, ASTM D6938

ECS CAROLINAS, LLP

Project No: 20747-A

Project Name: C & D Landfill Cell work

Date: 11/04/14

Client: Morton Trucking

Contractor: Morton Trucking

Technician: Brett L. Folsom

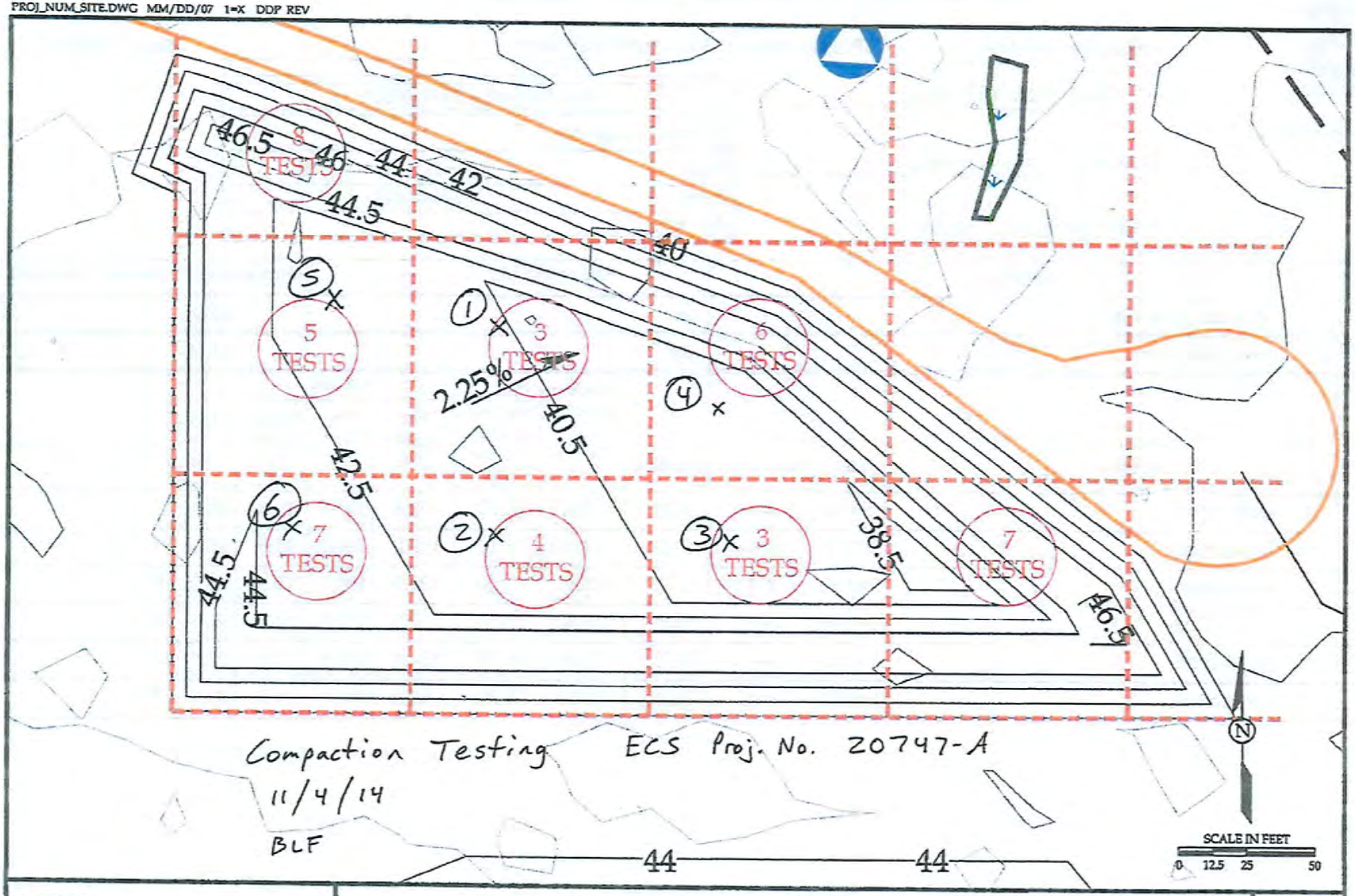
Test Method ASTM D6938			
Nuclear Gauge No.			
Make		Density Std	0
Model		Moisture Std	0
Ser. No.			

Sample No.	Description	Proctor Method	Uncorrected Max. Density	Uncorrected Opt. MC
s-2	gray fine sandy clay	std	106.30	11.50
s-4	gray sandy clay	std	112.60	15.70

Test No.	Test Mode	Probe Depth (in.)	Station / Location	Lift / Elev	Sample No.	% Oversize	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)	Test Data				P / F	Comments
									Wet Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Percent Comp. (%)		
1	DT	6	cell bottom	2nd lift	s-4	0.00	112.60	15.70	128.5	107.4	19.6	95.4	P	
2	DT	6	cell bottom	2nd lift	s-4	0.00	112.60	15.70	128.2	107.8	18.9	95.7	P	
3	DT	6	cell bottom	2nd lift	s-4	0.00	112.60	15.70	128.3	109.1	17.6	96.9	P	
4	DT	6	cell bottom	2nd lift	s-4	0.00	112.60	15.70	128.5	107.7	19.3	95.6	P	
5	DT	6	cell bottom	2nd lift	s-4	0.00	112.60	15.70	124.8	102.6	21.6	91.1	F	
6	DT	6	cell bottom	2nd lift	s-4	0.00	112.60	15.70	125.3	103.1	21.5	91.6	F	

Test Mode: DT = Direct Transmission BS = Back Scatter

PROJ_NUM_SITE.DWG MM/DD/07 1=X DDP REV



ERM

ERM NC, INC.

STRUCTURAL FILL TESTING
GREEN RECYCLING SOLUTIONS
MAYSVILLE, NORTH CAROLINA

FIGURE
1

Appendix 5

Compacted Soil Liner Undisturbed Samples - Laboratory Testing

(Services provided by ECS Carolinas LLP)

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]
NC Registered Engineering Firm # F-1078

LETTER OF TRANSMITTAL

November 6, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A**
	Permits:
	Location: **Hwy 17** **Maysville, NC**
ATTN: Mr. Tim Morton	

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Morton Trucking - Jill Howard**
Morton Trucking - Andrew Rhodes
Carolina South Builders - James Maides
ERM - Dave Wasiela, P.E.

ENCL:

Field Report # 10 11/05/2014

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

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ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

FIELD REPORT

Project No.	22:20747-A
Report No.	10
Day & Date	Wednesday 11/05/2014
Weather	74°/ Sunny
On-Site Time	0.75
Lab Time	0.50
Travel Time*	0.75
Total	2.00
Re Obs.Time	0.00

Project	C & D Landfill Cell work
Location	Maysville, NC
Client	Morton Trucking - Tim Morton
Contractor	Morton Trucking - Jill Howard

Remarks

Trip Charges* Tolls/Parking* Mileage* 50

Chargeable Items

Time of	Arrival	Departure
	02:00P	02:45P

* Travel time and mileage will be billed in accordance with the contract.

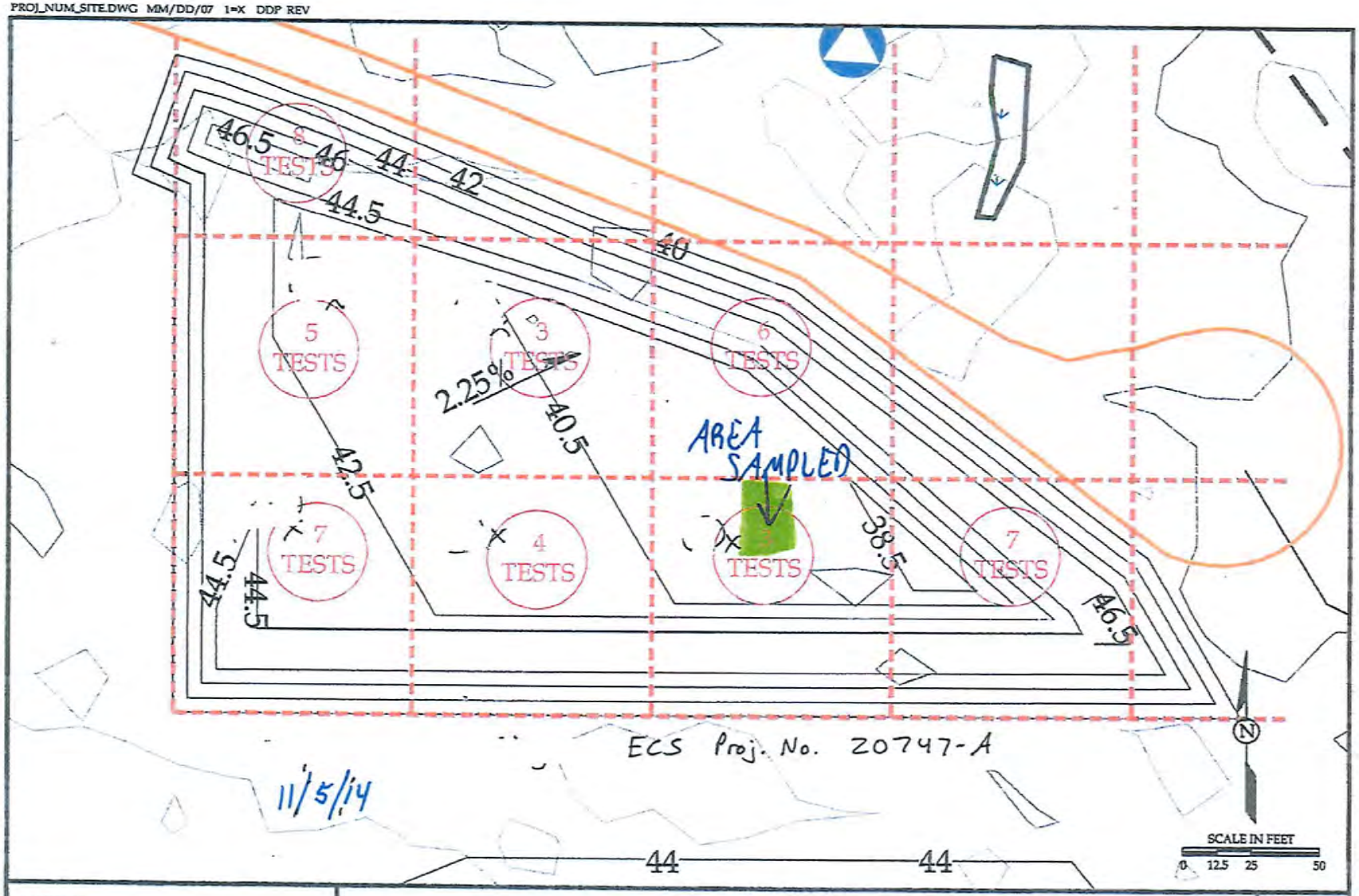
Summary of Services Performed (field test data, locations, elevations & depths are estimates) & Individuals Contacted.

The undersigned arrived on site, as requested, to drive Shelby tubes in each lift of the clay liner for an undisturbed permeability test. Please see the attached sketch for the approximate location.

By **Harry Slater, — Project Manager** 1800

1035208

PROJ_NUM_SITE.DWG MM/DD/07 1=X DDP REV



ERM

ERM NC, INC.

STRUCTURAL FILL TESTING
GREEN RECYCLING SOLUTIONS
MAYSVILLE, NORTH CAROLINA

FIGURE
1

ECS CAROLINAS, LLP
6714 Netherlands Drive
Wilmington, NC 28405
(910) 686-9114 [Phone]
(910) 686-9666 [Fax]

LETTER OF TRANSMITTAL

November 18, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A** Permits:
ATTN: Mr. Tim Morton	Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Carolina South Builders - Mr. James Maides**
Morton Trucking - Ms. Jill Howard
Morton Trucking - Mr. Andrew Rhodes
ERM - Dave Wasiela, P.E.

ENCL:

Attached is the in place hydraulic conductivity test test for the first lift of the cell. Sample ST-1.

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

MEASUREMENT OF HYDRAULIC CONDUCTIVITY USING A FLEXIBLE WALL PERMEAMETER ASTM D5084 METHOD C

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666
www.ecslimited.com

PROJECT INFORMATION

NAME: C&D Landfill Cell Work
NUMBER: 20747-A
DATE: 11/18/2014
ENGINEER:
Remarks:

SAMPLE INFORMATION

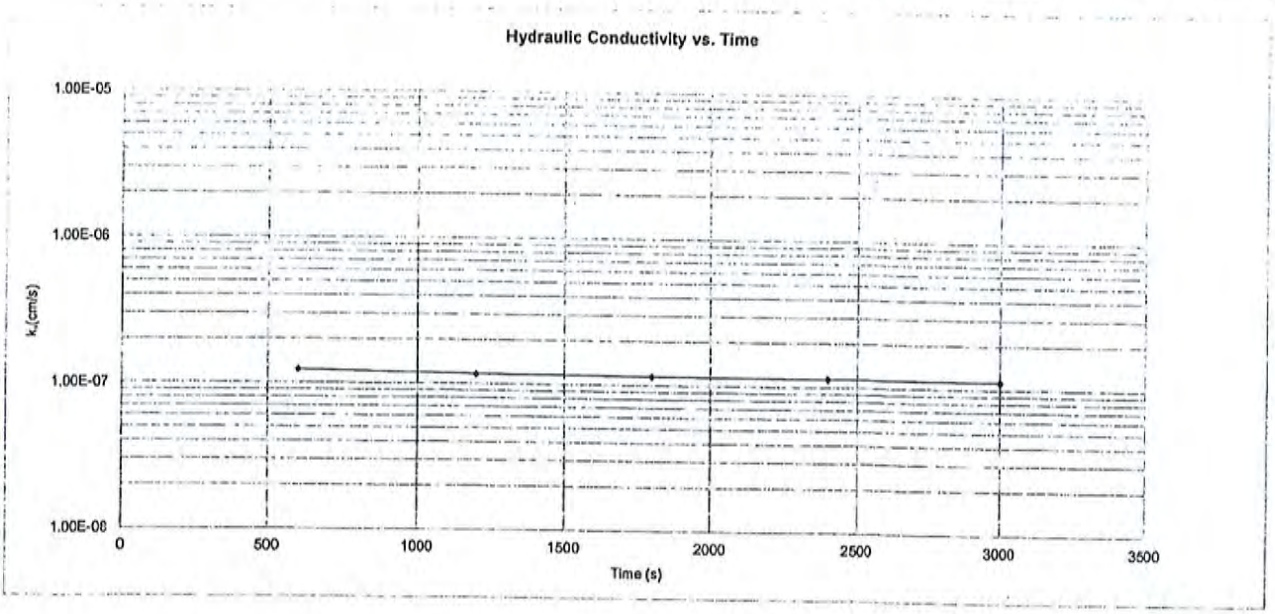
DESCRIPTION: Gray, Mottled Brown and Orange, Lean Clay
SOURCE: Morton Pit
DEPTH: Tube: Shelby Tube - Lift 1 Sample: ST-1
PREPARATION: Sample extracted from undisturbed shelby tube sample

Sample Properties	Initial	Final
Diameter (in)	2.848	2.859
Height (in)	5.753	5.760
Area (in²)	6.369	6.415
Volume (ft³)	0.0212	0.0214
Mass (g)	1216.37	1219.76
Water Content (%)	21.4%	22.1%
Dry Density (pcf)	103.8	102.7
Saturation (%)	99%	99%

Testing Data		
Cell Pressure (psi)	63	Specific Gravity (assumed) 2.6
Base Pressure / Sample Pressure (psi)	60	Area of Burette Tubes (cm²) 0.881
Top Pressure (psi)	55	Permeant Liquid Drinking Water

Test Results
Hydraulic Conductivity (k) (cm/sec) 1.16E-07
(k) (cm/sec) @ 20.0°C
1.13E-07

DATE	TIME	READINGS (Inflow)	READINGS (Outflow)	ELAPSED TIME (sec)	TOTAL ELAPSED TIME	OUTFLOW/INFLOW RATIO	HYDRAULIC CONDUCTIVITY (k)
11/14/2014	13:00:00	2.0	23.8	0	0	0.0	
11/14/2014	13:10:00	3.1	22.6	600	600	1.0	1.23E-07
11/14/2014	13:20:00	4.0	21.7	600	1200	1.0	1.17E-07
11/14/2014	13:30:00	4.9	20.8	600	1800	1.0	1.15E-07
11/14/2014	13:40:00	5.8	19.9	600	2400	1.0	1.14E-07
11/14/2014	13:50:00	6.7	19.0	600	3000	1.0	1.13E-07
11/14/2014	14:00:00	7.6	18.1	600	3600	1.0	1.13E-07
						AVERAGE	1.16E-07



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LETTER OF TRANSMITTAL

November 18, 2014	RE: **C & D Landfill Cell work**
Morton Trucking 121 Garnett Lane Jacksonville, NC 28546	ECS Job # **22:20747-A** Permits:
ATTN: Mr. Tim Morton	Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
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CC: **Carolina South Builders - Mr. James Maides**
Morton Trucking - Ms. Jill Howard
Morton Trucking - Mr. Andrew Rhodes
ERM - Dave Wasiela, P.E.

ENCL:

Attached is the in place hydraulic conductivity test for the second lift of the cell. Sample ST-2.

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666
www.ecslimited.com

MEASUREMENT OF HYDRAULIC CONDUCTIVITY USING A FLEXIBLE WALL PERMEAMETER ASTM D5084 METHOD C

PROJECT INFORMATION

NAME: C&D Landfill Cell Work
NUMBER: 20747-A
DATE: 11/14/2014
ENGINEER:
Remarks:

SAMPLE INFORMATION

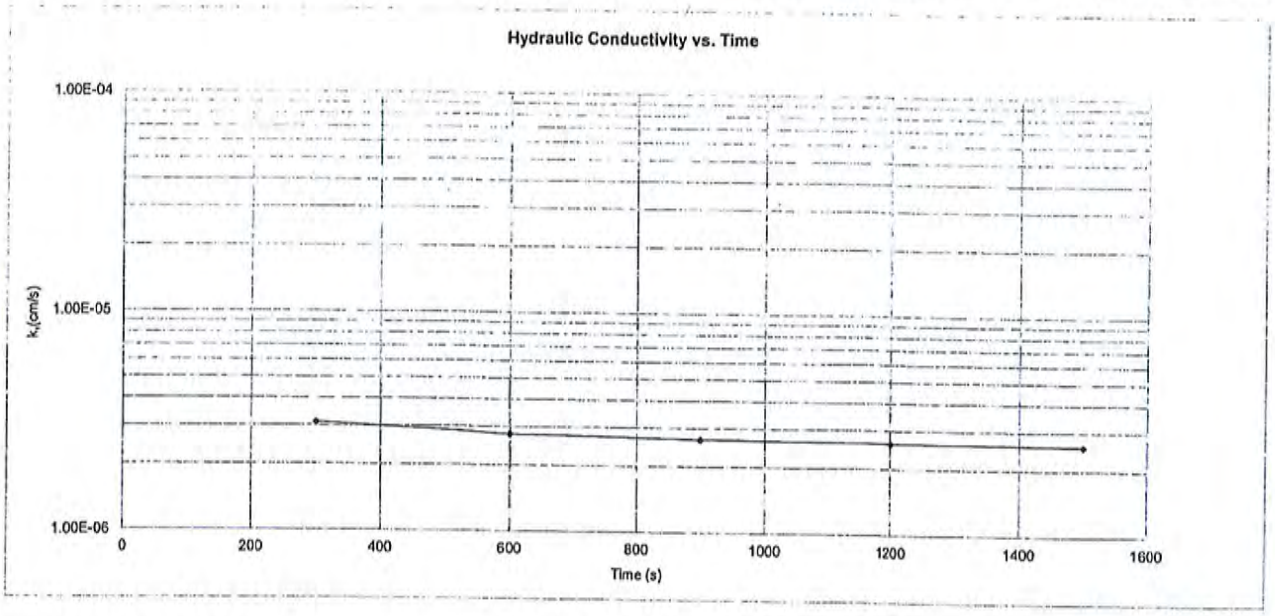
DESCRIPTION: Gray, Mottled Brown and Orange, Sandy Lean Clay
SOURCE: Morton Pit
DEPTH: Tube: Shelby Tube - Lift 2 Sample: ST-2
PREPARATION: Sample extracted from undisturbed shelby tube sample

Sample Properties	Initial	Final
Diameter (in)	2.860	2.873
Height (in)	5.584	5.596
Area (in²)	6.421	6.478
Volume (ft³)	0.0207	0.0210
Mass (g)	1287.73	1239.16
Water Content (%)	12.3%	13.8%
Dry Density (pcf)	121.9	119.5
Saturation (%)	96%	99%

Testing Data		
Cell Pressure (psi)	63	Specific Gravity (assumed) 2.6
Base Pressure / Sample Pressure (psi)	60	Area of Burette Tubes (cm²) 0.881
Top Pressure (psi)	55	Permeant Liquid Drinking Water

Test Results
Hydraulic Conductivity (k) (cm/sec) 2.73E-06
(k) (cm/sec) @ 20.0°C
2.58E-06

DATE	TIME	READINGS (Inflow)	READINGS (Outflow)	ELAPSED TIME (sec)	TOTAL ELAPSED TIME	OUTFLOW/INFLOW RATIO	HYDRAULIC CONDUCTIVITY (k)
11/11/2014	13:00:00	2.0	23.8	0	0	0.0	
11/11/2014	13:05:00	3.1	22.6	300	300	1.1	3.11E-06
11/11/2014	13:10:00	4.0	21.7	300	600	1.0	2.78E-06
11/11/2014	13:15:00	4.9	20.8	300	900	1.0	2.67E-06
11/11/2014	13:20:00	5.8	19.9	300	1200	1.0	2.62E-06
11/11/2014	13:25:00	6.7	19.0	300	1500	1.0	2.59E-06
11/11/2014	13:30:00	7.6	18.1	300	1800	1.0	2.58E-06
						AVERAGE	2.73E-06



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LETTER OF TRANSMITTAL

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ATTN: Mr. Tim Morton	Location: **Hwy 17** **Maysville, NC**

We are enclosing:

X Materials Engineering Division Reports
X For your use
X As requested

CC: **Carolina South Builders - Mr. James Maides**
Morton Trucking - Ms. Jill Howard
Morton Trucking - Mr. Andrew Rhodes
ERM - Dave Wasiela, P.E.

ENCL:

Attached is the in place hydraulic conductivity test for lift three of the cell. Sample ST-3.

Kris J. Stamm
Branch Manager/Principal

Harry Slater
Project Manager

MEASUREMENT OF HYDRAULIC CONDUCTIVITY USING A FLEXIBLE WALL PERMEAMETER ASTM D5084 METHOD C

ECS Carolinas, LLP
6714 Netherlands Drive
Wilmington, NC 28405
Phone: (910) 686-9114
Fax: (910) 686-9666
www.ecslimited.com

PROJECT INFORMATION

NAME: C&D Landfill Cell Work
NUMBER: 20747-A
DATE: 11/11/2014
ENGINEER:
Remarks:

SAMPLE INFORMATION

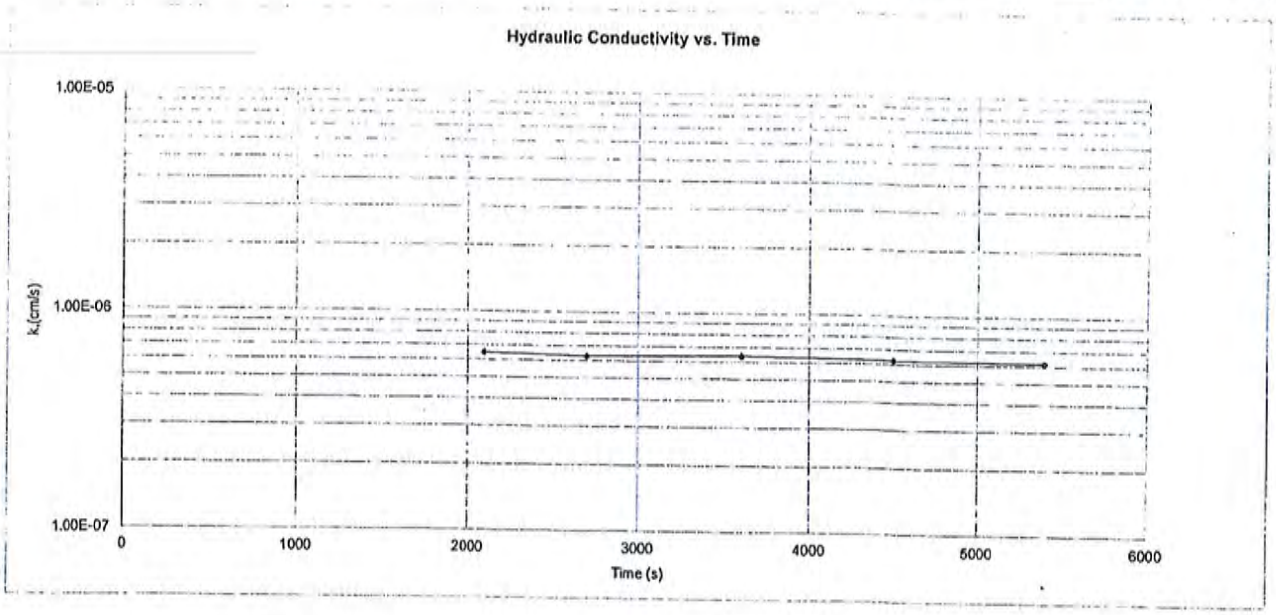
DESCRIPTION: Gray, Sandy Lean Clay
SOURCE: Morton Pit
DEPTH: Tube: Shelby Tube - Lift 3 Sample: ST-3
PREPARATION: Sample extracted from undisturbed shelby tube sample

Sample Properties	Initial	Final
Diameter (in)	2.867	2.883
Height (in)	5.866	5.847
Area (in²)	6.451	6.523
Volume (ft³)	0.0219	0.0221
Mass (g)	1232.55	1239.16
Water Content (%)	22.3%	24.1%
Dry Density (pcf)	101.6	99.8
Saturation (%)	97%	100%

Testing Data		
Cell Pressure (psi)	63	Specific Gravity (assumed) 2.6
Base Pressure / Sample Pressure (psi)	60	Area of Burette Tubes (cm²) 0.881
Top Pressure (psi)	55	Permeant Liquid Drinking Water

Test Results
Hydraulic Conductivity (k) (cm/sec) 6.25E-07
(k) (cm/sec) @ 20.0°C
6.08E-07

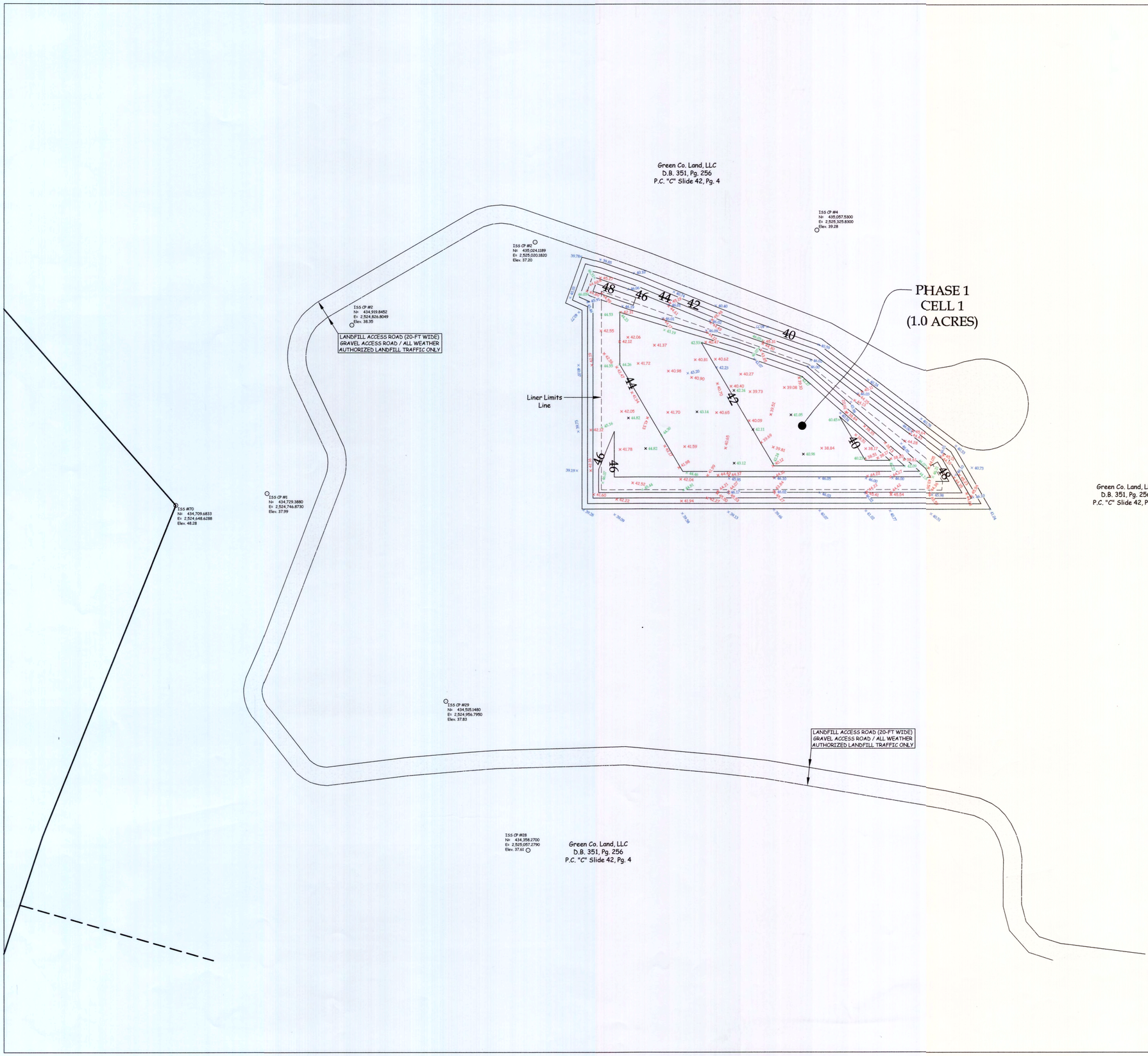
DATE	TIME	READINGS (Inflow)	READINGS (Outflow)	ELAPSED TIME (sec)	TOTAL ELAPSED TIME	OUTFLOW/INFLOW RATIO	HYDRAULIC CONDUCTIVITY (k)
11/7/2014	15:00:00	3.0	23.0	0	0	0.0	
11/7/2014	15:35:00	3.5	22.5	2100	2100	1.0	6.47E-07
11/7/2014	15:45:00	4.0	22.0	600	2700	1.0	6.29E-07
11/7/2014	16:00:00	4.5	21.5	900	3600	1.0	6.39E-07
11/7/2014	16:15:00	5.0	21.0	900	4500	1.0	6.25E-07
11/7/2014	16:30:00	5.4	20.6	900	5400	1.0	6.17E-07
11/7/2014	16:45:00	5.8	20.2	900	6300	1.0	6.11E-07
11/7/2014	17:00:00	6.3	19.7	900	7200	1.0	6.07E-07
						AVERAGE	6.25E-07

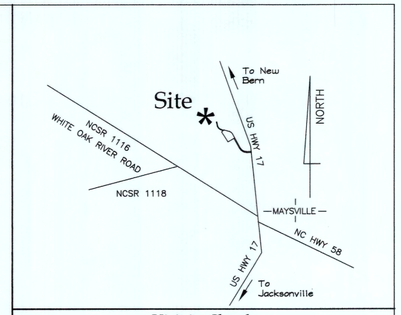


Appendix 6

Compacted Soil Liner As-Built Drawing

(Services provided by Parker & Associates, Inc.)





Vicinity Sketch

Not to Scale

GPS Grid North
NAD 83, 2007 Adjustment

As-Built Legend:

× 41.78 - Elevations shots taken 10/27/14 for base

× 42.23 - Elevations shots taken 11/12/14 for barrier layer

× 44.55 - Elevations shots taken 11/16/14 for barrier layer

CP - Control Point
D.B. - Deed Book
E - Easting
ISS - Iron Stake Set
N - Northing
PC - Plat Cabinet
Pg. - Page

I, Edwin N. Foley, certify that this project was completed under my supervision, from an actual ground survey under my supervision; that the survey was completed on 10/27/14, 11/12/14, and again on 11/16/14; and all coordinates are based on GPS Grid North, NAD '83, 2007 Adjustment.

12/10/14
Edwin N. Foley, P.L.S., L-2884

NORTH CAROLINA PROFESSIONAL SEAL L-2884 LAND SURVEYOR EDWIN N. FOLEY

Notes:

1. All distances are horizontal ground, U.S. survey feet.
2. Elevations per NAVD '88 Datum.
3. Horizontal per GPS Grid North, NAD '83, 2007 Adjustment.
4. No Register of Deed search done by or furnished to surveyor regarding deed or covenant restrictions.
5. Survey of Phase 1, Cell 1 on 10/27/14, 11/12/14, & 11/16/14.
6. The GPS portion of the boundary work was performed to third order, Class I, FGCC specifications, The coordinates were obtained by Real Time Kinematic Differential GPS Observations using Trimble Survey Grade 5800 GPS Unit, NCGS RTK Network Adjustments to NC Grid NAD' 83, 2007 Adjustments.
7. This map is prepared from an electronic overlay of the design plan prepared by ERM NC, INC. dated February 2012, and signed 1-6-14.

Topographic Survey Map

MAYSVILLE C&D LANDFILL
PHASE 1, CELL 1

Maysville Twp., Jones Co., North Carolina

For:
Green Recycling Solutions, LLC
11710 Hwy 17
Maysville, North Carolina 28555
(910) 938-5900

Parker & Associates, Inc.
Consulting Engineers - Land Surveyors - Land Planners
P.O. Box 976 - 28541-0976
306 New Bridge Street - 28540
Jacksonville, North Carolina
Phone (910) 455-2414 - Fax (910) 455-3441
Firm License Number: F-0108

Shaping Horizons

Date 12/10/14	Scale 1"=50'	Filename C&D worksheet.dwg	Disk Acad 2402	Sheet No. 1 of 1
				Designed
				Drawn JJS
				Job No. S140507-5796

Z:\Land Projects-3\C&D Landfill Boundary-Control\dwg\Phase 1 Cell 1 As-Built.dwg, 12/10/2014 9:15:52 AM, JJS

Appendix 7

High Density Polyethylene (HDPE) Liner

Roll Certification Sheets

cust: Chesapeake Containment

PO#: 14-215 Green Recycling LF

dest: Maysville, NC

doc 27283

6 rolls 60 HD micro (505)

English Dimensions

100k /lot 1ft x RW Geotechnics UPS Next Day

roll #	wid	len	area	check weld rod qty (if ordered)				wgt		resin lot #
G14F462021	23	505	11,615	60HD	micro	6tot	1	3494	1ft conf	H7241292
G14F462022	23	505	11,615	60HD	micro	6tot	2	3510		H7241292
G14F462023	23	505	11,615	60HD	micro	6tot	3	3504		H7241292
G14F462024	23	505	11,615	60HD	micro	6tot	4	3494		H7241292
G14F462025	23	505	11,615	60HD	micro	6tot	5	3516		H7241292
G14F462026	23	505	11,615	60HD	micro	6tot	6	3512		H7241292
								21030		

agru america
quality control dept.

quality certificate

ROLL # G14F462021 **LOT #** H7241292 **LINER TYPE** **MICROSPIKE HD 60**

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN	**1.42** mm	**56** mil	Thickness	**1.52 mm**	**60 mil**
	MAX	**1.54** mm	**61** mil	Length	**153.926** m	**505** feet
	AVE	**1.48** mm	**58** mil	Width	**7.01** m	**23** feet

OIT(Standard) ASTM D 3895						**198** minutes
Asperity ASTM D7466	Average	Top				**25** mil
		Bottom				**33** mil
Specific Gravity ASTM D792	Average Density				g/cc	**.943**
MFI ASTM D1238 COND. E Grade **K307**	Melt Flow Index 190C/2160 g - g/10 min					**.26**
Carbon Black Content ASTM D4218	Range				%	**2.3**
Carbon Black Dispersion ASTM D5596	Category					**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Yield	MD	**27** N/mm	**153** ppi		**2557** psi
		TD	**30** N/mm	**170** ppi		**2831** psi
	Average Strength @ Break	MD	**36** N/mm	**205** ppi		**3410** psi
		TD	**35** N/mm	**199** ppi		**3321** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	MD			%	**14.0**
		TD			%	**15.0**
	Average Elongation @Break	MD			%	**437.0**
		TD			%	**568.0**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change				%	**-0.6**
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD		**240.2** N		**54.0** lbs
		TD		**222.4** N		**50.0** lbs
Puncture Resistance FTMS 101 Method 2065 Modified						**CERTIFIED**
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load			**560.4** N		**126.0** lbs
ESCR ASTM D1693	Minumum Hrs w/o Failures			1500 Hrs		**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	Pass/Fail @ 30%			300 Hrs		**ONGOING**

Customer Chesapeake Containment
PO 14-215 Green Recycling LF
Destination Maysville, NC

Date **11/11/2014**

Signature

Quality Control Department

agru america
quality control dept.

quality certificate

ROLL # G14F462022 **LOT #** H7241292 **LINER TYPE** **MICROSPIKE HD 60**

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN	**1.41** mm	**55** mil	Thickness	**1.52 mm**	**60 mil**
	MAX	**1.59** mm	**63** mil	Length	**153.926** m	**505** feet
	AVE	**1.47** mm	**58** mil	Width	**7.01** m	**23** feet

OIT(Standard) ASTM D 3895					**198** minutes
Asperity ASTM D7466	Average	Top			**26** mil
		Bottom			**34** mil
Specific Gravity ASTM D792	Average Density			g/cc	**.943**
MFI ASTM D1238 COND. E Grade **K307**	Melt Flow Index 190C/2160 g - g/10 min				**.26**
Carbon Black Content ASTM D4218	Range			%	**2.3**
Carbon Black Dispersion ASTM D5596	Category				**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Yield	MD	**27** N/mm	**153** ppi	**2557** psi
		TD	**30** N/mm	**170** ppi	**2831** psi
	Average Strength @ Break	MD	**36** N/mm	**205** ppi	**3410** psi
		TD	**35** N/mm	**199** ppi	**3321** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	MD		%	**14.0**
		TD		%	**15.0**
	Average Elongation @Break	MD		%	**437.0**
		TD		%	**568.0**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change			%	**-0.6**
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD		**240.2** N	**54.0** lbs
		TD		**222.4** N	**50.0** lbs
Puncture Resistance FTMS 101 Method 2065 Modified					**CERTIFIED**
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load			**560.4** N	**126.0** lbs
ESCR ASTM D1693	Minumum Hrs w/o Failures			1500 Hrs	**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	Pass/Fail @ 30%			300 Hrs	**ONGOING**

Customer Chesapeake Containment
PO 14-215 Green Recycling LF
Destination Maysville, NC

Date **11/11/2014**

Signature

Quality Control Department

agru america
quality control dept.

quality certificate

ROLL # G14F462023 **LOT #** H7241292 **LINER TYPE** **MICROSPIKE HD 60**

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN	**1.42** mm	**56** mil	Thickness	**1.52 mm**	**60 mil**
	MAX	**1.59** mm	**63** mil	Length	**153.926** m	**505** feet
	AVE	**1.48** mm	**58** mil	Width	**7.01** m	**23** feet

OIT(Standard) ASTM D 3895					**198** minutes
Asperity ASTM D7466	Average	Top			**24** mil
		Bottom			**33** mil
Specific Gravity ASTM D792	Average Density			g/cc	**.943**
MFI ASTM D1238 COND. E Grade **K307**	Melt Flow Index 190C/2160 g - g/10 min				**.26**
Carbon Black Content ASTM D4218	Range			%	**2.3**
Carbon Black Dispersion ASTM D5596	Category				**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Yield	MD	**27** N/mm	**153** ppi	**2557** psi
		TD	**30** N/mm	**170** ppi	**2831** psi
	Average Strength @ Break	MD	**36** N/mm	**205** ppi	**3410** psi
		TD	**35** N/mm	**199** ppi	**3321** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	MD		%	**14.0**
		TD		%	**15.0**
	Average Elongation @Break	MD		%	**437.0**
		TD		%	**568.0**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change			%	**-0.6**
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD		**240.2** N	**54.0** lbs
		TD		**222.4** N	**50.0** lbs
Puncture Resistance FTMS 101 Method 2065 Modified					**CERTIFIED**
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load			**560.4** N	**126.0** lbs
ESCR ASTM D1693	Minumum Hrs w/o Failures			1500 Hrs	**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	Pass/Fail @ 30%			300 Hrs	**ONGOING**

Customer Chesapeake Containment
PO 14-215 Green Recycling LF
Destination Maysville, NC

Date **11/11/2014**

Signature

Quality Control Department

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quality control dept.

quality certificate

ROLL # G14F462024 **LOT #** H7241292 **LINER TYPE** **MICROSPIKE HD 60**

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN	**1.41** mm	**55** mil	Thickness	**1.52 mm**	**60 mil**
	MAX	**1.58** mm	**62** mil	Length	**153.926** m	**505** feet
	AVE	**1.49** mm	**59** mil	Width	**7.01** m	**23** feet

OIT(Standard) ASTM D 3895					**198** minutes
Asperity ASTM D7466	Average	Top			**26** mil
		Bottom			**34** mil
Specific Gravity ASTM D792	Average Density			g/cc	**.943**
MFI ASTM D1238 COND. E Grade **K307**	Melt Flow Index 190C/2160 g - g/10 min				**.26**
Carbon Black Content ASTM D4218	Range			%	**2.2**
Carbon Black Dispersion ASTM D5596	Category				**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Yield	MD	**27** N/mm	**155** ppi	**2588** psi
		TD	**31** N/mm	**176** ppi	**2926** psi
	Average Strength @ Break	MD	**38** N/mm	**218** ppi	**3641** psi
		TD	**34** N/mm	**195** ppi	**3252** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	MD		%	**15.0**
		TD		%	**15.0**
	Average Elongation @Break	MD		%	**430.0**
		TD		%	**559.0**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change			%	**-0.6**
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD		**240.2** N	**54.0** lbs
		TD		**275.8** N	**62.0** lbs
Puncture Resistance FTMS 101 Method 2065 Modified					**CERTIFIED**
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load			**573.8** N	**129.0** lbs
ESCR ASTM D1693	Minumum Hrs w/o Failures			1500 Hrs	**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	Pass/Fail @ 30%			300 Hrs	**ONGOING**

Customer Chesapeake Containment
PO 14-215 Green Recycling LF
Destination Maysville, NC

Date **11/11/2014**

Signature

Quality Control Department

agru america
quality control dept.

quality certificate

ROLL # G14F462025 **LOT #** H7241292 **LINER TYPE** **MICROSPIKE HD 60**

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN	**1.39** mm	**55** mil	Thickness	**1.52 mm**	**60 mil**
	MAX	**1.64** mm	**65** mil	Length	**153.926** m	**505** feet
	AVE	**1.50** mm	**59** mil	Width	**7.01** m	**23** feet

OIT(Standard) ASTM D 3895					**198** minutes
Asperity ASTM D7466	Average	Top			**27** mil
		Bottom			**35** mil
Specific Gravity ASTM D792	Average Density			g/cc	**.943**
MFI ASTM D1238 COND. E Grade **K307**	Melt Flow Index 190C/2160 g - g/10 min				**.26**
Carbon Black Content ASTM D4218	Range			%	**2.2**
Carbon Black Dispersion ASTM D5596	Category				**10 in Category 1**
Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Yield	MD	**27** N/mm	**155** ppi	**2588** psi
		TD	**31** N/mm	**176** ppi	**2926** psi
	Average Strength @ Break	MD	**38** N/mm	**218** ppi	**3641** psi
		TD	**34** N/mm	**195** ppi	**3252** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	MD		%	**15.0**
		TD		%	**15.0**
	Average Elongation @Break	MD		%	**430.0**
		TD		%	**559.0**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change			%	**-0.6**
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD	**240.2** N		**54.0** lbs
		TD	**275.8** N		**62.0** lbs
Puncture Resistance FTMS 101 Method 2065 Modified					**CERTIFIED**
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load		**573.8** N		**129.0** lbs
ESCR ASTM D1693	Minumum Hrs w/o Failures		1500 Hrs		**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	Pass/Fail @ 30%		300 Hrs		**ONGOING**

Customer Chesapeake Containment
PO 14-215 Green Recycling LF
Destination Maysville, NC

Date **11/11/2014**

Signature

Quality Control Department

agru america
quality control dept.

quality certificate

ROLL # G14F462026 **LOT #** H7241292 **LINER TYPE** **MICROSPIKE HD 60**

		METRIC	ENGLISH		METRIC	ENGLISH
Thickness Measurement ASTM D5994 (Modified)	MIN	**1.39** mm	**55** mil	Thickness	**1.52 mm**	**60 mil**
	MAX	**1.64** mm	**64** mil	Length	**153.926** m	**505** feet
	AVE	**1.50** mm	**59** mil	Width	**7.01** m	**23** feet

OIT(Standard) ASTM D 3895				**198** minutes
Asperity ASTM D7466	Average	Top		**27** mil
		Bottom		**35** mil
Specific Gravity ASTM D792	Average Density		g/cc	**.943**
MFI ASTM D1238 COND. E Grade **K307**	Melt Flow Index 190C/2160 g - g/10 min			**.26**
Carbon Black Content ASTM D4218	Range		%	**2.2**
Carbon Black Dispersion ASTM D5596	Category			**10 in Category 1**

Tensile Strength ASTM D6693 (2 inches / minute)	Average Strength @ Yield	MD	**27** N/mm	**155** ppi		**2588** psi
		TD	**31** N/mm	**176** ppi		**2926** psi
	Average Strength @ Break	MD	**38** N/mm	**218** ppi		**3641** psi
		TD	**34** N/mm	**195** ppi		**3252** psi
Tensile Elongation ASTM D6693 (2 inches / minute) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	MD			%	**15.0**
		TD			%	**15.0**
	Average Elongation @Break	MD			%	**430.0**
		TD			%	**559.0**
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change				%	**-0.6**
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	MD		**240.2** N		**54.0** lbs
		TD		**275.8** N		**62.0** lbs
Puncture Resistance FTMS 101 Method 2065 Modified						**CERTIFIED**
Puncture Resistance ASTM D4833 (Modified)	Average Peak Load			**573.8** N		**129.0** lbs
ESCR ASTM D1693	Minumum Hrs w/o Failures			1500 Hrs		**CERTIFIED**
Notched Constant Tensile Load ASTM D5397	Pass/Fail @ 30%			300 Hrs		**ONGOING**

Customer Chesapeake Containment
PO 14-215 Green Recycling LF
Destination Maysville, NC

Date **11/11/2014**

Signature

Quality Control Department

CoA Date: 10/24/2014

Certificate of Analysis

Shipped To: AGRU AMERICA INC:GEORGETOWN
500 GARRISON RD
GEORGETOWN SC 29440-9688
USA

Recipient: PALMER
Fax:

Delivery #: 88944834
PO #: 008740
Weight: 194100 LB
Ship Date: 10/24/2014
Package: BULK
Mode: Hopper Car
Car #: NAHX610254
Seal No: 12910

Product:
MARLEX POLYETHYLENE K307 BULK

Lot Number: H7241292

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.26	g/10mi
HLMI Flow Rate	ASTM D1238	23	g/10mi
Density	D1505 or D4883	0.937	g/cm3
Pellet Count	P02.08.03	32	pel/g
Production Date		10/15/2014	

PELLETCOUNT WAIVED NIEDERMOSER

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP (CPChem).
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 +1-832-813-4806

Lili Cui, Ph.D., Geomembrane Technical Service & Applications Development
Room 154 PTC ■ Bartlesville, OK 74004■
918-661-1897 ■ cuil@cpchem.com ■ Fax: 918-662-2220 ■ www.cpchem.com

June 8, 2012

Grant Palmer
Agru America
500 Garrison Road
Georgetown, SC 29440

Dear Grant:

This letter is to report the final results of oven-aging and UV-aging tests (according to GRI-GM13 and GRI-GM17) on Agru America sheet samples that you provided to us in 2011. These tests were performed by CPChem's Materials Evaluation Laboratory in Bartlesville, OK. The tests were completed April 2012.

The GRI-GM13 (HDPE) and GRI-GM17 (LLDPE) durability tests were done according to the following procedures.

Test	Exposure	Method
HP-OIT	150 °C, 500 psi oxygen	D5885
Oven Aging	90 days, 85 °C	D5721
UV Aging	1600 UV hrs (Conditions were 20 hours UVA-340 at 75 °C followed by 4 hrs dark with condensation at 60 °C. Irradiance was 0.72 W/m^2 at 340 nm.)	D7238

Oven-Aging Results

Sample	Initial HP-OIT (min)	HP-OIT Value after Oven Aging (min)	% HP-OIT Retained	GRI-GM13 or GRI-GM17 % Retained Requirement
40 mil LLDPE Roll # 346550-11 from Marlex® 7104 Polyethylene Lot # CBC810430	659	572	**87**	60
60 mil HDPE Roll # 447108-11 from Marlex® K307 Polyethylene Lot # 71-1-1104	1136	994	**88**	80

UV-Aging Results

Sample	Initial HP-OIT (min)	HP-OIT Value after UV Aging (min)	% HP-OIT Retained	GRI-GM13 or GRI-GM17 % Retained Requirement
40 mil LLDPE Roll # 346550-11 from Marlex® 7104 Polyethylene Lot # CBC810430	659	449	**68**	35
60 mil HDPE Roll # 447108-11 from Marlex® K307 Polyethylene Lot # 71-1-1104	1136	924	**81**	50

According to these test results, the durability requirements are met.

If you have any questions, please call me at 918-661-1897.

Sincerely,

Lili Cui, Ph.D.
Geomembrane Technical Service & Applications Development

Any technical advice, recommendations, results, or analysis ("Information") contained herein, including, without limitation, Information as it may relate to the selection of a specific product ("Product") for your use and application, is given ***without warranty or guarantee*** *and is accepted at your sole risk. It is imperative that you test the Information (and Product, if applicable) to determine to your own satisfaction whether the Information (and Product, if applicable) are suitable for your intended use and application.* ***You expressly assume, and release Chevron Phillips Chemical Company, from all risk and liability, whether based in contract, tort or otherwise, in connection with the use of, or results obtained from, such Information (and Product, if applicable).***

Lili Cui, Polyethylene Tech Service and Applications Development
Room 154 PTC ■ Bartlesville, OK 74003■
918-977- 4685 ■ cuill@cpchem.com ■ Fax: 918-977-7599 ■ www.cpchem.com

July 10, 2013

Grant Palmer
Agru America
500 Garrison Road
Georgetown, SC 29440

Dear Grant:

Per your request for this information, there has been no change to the additive formulation specifications of Marlex® 7104 and Marlex® K307 polyethylene resins since GRI-GM13 and GRI-GM17 oven- and UV-aging testing was performed on Agru America sheet from these resins in December 2012.

If you have any questions, please call me at 918-977-4685.

Sincerely,

Lili Cui

Lili Cui, Ph.D.
Polyethylene Tech Service and Applications Development

Any technical advice, recommendations, results, or analysis ("Information") contained herein, including, without limitation, Information as it may relate to the selection of a specific product ("Product") for your use and application, is given ***without warranty or guarantee*** *and is accepted at your sole risk. It is imperative that you test the Information (and Product, if applicable) to determine to your own satisfaction whether the Information (and Product, if applicable) are suitable for your intended use and application.* ***You expressly assume, and release Chevron Phillips Chemical Company, from all risk and liability, whether based in contract, tort or otherwise, in connection with the use of, or results obtained from, such Information (and Product, if applicable).***

Appendix 8

High Density Polyethylene (HDPE) Liner

Conformance Testing

(Services Provided by Geotechnics, Inc.)

geotechnics
INTEGRITY IN TESTING

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: GREEN RECYCLING MAYSVILLE LANDFILL
PROJECT NO.: L14148-01
LAB ID NO.: L14148-01-01
MATERIAL: AGRU 60 MIL HDPE MICROSPIKE
ROLL NO: G14F462021

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
THICKNESS	D 5994	mils	58	55	58	60	55		
			60	55	54	57	59	**57**	2.12
DENSITY	D 1505	g/cc	0.9437	0.9437	0.9435			**0.9436**	0.0001
CARBON BLACK CONTENT	D 1603	%	2.26	2.30				**2.28**	0.018
CARBON BLACK DISPERSION	D 5596	CATEGORY	1	1	1	1	1		
			1	1	1	1	1		
PUNCTURE RESISTANCE	D 4833	lbs	120.4	127.4	127.3	124.4	126.2		
			121.8	122.9	126.9	125.8	131.4		
			126.8	128.5	129.4	130.7	134.7	**127.0**	3.62
TEAR RESISTANCE	D 1004	MD-lbs	55.2	59.4	53.1	49.1	50.6		
			57.1	49.1	49.3	55.4	56.7	**53.5**	3.60
		CD-lbs	50.5	49.3	55.6	52.5	55.8		
			58.7	55.6	53.3	55.7	55.9	**54.3**	2.71
TENSILE PROPERTIES	D 6693								
STRENGTH AT YIELD		MD-ppi	128	133	130	126	136	**130**	3.66
		CD-ppi	133	145	138	143	140	**140**	4.09
STRENGTH AT BREAK		MD-ppi	177	194	192	197	175	**187**	9.00
		CD-ppi	162	186	169	175	150	**168**	11.97
ELONGATION AT YIELD		MD%	22.0	22.9	22.0	23.6	19.3	**22.0**	1.46
Lo = 1.3"		CD%	17.0	15.9	15.4	15.9	15.4	**15.9**	0.58
ELONGATION AT BREAK		MD%	453	495	475	456	496	**475**	18.36
Lo = 2.0"		CD%	554	616	586	578	511	**569**	35.12

CHECKED BY: BF DATE: 11-14-14

\\GEOSERVER\Data Drive\Synthetics\2014 SYNTHETICS\148 -ERM - GREEN RECYCLING\[L14148-01-01 HDPE MICRO GREEN RECYCLING.xl L14148-01-01 11/14/14

Appendix 9

High Density Polyethylene (HDPE) Liner

CQA Forms and As-Built Drawing

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Field Trial Seam Log

Project No.: I14-116
Project Name: Green Recycling
Start Date: 11/17/14
Project Location: Maysville, NC

Material: HDPE

60 mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	90	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 ºF/fpm (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)							
								1	2	3	4	5	1	2	3	4	5			
1	11/19/14	8:14	19	28	JGR	850/4		124	126	123			175	176	176			Pass	RC	-
								123	125	121										
2	11/19/14	8:15	19	25	SR	850/4		119	127	120			169	178	178			Pass	RC	-
								120	131	126										
3	11/19/14	12:50	37	25	SR	850/4		126	130	128			177	177	169			Pass	RC	-
								127	127	123										
4	11/19/14	13:29	37	14	DR		550/550	123	121	124			175	173	174			Pass	RC	-
5	11/20/14	8:20	43	14	DR		550/550	132	132	129			169	168	172			Pass	RC	-
6	11/20/14	7:50	43	15	JR		550/550	131	126	128			170	173	172			Pass	RC	-

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Panel Placement Log

Project No.: I14-116
Project Name: Green Recycling
Project Start Date: 11/17/14
Project Location: Maysville, NC

Material: HDPE

60 mil

Date Deployed	Panel No.	Time Deployed	Panel Location	Roll No.	Width (FT)	Length (FT)	Area (SQ FT)
11/19/14	1	8:01	Cell	2026	22.5	216	4860
11/19/14	2	8:10	Cell	2026	22.5	208	4680
11/19/14	3	8:28	Cell	2022	22.5	201	4522.5
11/19/14	4	8:36	Cell	2022	22.5	195	4387.5
11/19/14	5	8:45	Cell	2023	22.5	187	4207.5
11/19/14	6	8:59	Cell	2023	22.5	175	3937.5
11/19/14	7	9:12	Cell	2024	22.5	168	3780
11/19/14	8	9:20	Cell	2024	22.5	162	3645
11/19/14	9	9:31	Cell	2024	22.5	150	3375
11/19/14	10	9:55	Cell	2025	22.5	144	3240
11/19/14	11	10:10	Cell	2025	22.5	130	2925
11/19/14	12	10:18	Cell	2025	22.5	115	2587.5
11/19/14	13	10:30	Cell	2023	22.5	97	2182.5
11/19/14	14	11:00	Cell	2022	22.5	77	1732.5
11/19/14	15	11:10	Cell	2021	22.5	59	1327.5
11/19/14	16	11:20	Cell	2021	22.5	35	787.5
11/19/14	17	11:39	Cell	2021	13	19	247

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Seaming and Non Destructive Test Log

Project No.: I14-116
Project Name: Green Recycling
Start Date: 11/17/14
Project Location: Maysville, NC

Material: HDPE

Thickness : 60 mil

WELD DATE	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		Time		Tech	Date
										Start	Finish	Start	Finish		
11/19/14	1/2	8:30	JGR	28	850	4	0+00	2+12	2+12	30	30	11:39	11:44	VM	11/19/14
11/19/14	2/3	8:30	SR	25	850	4	0+00	2+06	2+06	30	30	11:40	11:45	VM	11/19/14
11/19/14	3/4	9:16	SR	25	850	4	0+00	1+98	1+98	30	30	11:47	11:52	VM	11/19/14
11/19/14	4/5	9:17	JGR	28	850	4	0+00	1+91	1+91	30	30	11:48	11:53	VM	11/19/14
11/19/14	5/6	10:00	JGR	28	850	4	0+00	1+81	1+81	30	30	11:56	12:01	VM	11/19/14
11/19/14	6/7	10:03	SR	25	850	4	0+00	1+72	1+72	30	30	11:58	12:03	VM	11/19/14
11/19/14	7/8	10:40	SR	25	850	4	0+00	1+05	1+05	30	30	13:06	13:11	VM	11/19/14
11/19/14	8/9	10:39	JGR	28	850	4	0+00	1+56	1+56	30	30	13:02	13:07	VM	11/19/14
11/19/14	9/10	11:14	JGR	28	850	4	0+00	1+47	1+47	30	30	13:11	13:16	VM	11/19/14
11/19/14	10/11	11:15	SR	25	850	4	0+00	1+37	1+37	30	30	13:12	13:17	VM	11/19/14
11/19/14	11/12	11:43	SR	25	850	4	0+00	1+22	1+22	30	30	13:21	13:26	VM	11/19/14
11/19/14	12/13	11:44	JGR	28	850	4	0+00	1+06	1+06	30	30	13:23	13:28	VM	11/19/14
11/19/14	13/14	12:33	SR	25	850	4	0+00	0+87	0+87	30	30	13:59	14:04	VM	11/19/14
11/19/14	14/15	13:41	SR	25	850	4	0+00	0+69	0+69	30	30	14:00	14:05	VM	11/19/14
11/19/14	15/16	14:03	SR	25	850	4	0+00	0+50	0+50	30	30	14:21	14:26	VM	11/19/14
11/19/14	16/17	14:12	SR	25	850	4	0+00	0+24	0+24	30	30	14:27	14:32	VM	11/19/14

CHESAPEAKE
CONTAINMENT SYSTEMS, INC.

Repair Log

Project No.: I14-116
Project Name: Green Recycling
Date: 11/17/14
Project Location: Maysville, NC

Material: HDPE
Thickness: 60 mil

Repair #	Defect Code	Defect Location	Repair Date	Repair Time	Repair Type	Approx Size	Machine ID	Repair Tech	Vacuum Test		Vac Test Tech
		Seam #							P/F	Date	
1	DS-1	3/4 98' F BOS	11/19/14	13;49	Patch	2X6	14	DR	Pass	11/19/14	VM
2	DS-2	6/7 43' F BOS	11/19/14	13:47	Patch	2X6	14	DR	Pass	11/19/14	VM
3	DS-3	9/10 60' F BOS	11/19/14	14:06	Patch	2X6	14	DR	Pass	11/19/14	VM
4	BO	12/13 1' F BOS	11/19/14	14:16	Patch	2X3	14	DR	Pass	11/19/14	VM
5	DS-4	14/15 18' F BOS	11/19/14	14:36	Patch	2X6	14	DR	Pass	11/19/14	VM

CHESAPEAKE CONTAINMENT SYSTEMS, INC.

Geomembrane Seam Destructive Test Log

Project No.: I14-116
Project Name: Green Recycling
Start Date: 11/17/14
Project Location: Maysville, NC

Material: HDPE

60 Mil Thickness

Project Seam Requirements

	Fusion:		Extrusion:
Peel:	90	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 (or %max)	Barrel/ Preheat ºF/ºF	Peel (ppi) IN/OUT					Shear (ppi)							
							1	2	3	4	5	1	2	3	4	5			
1	3/4 98' F BOS	11/19/14	25	SR	850/4		124	125	121	126	131	175	181	175	174	174	Pass	RC	-
							121	123	124	123	134								
2	6/7 43' F BOS	11/19/14	25	SR	850/4		124	121	132	126	127	178	177	172	170	174	Pass	RC	-
							122	125	131	124	127								
3	9/10 60' F BOS	11/19/14	28	JGR	850/4		126	131	130	127	125	178	175	170	171	175	Pass	RC	-
							123	132	125	125	124								
4	14/15 18' F BOS	11/19/14	28	JGR	850/4		121	126	127	123	121	178	175	172	176	177	Pass	RC	-
							120	125	124	121	127								

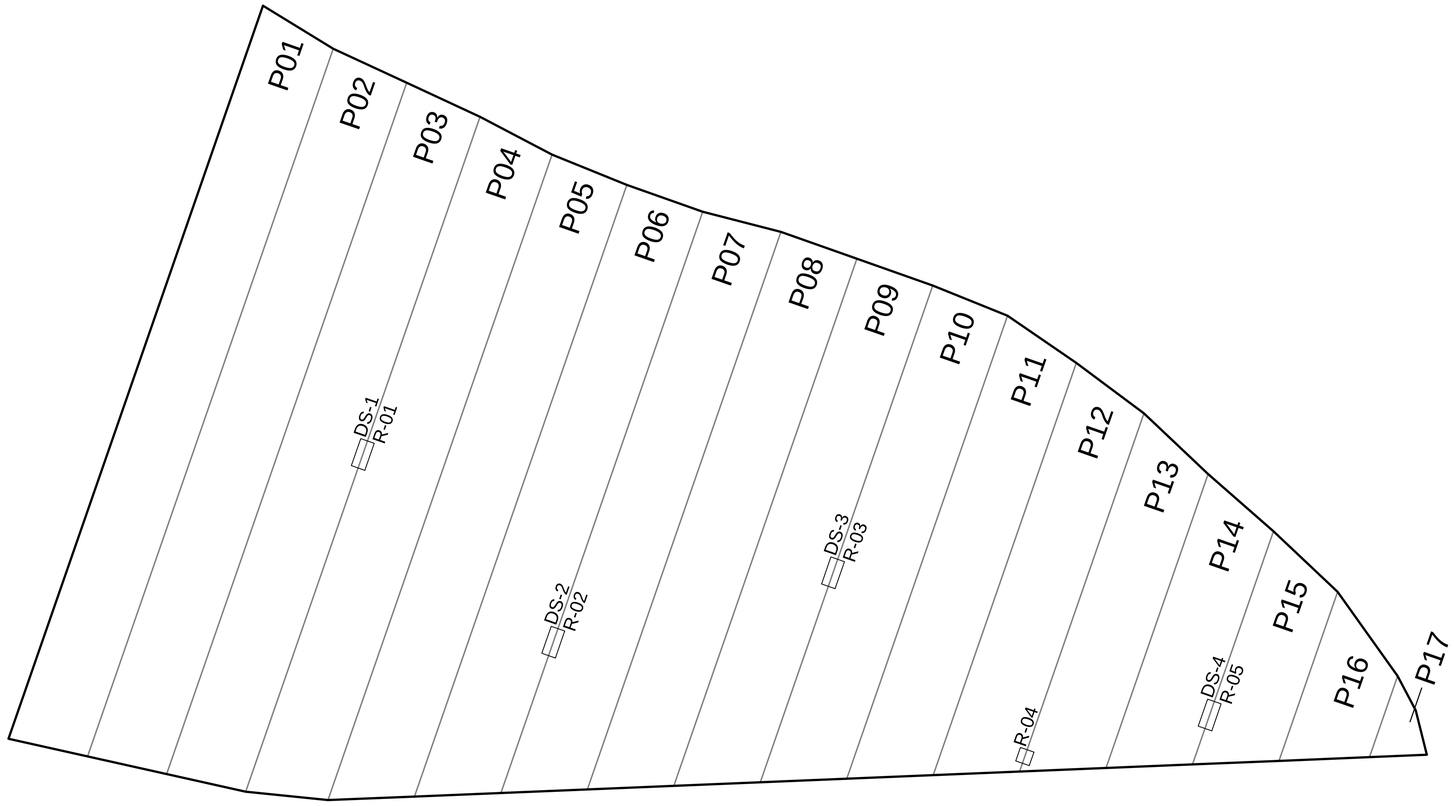
Legends

DEFECT CODE			
BO-	Burn Out	SI-	Soil Surface
CR-	Crease	DD-	Deployment Damage
DS-	Destructive Test Number	MD-	Material Damage
EE-	Earthwork Equipment Damage	WR-	Wrinkle
FM-	Fishmouth	WS-	Welder Restart
FT-	Pressure Test Cut	FD-	Factory Defect
T-	Joint	AT-	Air Test

REPAIR TYPE	
C-	Cap Strip
P-	Patches
B-	Extrudate Bead
GB-	Grind & Bead
BT-	Boot

NOTATIONS	
SOS or 0'	Beginning of Seam
EOS	End of Seam
--	To an Area
>	From an Area
NOAT	No AT

TEST RESULTS	
P-	Pass
F-	Fail



LEGEND

	PANEL BOUNDARY
	PANEL
P00	PANEL NUMBER
R-0	REPAIR LOCATION
DS-0 R-0	DESTRUCT LOCATION

NORTH

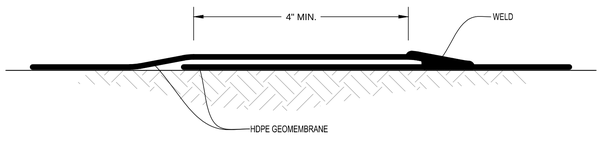
RECORD LAYOUT DRAWING

20' 0 20' 40' 60'

SCALE : 1" = 20'

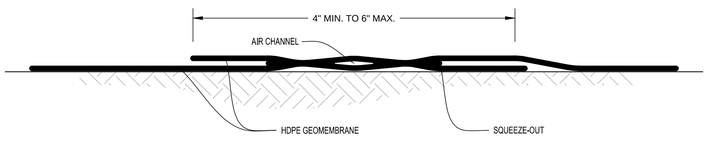
Typical Extrusion Weld

NOT TO SCALE



Typical Hot Wedge Double Track Fusion Weld

NOT TO SCALE



NOTE:

RECORD LAYOUT DRAWING IS FOR GENERAL ORIENTATION ONLY. INFORMATION DOCUMENTED AND SUBMITTED AS FINAL RECORD COPY OF INSTALLATION. THIS IS NOT A SURVEYED DRAWING.

352 Earls Road
Middle River, MD 21220

1.888.50.LINER(54637)
office: 410.335.5886
fax: 443.303.1682

CHESAPEAKE CONTAINMENT SYSTEMS, INC.
www.ccsliners.com

ENGINEER SEAL

RECORD LAYOUT DRAWING PLAN

MAYSVILLE C&D LANDFILL
PHASE 1 CELL 1
MAYSVILLE, NORTH CAROLINA

SCALE	DATE
1" = 20'	11/24/2014
CCS JOB NUMBER	SHEET NUMBER
I14-116	01 OF 01

DRAWING NUMBER

R-01

Appendix 10

High Density Polyethylene (HDPE) Liner

Destructive Testing Results

(Services Provided by Geotechnics, Inc.)

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: ERM
CLIENT PROJECT: GREEN RECYCLING
MAYSVILLE LANDFILL
PROJECT NO.: L14148-03
LAB ID NO.: L14148-03-01
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	134.3	SE1	<10
2	125.6	SE1	<10
3	132.7	SE1	<10
4	127.0	SE1	<10
5	145.4	SE1	<10
AVERAGE	**133.0**		
STD. DEV.	7.02		
INSIDE TRACK (WELD "B")			
1	137.3	SE1	<10
2	138.1	SE1	<10
3	131.6	SE1	<10
4	128.1	SE1	<10
5	134.8	SE1	<10
AVERAGE	**134.0**		
STD. DEV.	3.71		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	154.3	SE1
2	173.7	SE1
3	166.2	SE1
4	156.4	SE1
5	162.0	SE1
AVERAGE	**162.5**	
STD. DEV.	6.98	

CHECKED BY: BF DATE: 11-20-14

C:\Excel\Templates\[HDP&S-DFusion.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • 412-823-7600 • FAX 412-823-8999 • www.geotechnics.net

PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: ERM
CLIENT PROJECT: GREEN RECYCLING
MAYSVILLE LANDFILL
PROJECT NO.: L14148-03
LAB ID NO.: L14148-03-02
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	136.2	SE1	<10
2	143.9	SE1	<10
3	137.6	SE1	<10
4	145.3	SE1	<10
5	141.2	SE1	<10
AVERAGE	**140.8**		
STD. DEV.	3.50		
INSIDE TRACK (WELD "B")			
1	137.5	SE1	<10
2	140.0	SE1	<10
3	131.7	SE1	<10
4	131.9	SE1	<10
5	131.1	SE1	<10
AVERAGE	**134.4**		
STD. DEV.	3.62		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	158.5	SE1
2	158.2	SE1
3	161.7	SE1
4	160.6	SE1
5	158.4	SE1
AVERAGE	**159.5**	
STD. DEV.	1.41	

CHECKED BY: BF DATE: 11-20-14

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING

ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: ERM
CLIENT PROJECT: GREEN RECYCLING
MAYSVILLE LANDFILL
PROJECT NO.: L14148-03
LAB ID NO.: L14148-03-03
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	124.1	SE1	<10
2	116.6	SE1	<10
3	115.7	SE1	<10
4	116.8	SE1	<10
5	115.5	SE1	<10
AVERAGE	**117.7**		
STD. DEV.	3.22		
INSIDE TRACK (WELD "B")			
1	138.2	SE1	<10
2	133.8	SE1	<10
3	136.7	SE1	<10
4	128.0	SE1	<10
5	132.9	SE1	<10
AVERAGE	**133.9**		
STD. DEV.	3.53		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	166.3	SE1
2	155.0	SE1
3	159.8	SE1
4	160.2	SE1
5	159.8	SE1
AVERAGE	**160.2**	
STD. DEV.	3.59	

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PEEL AND SHEAR TEST RESULTS
DESTRUCTIVE SEAM TESTING
ASTM D 6392

geotechnics
INTEGRITY IN TESTING

CLIENT: ERM
CLIENT PROJECT: GREEN RECYCLING
MAYSVILLE LANDFILL
PROJECT NO.: L14148-03
LAB ID NO.: L14148-03-04
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	143.0	SE1	<10
2	144.7	SE1	<10
3	143.7	SE1	<10
4	127.2	SE1	<10
5	143.2	SE1	<10
AVERAGE	**140.4**		
STD. DEV.	6.61		
INSIDE TRACK (WELD "B")			
1	139.2	SE1	<10
2	136.9	SE1	<10
3	134.8	SE1	<10
4	138.6	SE1	<10
5	132.4	SE1	<10
AVERAGE	**136.4**		
STD. DEV.	2.51		

BONDED SEAM (SHEAR) STRENGTH

REPLICATE No.	PEAK LOAD (lbs/in)	EPA BREAK CLASSIFICATION CODE
1	161.3	SE1
2	160.7	SE1
3	158.9	SE1
4	162.1	SE1
5	159.9	SE1
AVERAGE	**160.6**	
STD. DEV.	1.11	

CHECKED BY: BF DATE: 11-20-14

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Appendix 11

Geocomposite Roll Certifications

November 17, 2014
Chesapeake Containment Systems, Inc.
352 Earls Road
Middle River, MD, 21220

Ref. : Green Recycling Landfill, NC
Customer P.O. # 14-214
Product : TN 300-2-6

We certify that the TN 300-2-6 drainage geocomposite, meets the project requirements as stated in the specifications. The properties listed in this section are:

Property	Test Method	Unit	Required Value	Qualifier
Geonet[3]				
Mass per Unit Area	ASTM D 5261	lbs/ft^2	0.160	MAV[6]
Thickness	ASTM D 5199	mil	250	MAV
Carbon Black	ASTM D 4218	%	2.0 - 3.0	Range
Tensile Strength	ASTM D 5035	lbs/in	55	MAV
Melt Flow	ASTM D 1238[2]	g/10 min	1.0	Maximum
Density	ASTM D 1505	g/cm^3	0.94	Minimum
Composite				
Ply Adhesion	ASTM D 7005	lb/in	0.33	MAV
Transmissivity[1]	ASTM D 4716	m^2/sec	5.0×10^{-4}	MAV
Geotextile[3 & 4]				
Fabric Weight	ASTM D 5261	oz/yd^2	6.0	MARV[5]
Grab Strength	ASTM D 4632	lbs	150	MARV
Grab Elongation	ASTM D 4632	%	50	MARV
Tear Strength	ASTM D 4533	lbs	70	MARV
Puncture Resistance	ASTM D 4833	lbs	90	MARV
Permittivity	ASTM D 4491	sec^{-1}	1.30	MARV
AOS	ASTM D 4751	US Sieve	70	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 0.25 and a confining pressure of 10,000 psf between steel plates after 24 hours.

2 Condition 190/2.16

3 Geotextile and Geonet properties are prior to lamination.

4 Geotextile data is provided by the supplier.

5 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.

6 Minimum average value.

Sincerely,

Nilay Patel

Nilay Patel
QA Manager

APPROVED 5 QA

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : contact@skaps.com

Product : **TN 300-2-6**
Project : **Green Recycling Landfill, NC**

We, the Geocomposite Manufacturer, hereby certify the following for the material delivered to the above referenced project :

Roll	Geocomposite Roll Number	Geonet Roll Number	Geotextile Roll Number		Ply Adhesion (lb/in)		Geocomposite Transmissivity (m^2/sec)
			Side A	Side B	Minimum	Average	
1	62571010001	62571010001 - N	6257.006	6257.002	2.55	3.89	8.52×10^{-4}
2	62571010002	62571010002 - N	6257.006	6257.002			
3	62571010003	62571010003 - N	6257.006	6257.002			
4	62571010004	62571010004 - N	6257.006	6257.002			
5	62571010005	62571010005 - N	6257.006	6257.002			
6	62571010006	62571010006 - N	6257.006	6257.002			
7	62571010007	62571010007 - N	6257.006	6257.002			
8	62571010008	62571010008 - N	6257.008	6257.005			
9	62571010009	62571010009 - N	6257.008	6257.005			
10	62571010010	62571010010 - N	6257.008	6257.005			
11	62571010011	62571010011 - N	6257.008	6257.005			
12	62571010012	62571010012 - N	6257.008	6257.005			
13	62571010013	62571010013 - N	6257.008	6257.005			
14	62571010014	62571010014 - N	6257.008	6257.005			
15	62571010015	62571010015 - N	6257.003	6257.001	2.58	3.65	
16	62571010016	62571010016 - N	6257.003	6257.001			
17	62571010017	62571010017 - N	6257.003	6257.001			
18	62571010018	62571010018 - N	6257.003	6257.001			
19	62571010019	62571010019 - N	6257.003	6257.001			
20	62571010020	62571010020 - N	6257.003	6257.001			
21	62571010021	62571010021 - N	6257.003	6257.001			
22	62571010022	62571010022 - N	6257.007	6257.004			
23	62571010023	62571010023 - N	6257.007	6257.004			
24	62571010024	62571010024 - N	6257.007	6257.004			

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : contact@skaps.com

Product : **TN 300-2-6**
Project : **Green Recycling Landfill, NC**

We, the Geonet Manufacturer, hereby certify the following for the material sent to the above referenced project :

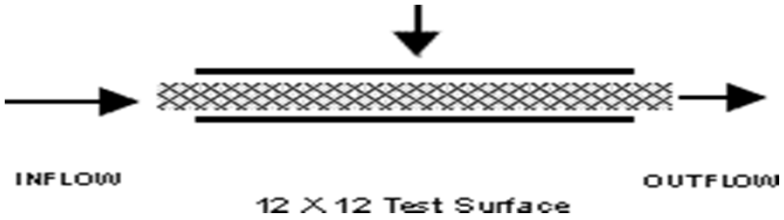
Geonet Roll Number	Resin Lot Number	Geonet Density (gm/cc)	Mass Per Unit Area (lb/ft^2)	Thickness (mils)	Carbon Black (%)	Tensile Strength (MD) (lb/in)	Transmissivity (m^2/sec)
62571010001 - N	XOMX 710338	0.9557	0.289	297	2.42	96	
62571010002 - N	XOMX 710338	0.9557					
62571010003 - N	XOMX 710338	0.9557					
62571010004 - N	XOMX 710338	0.9557					
62571010005 - N	XOMX 710338	0.9557					
62571010006 - N	XOMX 710338	0.9557					
62571010007 - N	XOMX 710338	0.9557					
62571010008 - N	XOMX 710338	0.9557					
62571010009 - N	XOMX 710338	0.9557					
62571010010 - N	XOMX 710338	0.9557					
62571010011 - N	XOMX 710338	0.9557					
62571010012 - N	XOMX 710338	0.9557					
62571010013 - N	XOMX 710338	0.9557					
62571010014 - N	XOMX 710338	0.9557					
62571010015 - N	XOMX 710338	0.9551	0.287	289	2.34	94	
62571010016 - N	XOMX 710338	0.9551					
62571010017 - N	XOMX 710338	0.9551					
62571010018 - N	XOMX 710338	0.9551					
62571010019 - N	XOMX 710338	0.9551					
62571010020 - N	XOMX 710338	0.9551					
62571010021 - N	XOMX 710338	0.9551					
62571010022 - N	XOMX 710338	0.9551					
62571010023 - N	XOMX 710338	0.9551					
62571010024 - N	XOMX 710338	0.9551					

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : contact@skaps.com

ASTM D 4716

Client:	Chesapeake Containment Systems, Inc.	**Job #**	6257
Project:	Green Recycling Landfill, NC		
Product:	TN 300-2-6		

Test Configuration:



Test Information:

Boundary Conditions:	Steel Plate Geocomposite Steel Plate	**Normal Load:**	10000
		Gradient:	0.25
		Seating Time:	24 hours
		Flow Direction:	MD

Test Results:

Roll No.	Pressure, psf	Gradient	Transmissivity, m^2/sec
			24 hours
62571010001	10000	0.25	8.52×10^{-4}

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : contact@skaps.com

POLYETHYLENE RESIN CERTIFICATION

Customer Name : Chesapeake Containment Systems, Inc.
Project Name : Green Recycling Landfill, NC
Geocomposite Manufacturer : SKAPS Industries
Geocomposite Production Plant : Commerce, GA
Geocomposite Brand Name : TN 300-2-6

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*
Osterman and Company	Chevron, TX	HDPE	XOMX 710338	Density	ASTM D1505	gm / cc	0.9510	0.9506
				Melt flow Index	ASTM D1238[(a)]	gm / 10 min	0.12	0.14

(a) Condition 190/2.16
* Data from SKAPS Quality Control

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : contact@skaps.com

Product : **TN 300-2-6**
Project : **Green Recycling 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 %	MD TRAP lbs.	XMD TRAP lbs.	PUNCTURE lbs.	AOS us sieve	PERM-ITY sec^{-1}
62571010001	6257.006	6.31	161	71	175	75	78	84	95	70	1.76
	6257.002	6.67	163	74	172	83	73	86	100	70	1.76

571 Industrial Parkway, Commerce, GA 30529 Ph : 706-336-7000 Fax : 706-336-7007 Email : contact@skaps.com

Appendix 12

Geocomposite Conformance Testing

(Services Provided by Geotechnics, Inc.)

geotechnics
INTEGRITY IN TESTING

CONFORMANCE TEST RESULTS

CLIENT: ERM
CLIENT PROJECT: GREEN RECYCLING MAYSVILLE LANDFILL
PROJECT NO.: L14148-02
LAB ID NO.: L14148-02-01
MATERIAL: SKAPS TN 300-2-6 GEOCOMPOSITE
ROLL NO: 62571010001

TEST	ASTM METHOD	UNITS	SPECIMEN NO. 1	2	3	4	5	AVE	STD
PLY ADHESION	D 7005								
	SIDE "A"	MD-gm/in	2565	2100	2304	3484	2168	**2524.2**	505.84
	SIDE"B"	MD-gm/in	2168	1328	2463	2656	2145	**2152.0**	453.86

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TRANSMISSIVITY TEST RESULTS
ASTM D 4716

geotechnics
INTEGRITY IN TESTING

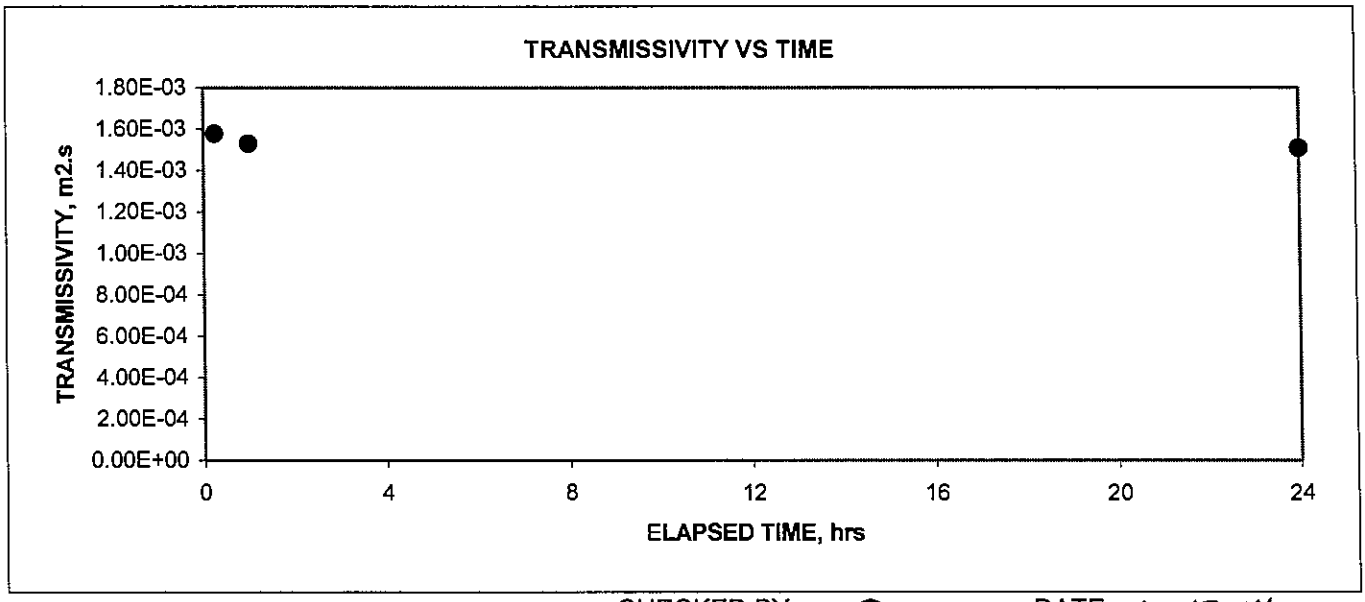
CLIENT: ERM
PROJECT: GREEN RECYCLING
MAYSVILLE LANDFILL
MATERIAL: SKAPS TN 300-2-6 GEOCOMPOSITE

PROJECT NO.: L14148-02
LAB I.D. NO.: L14148-02-01
ROLL NO.: 62571010001
REPLICATE NO.: 1 of 1

TEST SECTION: PLATE
GEOCOMPOSITE-MD
PLATE

10,000 psf NORMAL COMPRESSIVE STRESS

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)
0.25	3.40	0.40	0.25	1230 1230 1230	10 10 10	19.8	3.95E-01	1.907	1.58E-03
1	3.40	0.40	0.25	1190 1190 1190	10 10 10	19.7	3.83E-01	1.849	1.53E-03
24	3.40	0.40	0.25	1170 1170 1170	10 10 10	19.6	3.77E-01	1.822	1.51E-03



CHECKED BY: JO DATE: 11-19-14

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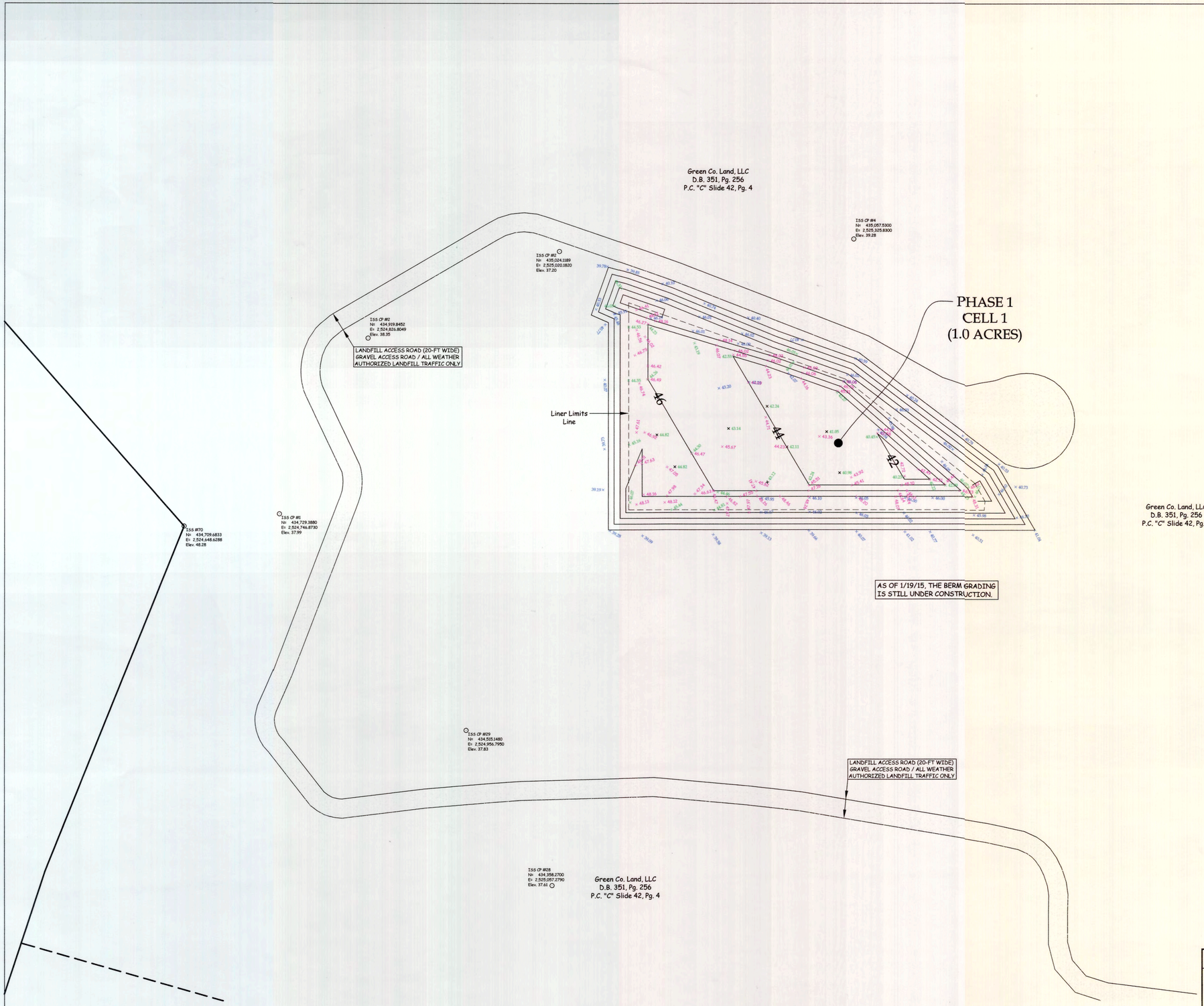
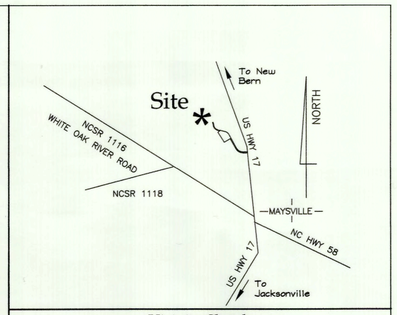
Appendix 13

Operational Cover As-Built Drawing

(Services Provided by Parker & Associates, Inc.)





Vicinity Sketch

Not to Scale

GPS Grid North
NAD '83, 2007 Adjustment

As-Built Legend:

- 42.23 - Elevations shots taken 11/12/14 for barrier layer
- 44.55 - Elevations shots taken 11/16/14 for barrier layer
- 46.42 - Elevations shots taken 01/08/15, 01/13/15, and 01/19/15 for protection layer

CP - Control Point
D.B. - Deed Book
E - Easting
ISS - Iron Stake Set
N - Northing
PC - Plat Cabinet
Pg. - Page

NORTH CAROLINA PROFESSIONAL SEAL L-2884 LAND SURVEYOR EDWIN N. FOLEY

I, Edwin N. Foley, certify that this project was completed under my supervision, from an actual ground survey under my supervision; that the survey was completed on As Noted; and all coordinates are based on GPS Grid North, NAD '83; 2007 Adjustment.

Edwin N. Foley, P.L.S., L-2884 1/22/15

Notes:

1. All distances are horizontal ground, U.S. survey feet.
2. Elevations per NAVD '88 Datum.
3. Horizontal per GPS Grid North, NAD '83, 2007 Adjustment.
4. No Register of Deed search done by or furnished to surveyor regarding deed or covenant restrictions.
5. Survey of Phase 1, Cell 1 on 10/27/14, 11/12/14, & 11/16/14.
6. The GPS portion of the boundary work was performed to third order, Class I, FGCC specifications, The coordinates were obtained by Real Time Kinematic Differential GPS Observations using Trimble Survey Grade 5800 GPS Unit, NCGS RTK Network Adjustments to NC Grid NAD' 83, 2007 Adjustments.
7. This map is prepared from an electronic overlay of the design plan prepared by ERM NC, INC. dated February 2012, and signed 1-6-14.

Rev. 01/08/15 JJS - Added field data surveyed on 11/12/14
Rev. 01/19/15 JJS - Added additional field data in this color surveyed on 01/19/15
Rev. 01/15/15 JJS - Added additional field data in this color surveyed on 01/13/15
Rev. 01/08/15 JJS - Added additional field data in this color surveyed on 01/08/15; removed elevations surveyed on 10/27/14 & 11/12/14 for clarity

Topographic Survey Map

MAYSVILLE C&D LANDFILL PHASE 1, CELL 1

Maysville Twp., Jones Co., North Carolina

For:
Green Recycling Solutions, LLC
11710 Hwy 17
Maysville, North Carolina 28555
(910) 938-5900

Parker & Associates, Inc.
Consulting Engineers - Land Surveyors - Land Planners
P.O. Box 976 - 28541-0976
306 New Bridge Street - 28540
Jacksonville, North Carolina
Phone (910) 455-2414 - Fax (910) 455-3441
Firm License Number: F-0108

Shaping Horizons

Date	Scale	Filename	Disk	Job No.
12/10/14	1"=50'	Phase 1 Cell 1 As-Built2.dwg	Acad 2402	S140507-5796

Sheet No. 1 of 1
Designed
Drawn JJS

Z:\Land Projects\3\C&D Landfill Boundary-Control\.dwg\Phase 1 Cell 1 As-Built2.dwg, 1/22/2015 1:19:10 PM, JJS

Appendix 14

High Density Polyethylene (HDPE) Pipe

Material Certifications

Lee Supply Co., Inc
Charleroi, PA
1-800-353-3747

PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

PerformancePipe.com

DRISCOPLEX® 4000 (DIPS) / 4100 (IPS)

HDPE PIPE DATA SHEET

DriscoPlex® 4000/4100 Pipe meets or exceeds:

ASTM F714 (4" and larger) AWWA C906 NSF/ANSI 61
ASTM D3035 (up to 3") AWWA C901 NSF/ANSI 61
ASTM D3350, cell classification PE445574C
PPI TR-4 designation PE4710
NSF/ANSI 14 – Available upon request

DriscoPlex® 4000/4100 Pipe for:

Potable Water, Raw Water, Sanitary Sewer,
Reclaimed Water, Storm Drain, Treated Sewage, etc.
Iron Pipe Size OD (IPS) ¾" to 54",
Ductile Iron Pipe Size OD (DIPS) 4" to 42"
40' and 50' Joints / Solid Black / Color Striping Available
500' coils available in sizes through 6"

NOMINAL PIPE PROPERTIES [1]	UNIT	TEST METHOD	VALUE PE4710
Density	gms / cm^3	ASTM D1505	0.960 (black)
Melt Index (MI) Condition 190°C / 2.16kg	gms / 10 minutes	ASTM D1238	0.08
Hydrostatic Design Basis 73° F (23° C)	psi	ASTM D2837	1600
Hydrostatic Design Basis 140° F (60° C)	psi	ASTM D2837	1000
Color: UV Stabilizer [C]	---	ASTM D3350	Min 2% Carbon Black
NOMINAL MATERIAL PROPERTIES [1] [2]	**UNIT**	**TEST METHOD**	**VALUE PE4710**
Flexural Modulus 2% Secant – 16:1 span: depth. 0.5 in / min.	psi	ASTM D790	>120,000
Tensile Strength at Yield	psi	ASTM D638 Type IV	>3500
Elongation at Break 2 in / min., Type IV Bar	%	ASTM D638	>800
Elastic Modulus	psi	ASTM D638	>175,000
Hardness	Shore D	ASTM D2240	62
PENT	hrs	ASTM F1473	>500
Vicat Softening Temperature	°F	ASTM D1525	256
Brittleness Temperature	°F	ASTM D746	< -103
Thermal Expansion	in / in / °F	ASTM D696	1.0×10^{-4}

1. This is not a product specification and does not guarantee or establish specific minimum or maximum values or manufacturing tolerance for material or piping products to be supplied.
2. Values obtained from tests of specimens taken from piping product may vary from these typical values.

When Performance Matters Rely on Performance Pipe

Bulletin: PP101 / January 2011

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Performance Pipe, a division of Chevron Phillips Chemical Company LP | 5085 W. Park Blvd | Suite 500 | Plano, TX 75093 | Phone: 800-527-0662 | Fax: 972-599-7348

This data sheet provides typical properties for Performance Pipe piping products. Before using this product, the user is advised and cautioned to make their own determination and assessment of the safety and suitability of the product for the specific use in question and is further advised against relying on the information contained herein as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is application to the user's specific application. Chevron Phillips Chemical Company LP does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, allegedly arising from any usage of any trade or from any course of dealing in connection with the use of information contained herein or the product itself. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself. Further, information contained herein is given without reference to any intellectual property issues, as well as federal, state or local laws which may be encountered in the use thereof. Such questions should be investigated by the user. The data sheet may change periodically. Visit www.Performance Pipe.com for the most current data sheet.

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Lee Supply Co., Inc
Charleroi, PA
1-800-353-3747

Iron Pipe Size (IPS) and Dimension Data

PE4710 (PE3408)

DriscoPlex® Pipe for Municipal and Industrial Applications

Pressure Ratings are calculated using 0.63 design factor for HDS at 73°F as listed in PPI TR-4 for PE 4710 materials. HDPE can accomodate up to 1.5 times the pipe pressure rating for a recurring surge and up to 2.0 times the pipe pressure rating for an occasional surge. Temperature, Chemical, and Environmental use considerations may require use of additional design factors.

Pressure Rating		125 psi DR 17.0			100 psi DR 21.0			80 psi DR 26.0			63 psi DR 32.5			
Nominal Pipe Size	IPS OD (in)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Nominal Pipe Size
1 1/4"	1.660													1 1/4"
1 1/2"	1.900													1 1/2"
2"	2.375	0.140	2.078	0.43										2"
3"	3.500	0.206	3.063	0.94										3"
4"	4.500	0.265	3.938	1.55	0.214	4.046	1.27							4"
6"	6.625	0.390	5.798	3.36	0.315	5.957	2.75	0.255	6.084	2.24	0.204	6.193	1.81	6"
8"	8.625	0.507	7.550	5.69	0.411	7.754	4.66	0.332	7.921	3.80	0.265	8.063	3.07	8"
10"	10.750	0.632	9.410	8.83	0.512	9.665	7.24	0.413	9.874	5.91	0.331	10.048	4.77	10"
12"	12.750	0.750	11.160	12.43	0.607	11.463	10.19	0.490	11.711	8.31	0.392	11.919	6.71	12"
14"	14.000	0.824	12.253	14.98	0.667	12.586	12.28	0.538	12.859	10.02	0.431	13.086	8.09	14"
16"	16.000	0.941	14.005	19.57	0.762	14.385	16.04	0.615	14.696	13.09	0.492	14.957	10.56	16"
18"	18.000	1.059	15.755	24.77	0.857	16.183	20.30	0.692	16.533	16.57	0.554	16.826	13.37	18"
20"	20.000	1.176	17.507	30.58	0.952	17.982	25.07	0.769	18.370	20.45	0.615	18.696	16.50	20"
22"	22.000	1.294	19.257	37.00	1.048	19.778	30.33	0.846	20.206	24.75	0.677	20.565	19.97	22"
24"	24.000	1.412	21.007	44.03	1.143	21.577	36.10	0.923	22.043	29.45	0.738	22.435	23.76	24"
26"	26.000	1.529	22.759	51.67	1.238	23.375	42.36	1.000	23.880	34.57	0.800	24.304	27.89	26"
28"	28.000	1.647	24.508	59.93	1.333	25.174	49.13	1.077	25.717	40.09	0.862	26.173	32.34	28"
30"	30.000	1.765	26.258	68.80	1.429	26.971	56.40	1.154	27.554	46.02	0.923	28.043	37.13	30"
32"	32.000	1.882	28.010	78.28	1.524	28.769	64.17	1.231	29.390	52.36	0.985	29.912	42.24	32"
34"	34.000	2.000	29.760	88.37	1.619	30.568	72.44	1.308	31.227	59.11	1.046	31.782	47.69	34"
36"	36.000	2.118	31.510	99.07	1.714	32.366	81.21	1.385	33.064	66.27	1.108	33.651	53.46	36"
42"	42.000	2.471	36.761	134.84	2.000	37.760	110.54	1.615	38.576	90.20	1.292	39.261	72.77	42"
48"	48.000	2.824	42.013	176.12	2.286	43.154	144.38	1.846	44.086	117.81	1.477	44.869	95.05	48"
54"	54.000	3.176	47.266	222.90	2.571	48.549	182.73	2.077	49.597	149.10	1.662	50.477	120.29	54"

This size and dimension chart is intended for reference purposes. It should not be used in place of the advice from a licensed Professional Engineer. Pipe weights are calculated in accordance with PPI TR-7. Average inside diameter is calculated using IPS OD and Minimum wall plus 6% for use in estimating fluid flows. Actual ID will vary. When designing components to fit the pipe ID, refer to pipe dimension and tolerances in the applicable pipe manufacturing specification.

Visit www.performancepipe.com for the most current literature.

August 2014 Supersedes all previous publications
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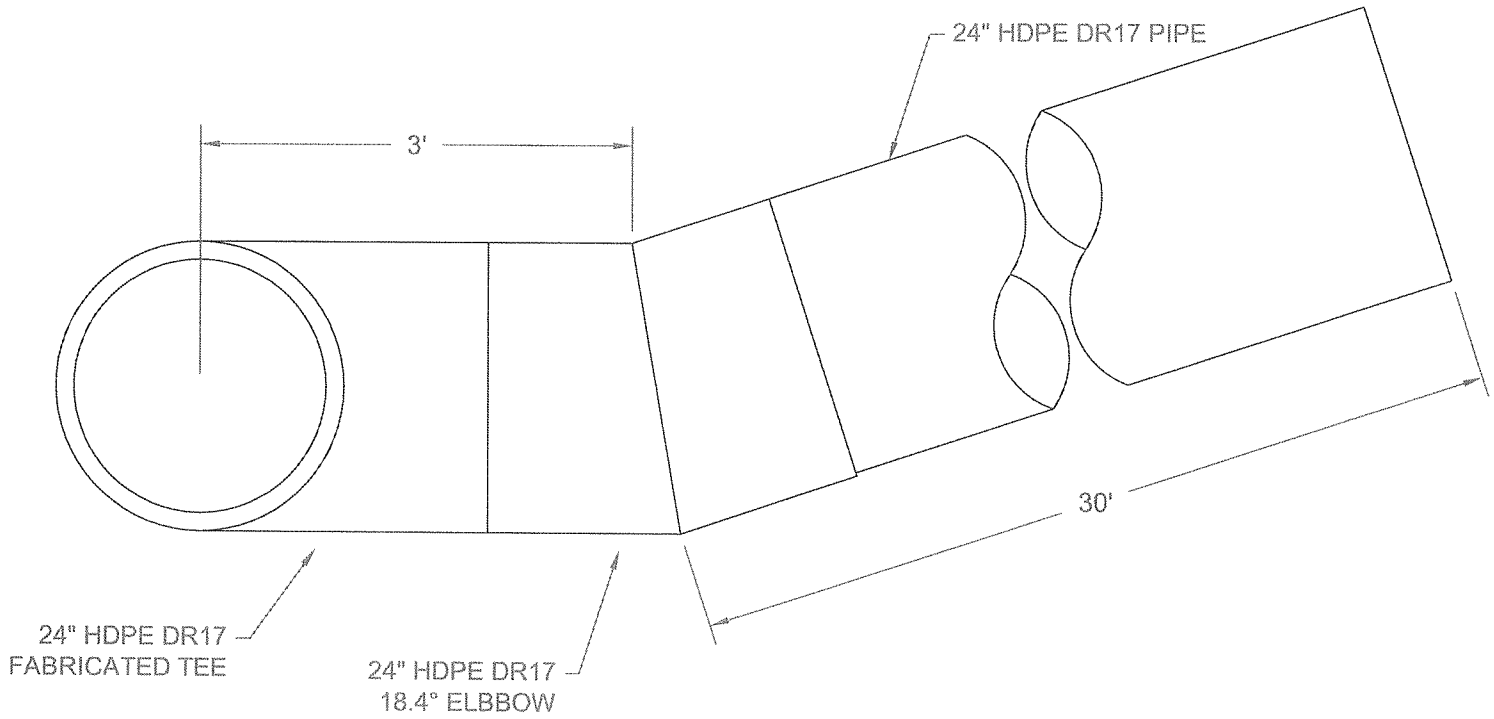

24" HDPE DR17 SLOPE RISER

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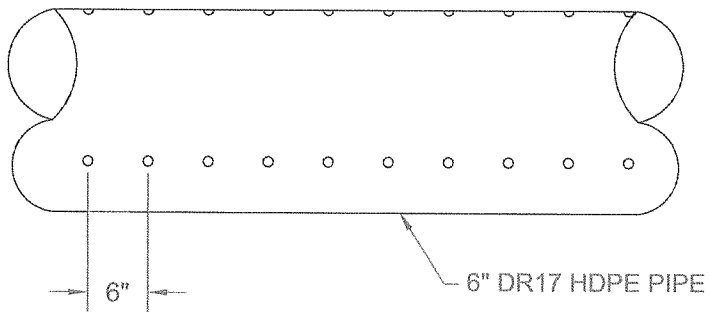
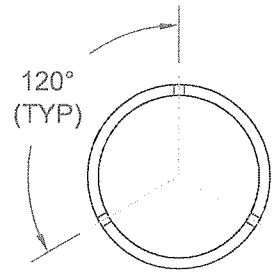
LEE SUPPLY CO. INC.

1-800-353-3747

CUSTOMER:	ERM NC INC
DRAWN BY:	MATTHEW
DATE:	SEPTEMBER 18,2014
APPROVED BY:	
REVISIONS:	





PERFORATION PATTERN
3/8" HOLES
3 ROWS EVERY 120°
6" CENTERS
NON STAGGERED

6" DR17 HDPE PERF PIPE	*EXTRUSION WELDS ARE NOT PRESSURE RATED. *DRAWINGS MUST BE SIGNED FOR APPROVAL. ONCE APPROVED ALL MATERIALS ARE NON CANCELLABEL/NON RETURNABLE. *ALL FABRICATIONS WILL BE BASED ON APPROVED DRAWINGS.	LEE SUPPLY CO. INC.	CUSTOMER:	
			DRAWN BY:	MATTHEW
			DATE:	SEPTEMBER 18,2014
			APPROVED BY:	
			REVISIONS:	
		1-800-353-3747		

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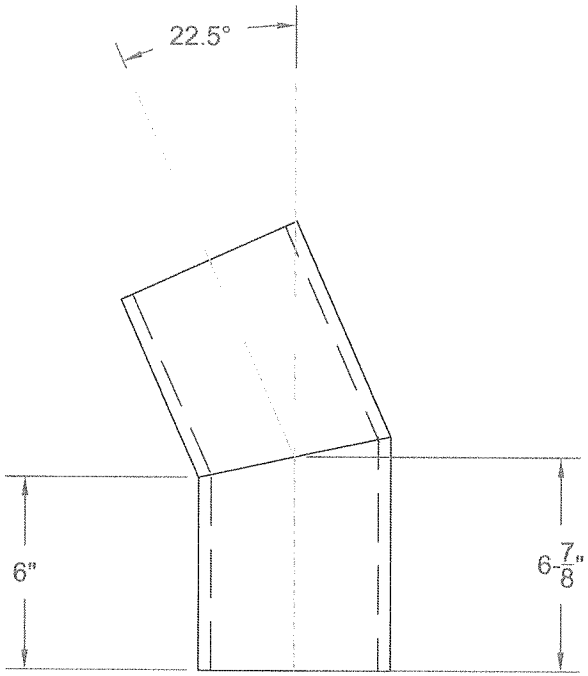

6 IN HDPE DR17 22.5°

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LEE SUPPLY CO. INC.

1-800-353-3747

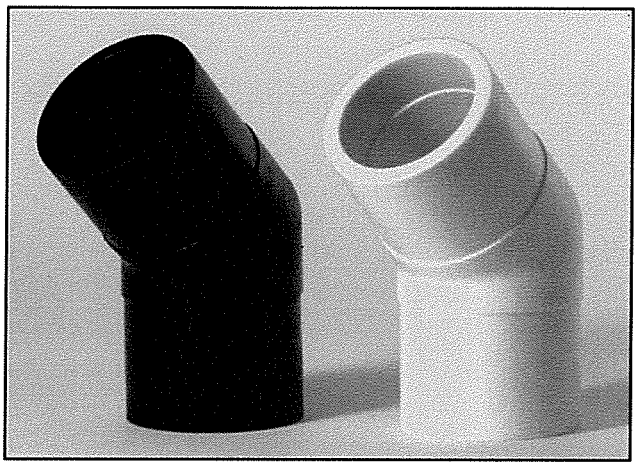
CUSTOMER:	
DRAWN BY:	MATTHEW
DATE:	SEPTEMBER 18,2014
APPROVED BY:	
REVISIONS:	

PERFORMANCE PIPE
A DIVISION OF CHEVRON PHILLIPS CHEMICAL COMPANY LP

Lee Supply Co., Inc
Charleroi, PA
1-800-353-3747

DriscoPlex® MDPE & HDPE Molded Fittings

Molded Butt 45° Elbow



DriscoPlex® MDPE and HDPE Molded Fittings are available to meet your needs in compliance with ASTM D2513, D3261, F2897 and AWWA C901 and C906 product standards.

Made in the USA and produced from high quality MDPE and HDPE material, DriscoPlex® Fittings are manufactured from PE 2708 and NSF-61/Annex G approved PE 4710 resin as listed in PPI-TR4.

DriscoPlex® PE Fittings Advantages:

- ✓ Durable
- ✓ Leak Tight
- ✓ Excellent Flow
- ✓ Easy Install
- ✓ Light Weight
- ✓ Impact Resistant
- ✓ Fusibility
- ✓ Corrosion Resistant
- ✓ Chemical Resistant
- ✓ Life Cycle Cost
- ✓ Toughness
- ✓ Environmental

DriscoPlex® PE Fittings Material Physical Properties

Property	Standard	HDPE Typical Values	MDPE Typical Values
Material Designation	ASTM F714	PE4170	PE 2708
Cell Classification	ASTM D3350	445574C (black)	234373E
Density [4]	ASTM D1505	0.960 g/cc (black)	0.939 g/cc (Yellow)
Melt Index [4]	ASTM D1238	0.08 g/10 min	0.18 g/10 min
Flexural Modulus [5]	ASTM D790	>120,000 psi	> 90,000 psi
Tensile Strength [5]	ASTM D638 Type IV	>3500 psi	> 2800 psi
SCG (PENT) [7]	ASTM F1473	>2000 hours	> 2000 hours
HDB at 73°F (23°C) [4]	ASTM D2837	1600 psi	1250 psi
Color; UV stabilizer [C] [E]	ASTM D3350	Black –	– Yellow

This is not a product specification and does not guarantee or establish specific minimum or maximum values or manufacturing tolerance for material or piping products to be supplied. Values obtained from tests of specimens taken from piping product may vary from these typical values.

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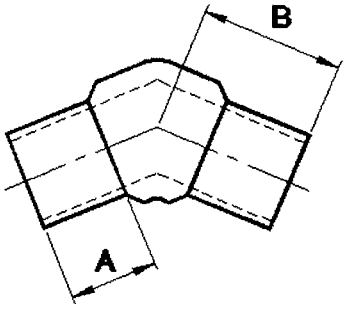

Molded Butt 45° Elbow

Butt 45° Elbow	DR/Wall	Dimensions A x B (in)	Package Quantity	Package Weight (lbs)	Box Quantity	Part Number MDPE	HDPE	FM*
2" IPS	DR 7	2.45 x 3.20	20	0.51	20	-	1079244	-
2" IPS	DR 9		20	0.43	20	-	1079245	1103089[F2]
2" IPS	DR 11		20	0.40	20	1074670	1079246	-
3" IPS	DR 7	3.10 x 5.38	4	1.95	4	-	1096055	-
3" IPS	DR 9		4	1.62	4	-	1007927	1003784[F2]
3" IPS	DR 11 / 11.5	3.00 x 5.15	4	1.40	4	1005256[C]	1007931	1071711[F1]
3" IPS	DR 17		4	1.27	4	-	1097124	-
4" IPS	DR 7	3.00 x 5.38	4	3.06	4	-	1096053	-
4" IPS	DR 9		4	2.50	4	-	1007935	1003823[F2]
4" IPS	DR 11 / 11.5	3.00 x 4.93	4	2.15	4	1005273[C]	1006430	1003844[F1]
4" IPS	DR 13.5		4	2.00	4	1005281[C]	-	-
4" IPS	DR 17		4	2.06	4	-	1097122	-
6" IPS	DR 7	4.25 x 7.12	2	10.00	2	-	1096052	-
6" IPS	DR 9		2	9.93	2	-	1080049	1003877[F2]
6" IPS	DR 11 / 11.5	4.00 x 6.38	2	6.30	2	1005287[C,I]	1006438	1003891[F1]
6" IPS	DR 13.5		2	5.95	2	1005294[C]	-	-
6" IPS	DR 17		2	6.00	2	-	1098257	-
8" IPS	DR 7	6.00 x 10.00	1	24.00	1	-	1099670	-
8" IPS	DR 9		1	22.00	1	-	1071091	1050614[F2]
8" IPS	DR 11		1	17.09	1	1005307[C]	1007943	1003928[F1]
8" IPS	DR 13.5		1	16.60	1	1005312[C]	-	-
8" IPS	DR 17		1	16.40	1	-	1097364	-

This product flyer is intended for reference purposes. It should not be used in place of the advice from a licensed Professional Engineer. Additional fitting sizes and DR available. Contact Performance Pipe. www.performancepipe.com

Legend

C - CSA I – IAPMO F1 – FM 150 F2 – FM 200
*FM Products only available in High Density Materials

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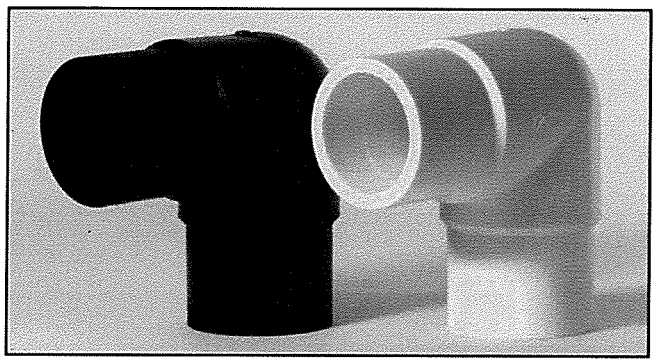
Charleroi, PA
1-800-353-3747

DriscoPlex® MDPE & HDPE Molded Fittings

Molded Butt 90° Elbow



DriscoPlex® MDPE and HDPE Molded Fittings are available to meet your needs in compliance with ASTM D2513, D3261, F2897 and AWWA C901 and C906 product standards.

Made in the USA and produced from high quality MDPE and HDPE material, DriscoPlex® Fittings are manufactured from PE 2708 and NSF-61/Annex G approved PE 4710 resin as listed in PPI-TR4.

DriscoPlex® PE Fittings Advantages:

- ✓ Durable
- ✓ Leak Tight
- ✓ Excellent Flow
- ✓ Easy Install
- ✓ Light Weight
- ✓ Impact Resistant
- ✓ Fusibility
- ✓ Corrosion Resistant
- ✓ Chemical Resistant
- ✓ Life Cycle Cost
- ✓ Toughness
- ✓ Environmental

DriscoPlex® PE Fittings Material Physical Properties

Property	Standard	HDPE Typical Values	MDPE Typical Values
Material Designation	ASTM F714	PE4170	PE 2708
Cell Classification	ASTM D3350	445574C (black)	234373E
Density [4]	ASTM D1505	0.960 g/cc (black)	0.939 g/cc (Yellow)
Melt Index [4]	ASTM D1238	0.08 g/10 min	0.18 g/10 min
Flexural Modulus [5]	ASTM D790	>120,000 psi	> 90,000 psi
Tensile Strength [5]	ASTM D638 Type IV	>3500 psi	> 2800 psi
SCG (PENT) [7]	ASTM F1473	>2000 hours	> 2000 hours
HDB at 73°F (23°C) [4]	ASTM D2837	1600 psi	1250 psi
Color; UV stabilizer [C] [E]	ASTM D3350	Black –	– Yellow

This is not a product specification and does not guarantee or establish specific minimum or maximum values or manufacturing tolerance for material or piping products to be supplied. Values obtained from tests of specimens taken from piping product may vary from these typical values.

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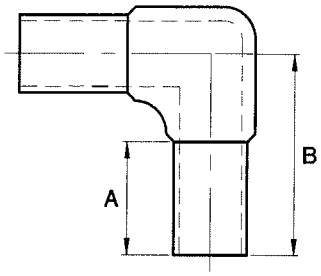

Molded Butt 90° Elbow

Butt 90° Elbow	DR/Wall	Dimensions A x B (in)	Package Quantity	Package Weight (lbs)	Box Quantity	Part Number MDPE	HDPE	FM*
1/2" CTS	0.090" wall	1.69 x 1.79	10	0.10	100	1049239	-	-
3/4" IPS	DR 11	1.72 x 2.94	10	0.08	50	1005178[C]	1007901	-
1" IPS	DR 9	1.72 x 3.06	10	0.15	50	-	1079221	-
	DR 11		10	0.12	50	1005193[C]	1007909	-
1 1/4" IPS	DR 9	2.50 x 3.88	10	0.34	20	-	1007913	-
	DR 10	3.13 x 4.50	10	0.35	20	1005215[C]	-	-
	DR 11		10	0.32	20	-	1007916	-
1 1/2" IPS	DR 11	3.00 x 4.50	10	0.41	10	-	1007922	-
2" IPS	DR 7	2.88 x 5.06	10	0.90	10	-	1097091	-
	DR 9		10	0.78	10	-	1007925	1003762[F2]
	DR 11		10	0.67	10	1005241[C,I]	1006422	1003774[F1]
3" IPS	DR 7	3.00 x 6.00	4	2.20	4	-	1096048	-
	DR 9		4	1.90	4	-	1096051	1003786[F2]
	DR 11 / 11.5	3.00 x 5.63	4	1.67	4	1007514[C,I]	1007932	1003802[F1]
	DR 17		4	1.60	4	-	1097223	-
4" IPS	DR 7	3.00 x 6.00	4	4.70	4	-	1096050	-
	DR 9		4	4.02	4	-	1007936	1050548[F2]
	DR 11 / 11.5	3.00 x 6.75	4	3.50	4	1005275[C,I]	1006432	1003848[F1]
	DR 13.5		4	3.40	4	1005282[C]	-	-
	DR 17		4	3.15	4	-	1097090	-
6" IPS	DR 7	4.25 x 8.63	2	13.25	2	-	1096049	-
	DR 9		2	12.95	2	-	1080050	1050613[F2]
	DR 11 / 11.5	4.00 x 8.25	2	7.98	2	1005289[C,I]	1006440	1003895[F1]
	DR 13.5		2	7.80	2	1005295[C]	-	-
	DR 17		2	7.55	2	-	1098336	-
8" IPS	DR 7	6.00 x 11.81	1	27.00	1	-	1007947	-
	DR 9		1	26.00	1	-	1071089	1050613[F2]
	DR 11		1	20.27	1	1005309[C]	1007944	1003933[F1]
	DR 13.5		1	19.95	1	1005314[C]	-	-
	DR 17		1	19.30	1	-	1098783	-

This product flyer is intended for reference purposes. It should not be used in place of the advice from a licensed Professional Engineer. Additional fitting sizes and DR available. Contact Performance Pipe. www.performancepipe.com

Legend

C - CSA I – IAPMO F1 – FM 150 F2 – FM 200
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Material: HDPE - PE4710/3608/100

REVISION HISTORY			
REV	DESCRIPTION	DATE	DESIGNER
1	VALID - ORIGINAL DWG	05/19/11	
2	EDIT L COLUMN	07/27/11	
3	EDIT T-2 DIMENSIONS	09/02/11	Matthew
5	UPDATE TOLERANCE ON SUBMITTAL SHEET	3/6/2013	JEREMY GARZA
6	CORRECT EDITS	5/16/2013	JEREMY GARZA

Wall Thickness and Hub Height (2" - 16")

	SDR's																			
	7		9		11		13.5		15.5		17		19		21		26		32.5	
Size	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2
2	0.339	0.450	0.264	0.400	0.216	0.402	0.176	0.402	0.153	0.402	0.138	0.402	0.125	0.402	0.113	0.402	0.091	0.402	0.073	0.402
3	0.500	0.600	0.389	0.598	0.319	0.598	0.259	0.598	0.226	0.598	0.205	0.598	0.184	0.598	0.167	0.598	0.135	0.598	0.108	0.598
4	0.642	1.000	0.500	0.800	0.409	0.800	0.333	0.800	0.290	0.800	0.264	0.800	0.237	0.800	0.214	0.800	0.173	0.800	0.138	0.800
6	0.945	1.200	0.736	0.920	0.602	0.799	0.491	0.799	0.427	0.799	0.390	0.799	0.349	0.799	0.315	0.799	0.255	0.799	0.204	0.799
8	1.232	1.598	0.958	1.200	0.783	0.799	0.639	0.799	0.556	0.799	0.508	0.799	0.454	0.799	0.411	0.799	0.332	0.799	0.265	0.799
10	1.535	1.900	1.194	1.490	0.976	1.299	0.796	1.299	0.694	1.299	0.634	0.902	0.566	0.902	0.512	0.902	0.413	0.902	0.331	0.902
12	1.823	2.299	1.417	1.770	1.159	1.500	0.944	1.500	0.823	1.500	0.752	1.000	0.671	1.000	0.607	1.000	0.490	1.000	0.392	1.000
14	2.000	2.598	1.556	1.950	1.272	1.701	1.037	1.701	0.903	1.701	0.823	1.098	0.737	1.098	0.667	1.098	0.538	1.098	0.431	1.098
16	2.287	3.000	1.778	2.220	1.453	1.902	1.185	1.902	1.032	1.902	0.941	1.201	0.842	1.201	0.762	1.201	0.615	1.201	0.492	1.201

Wall Thickness and Hub Height (18" - 63")

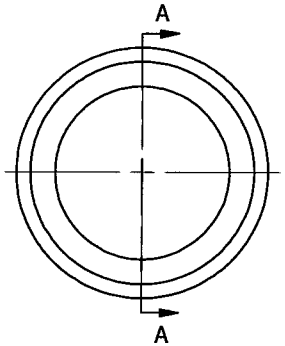
	SDR's																			
	7		9		11		13.5		15.5		17		19		21		26		32.5	
Size	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2	T-1	T-2
18	2.571	3.858	2.000	2.500	1.636	2.100	1.333	2.100	1.161	2.100	1.059	1.400	0.947	1.250	0.857	1.250	0.692	1.250	0.554	1.250
20	2.857	3.630	2.222	3.490	1.819	2.300	1.481	2.300	1.290	2.300	1.177	1.500	1.053	1.390	0.952	1.390	0.769	1.390	0.615	1.390
22	3.143	3.920	2.444	3.920	2.000	2.500	1.630	2.500	1.419	2.500	1.295	1.600	1.158	1.520	1.048	1.520	0.846	1.520	0.677	1.520
24	3.429	4.360	2.667	4.360	2.181	2.900	1.778	2.900	1.548	2.900	1.413	1.800	1.263	1.667	1.143	1.667	0.923	1.667	0.738	1.667
26	3.714	4.643	2.889	4.643	2.364	2.955	1.926	2.955	1.677	2.955	1.529	2.955	1.368	1.711	1.238	1.711	1.000	1.711	0.800	1.711
28			3.111	5.000	2.545	3.182	2.074	3.182	1.806	3.182	1.647	3.182	1.474	1.842	1.333	1.842	1.077	1.842	0.862	1.842
30			3.333	5.357	2.727	3.409	2.222	3.409	1.935	3.409	1.765	3.409	1.579	1.974	1.429	1.974	1.154	1.974	0.923	1.974
32			3.556	5.714	2.909	3.636	2.370	3.636	2.065	3.636	1.882	3.636	1.684	2.105	1.524	2.105	1.231	2.105	0.985	2.105
34			3.778	6.071	3.091	3.864	2.519	3.864	2.194	3.864	2.000	3.864	1.789	2.237	1.619	2.237	1.308	2.237	1.046	2.237
36			4.000	6.429	3.273	4.091	2.667	4.091	2.323	4.091	2.118	4.091	1.895	2.368	1.714	2.368	1.385	2.368	1.108	2.368
42					3.818	4.773	3.111	4.773	2.710	4.773	2.471	4.773	2.211	2.763	2.000	2.763	1.615	2.763	1.292	2.763
48					4.364	5.455	3.556	5.455	3.097	5.455	2.824	5.455	2.526	3.158	2.286	3.158	1.846	3.158	1.477	3.158
54															2.571	3.553	2.077	3.553	1.662	3.553
63															3.000	4.145	2.423	4.145	1.938	4.145

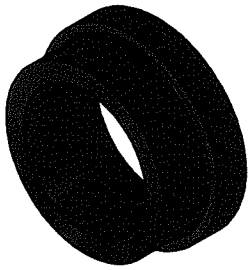
Flange Adapter Dimensions

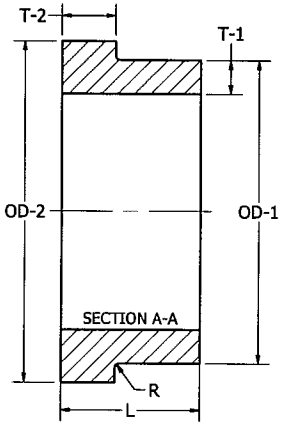
Size	Type	OD-1	OD-2	L	R
2	IPS	2.375	4.000	5.984	0.354
3	IPS	3.500	5.000	5.984	0.354
4	IPS	4.500	6.598	5.984	0.433
6	IPS	6.625	8.500	7.992	0.433
8	IPS	8.625	10.598	9.016	0.433
10	IPS	10.750	12.799	11.000	0.433
12	IPS	12.750	15.252	11.000	0.433
14	IPS	14.000	17.500	11.000	0.433
16	IPS	16.000	20.000	12.000	0.433
18	IPS	18.000	21.098	12.000	0.500
20	IPS	20.000	23.500	12.000	0.500
22	IPS	22.000	25.600	12.000	0.500
24	IPS	24.000	27.900	14.000	0.500
26	IPS	26.000	29.750	14.000	0.500
28	IPS	28.000	32.000	14.000	0.500
30	IPS	30.000	34.000	14.000	0.500
32	IPS	32.000	36.125	14.000	0.500
34	IPS	34.000	38.125	14.000	0.500
36	IPS	36.000	40.500	14.000*	0.500
42	IPS	42.000	47.125	21.000	0.500
48	IPS	48.000	53.500	21.000	0.500
54	IPS	54.000	59.625	21.000	0.500
63	IPS	63.000	66.790	21.000	0.500

*Length is 16.500" for 36" SDR9 only.

Lee Supply Co., Inc
Charleroi, PA
1-800-353-3747







Notes

HIGH DENSITY POLYETHYLENE PIPE FITTINGS MANUFACTURED BY IMPROVED PIPING PRODUCTS (IPP) MEET DIMENSIONS, TOLERANCES AND REQUIREMENTS OF ASTM D3261, AWWA C906 AND NSF 61 STANDARD, AS APPROPRIATE. SPECIFICATIONS NOT STATED IN THESE STANDARDS FOLLOW IMPROVED PIPING PRODUCTS STANDARD SPECIFICATIONS."

DRAWN Matt Graff	5/19/2011
ENG Ellis Clark	3/20/2013
QA Teresa Matias	3/20/2013

IMPROVED PIPING PRODUCTS, INC.

TITLE: IPS Flange Adapter Submittal

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES OR METRIC

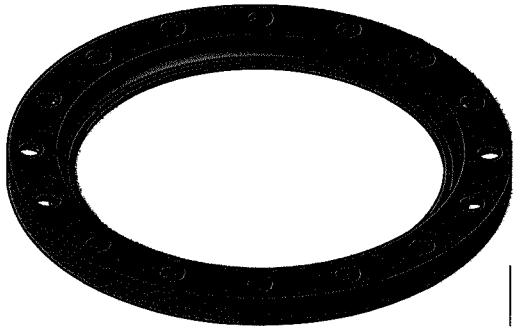
SIZE: C | PART NO: FA SUBMITTAL - IPS | SALES NO:

SCALE | MAT'L: HDPE - PE4710/3608/100 | WEIGHT | SHEET 1 OF 1

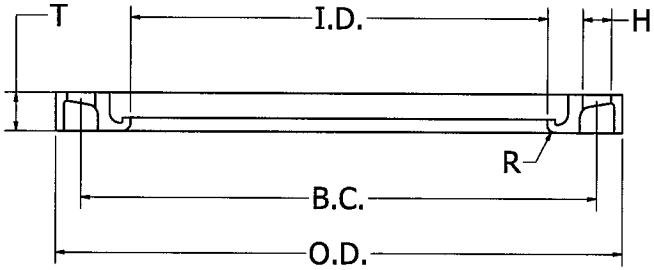
Material: Ductile Iron, ASTM A536, 65/45/12

REVISION HISTORY			
REV	DESCRIPTION	DATE	DESIGNER
2	ADD 42" SDR11	09/07/11	Matt Graff
3	ADD 20", 22", 24 SDR7	10/14/11	Matt Graff
4	EDIT SDR COUMN	06/28/12	Matt Graff
5	EDIT PER PHYSICAL FLANGE	05/20/13	Don Peterson
6	CHANGED SDR26 TO SDR17 AND SDR19 TO SDR26	2/26/2014	JEREMY GARZA
1	VALID - ORIGINAL DWG	7/29/11	Matt Graff
7	CHANGED 160psi to 200psi & 267psi to 335psi	4/2/14	JEREMY GARZA

Dimensions											
Pipe Diameter (in)	SDR	O.D.	T	I.D.	Bolt Count	Bolt Hole Size (H)	Bolt Hole Circle (BC)	R	Weight (lbs)	Pressure Class (PC)	FM Approved
1/2"	7	3.500	0.500	0.900	4	0.625	2.380	0.130	1.0	335	N/A
3/4"	7	3.880	0.500	1.110	4	0.625	2.750	0.130	1.0	335	N/A
1"	7	4.250	0.560	1.380	4	0.625	3.130	0.130	1.0	335	N/A
1 1/4"	7	4.630	0.630	1.720	4	0.625	3.500	0.190	1.4	335	N/A
1 1/2"	7	5.000	0.690	1.970	4	0.625	3.880	0.250	1.7	335	N/A
2"	7	6.000	0.750	2.460	4	0.750	4.750	0.310	2.2	335	FM(200psi)
2"	11	6.000	0.500	2.630	4	0.750	4.750	0.200	1.5	200	FM(160psi)
2 1/2"	7	7.000	0.880	2.970	4	0.750	5.500	0.310	4.0	335	FM(200psi)
3"	7	7.500	0.940	3.600	4	0.750	6.000	0.400	3.5	335	FM(200psi)
3"	11	7.500	0.530	3.750	4	0.750	6.000	0.280	2.5	200	FM(160psi)
4"	7	9.000	0.940	4.600	8	0.750	7.500	0.400	5.0	335	FM(200psi)
4"	11	9.000	0.550	4.750	8	0.750	7.500	0.280	3.5	200	FM(160psi)
5"	7	10.000	0.940	5.690	8	0.875	8.500	0.440	6.0	335	FM(200psi)
6"	7	11.000	1.000	6.750	8	0.875	9.500	0.400	7.5	335	FM(200psi)
6"	11	11.000	0.630	6.880	8	0.875	9.500	0.280	4.5	200	FM(160psi)
8"	7	13.500	1.120	8.750	8	0.875	11.750	0.400	11.0	335	FM(200psi)
8"	11	13.500	0.850	8.880	8	0.875	11.750	0.280	8.0	200	FM(160psi)
10"	7	16.000	1.190	10.920	12	1.000	14.250	0.400	17.0	335	FM(200psi)
10"	11	16.000	0.980	11.000	12	1.000	14.250	0.310	12.0	200	FM(160psi)
12"	7	19.000	1.500	12.920	12	1.000	17.000	0.400	22.0	335	FM(200psi)
12"	11	19.000	1.250	13.130	12	1.000	17.000	0.280	20.0	200	FM(160psi)
14"	7	21.000	1.630	14.180	12	1.125	18.750	0.400	37.0	335	FM(200psi)
14"	11	21.000	1.380	14.380	12	1.125	18.750	0.310	30.0	200	FM(160psi)
16"	7	23.500	1.880	16.190	16	1.125	21.250	0.400	52.5	335	FM(200psi)
16"	11	23.500	1.650	16.380	16	1.125	21.250	0.350	40.0	200	FM(160psi)
18"	7	25.000	1.900	18.200	16	1.250	22.750	0.400	56.0	335	FM(200psi)
18"	11	25.000	1.670	18.380	16	1.250	22.750	0.350	41.0	200	FM(160psi)
20"	7	27.500	2.125	20.375	20	1.250	25.000	0.310	66.5	335	FM(200psi)
20"	11	27.500	1.810	20.380	20	1.250	25.000	0.400	53.0	200	FM(160psi)
22"	7	29.500	2.300	22.375	20	1.375	27.250	0.310	87.0	335	FM(200psi)
22"	11	29.500	2.000	22.380	20	1.380	27.250	0.370	65.0	200	FM(160psi)



Lee Supply Co., Inc
Charleroi, PA
1-800-353-3747



NOTES

Improved Piping Products' backing ring and blinds mate with AWWA C207, ANSI B16.5 and ANSI B16.47, as appropriate. Specificatiions not stated in these standards follow internal specifications

DRAWN Matt Graff	7/29/2011	IMPROVED PIPING PRODUCTS, INC.
ENG Jeremy Garza	4/7/2014	
QA Teresa Matias	4/7/2014	TITLE BUP-SDR Convoluted Flange / Backup Ring Submittal Sheet
VPOP		

UNLESS OTHERWISE NOTED, ALL DIMENSIONS IN INCHES

SIZE C | PART NO BUP-SDR submittal | SALES NO | SCALE | REV 6 | SHEET 1 OF 2

Ongoing engineering design efforts may affect the technical information listed in our publications.

Lee Supply Co., Inc
Charleroi, PA
1-800-253-3747

PRODUCT INFO

BILTRITE

Neoprene Blended Sheet

Style 10 Smooth Finish

Style	Thickness Inches	Width Inches	Durometer Hardness Shore A ±5	Tensile	Elongation	Temperature	Wt. Per Lin. Foot 36"	Finish	Specifications
10	1/16 thru 1	36 & 48	40	800	350	-20°F to +170°F	1/8-2.5	Smooth	ASTM D-2000 SAE J200, 1BC 408Z1* MIL R-3065, SC 408Z1*
10	1/16 thru 2	36 & 48	50	800	300	-20°F to +170°F	1/8-2.6	Smooth	ASTM D-2000 SAE J200, 1BC 508 MIL R-3065, SC 508
10	1/32 thru 2 1/16, 1/8, 1/4	36 & 48 72	60	900	300	-20°F to +170°F	1/8-2.7	Smooth	ASTM D-2000 SAE J200, 1BC 609 MIL R-3065, SC 609
10	1/16 thru 2	36 & 48	70	1000	200	-20°F to +170°F	1/8-2.7	Smooth	ASTM D-2000 SAE J200, 1BC 710 MIL R-3065, SC 710
10	1/16 thru 2	36 & 48	80	1000	100	-20°F to +170°F	1/8-2.9	Smooth	ASTM D-2000 SAE J-200, 1BC 810 MIL R-3065, SC 810

* Z1 Elongation 350%

LEE SUPPLY CO., INC.
P. O. BOX #35
CHARLEROI, PA 15022

BADEN STEELBAR & BOLT CORP.

852 BIG SEWICKLEY CREEK ROAD
SEWICKLEY, PA. 15143
Phone: (724) 266-3003
Fax : (724) 266-1619

CERTIFICATION OF CONFORMANCE

Baden Steelbar & Bolt Corporation certifies that our 304 Stainless Steel Althread Studs meet all requirements of ASTM A193 B8.

Baden Steelbar & Bolt Corporation certifies that our 316 Stainless Steel Althread Studs meet all requirements of ASTM A193 B8M.

Physical Requirements as specified by ASTM for either B8 or B8M are:

Tensile Strength min.	75,000# per sq. inch
Yield Strength min. 0.2% offset	30,000# per sq. inch
Elongation in 4D min. %	30%
Reduction of Area min. %	50%

Sincerely,

Mark Holzbach - President
Baden Steelbar & Bolt Corp.

LEE SUPPLY CO., INC.
P. O. BOX #35
CHARLEROI, PA 15022

LEE SUPPLY CO. INC.

QUALITY PEOPLE ▪ PRODUCTS ▪ SERVICE *Since 1954*

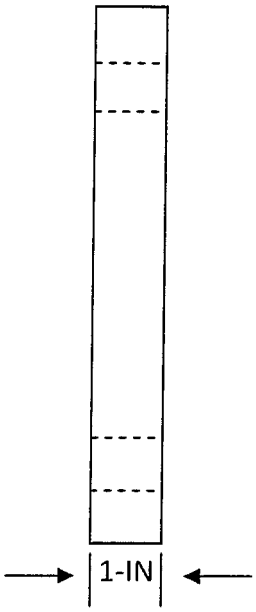
ENERGY ▪ MINING ▪ MUNICIPAL ▪ INDUSTRIAL ▪ ENVIRONMENTAL

305 1ST Street ▫ P.O. Box 35 ▫ Charleroi, PA 15022 ▫ T: 724-483-3543 ▫ F: 724-483-0577

1-800-353-3747 ▫ E-MAIL: **info@leesupply.com** ▫ **www.leesupply.com**

HDPE BLIND FLANGE DIMENSIONS

NOMINAL PIPE SIZE	OUTSIDE DIAMETER	BOLT CIRCLE DIAMETER	NUMBER OF HOLES	HOLE DIAMETER
2	6	4 3/4	4	3/4
3	7 1/2	6	4	3/4
4	9	7 1/2	8	3/4
6	11	9 1/2	8	7/8
8	13 1/2	11 3/4	8	7/8
10	16	14 1/4	12	1
12	19	17	12	1
14	21	18 3/4	12	1 1/8
16	23 1/2	21 1/4	16	1 1/8
18	25	22 3/4	16	1 1/4
20	27 1/2	25	20	1 1/4
22	29 1/2	27 1/4	20	1 3/8
24	32	29 1/2	20	1 3/8



Appendix 15

EPG Leachate Pumping System and Tanks

EPG Companies Inc.

19900 County Road 81
Maple Grove, MN 55311

Phone: 763-424-2613
800-443-7426
Fax: 763-493-4812
www.epgco.com

Quote Number: 15814

TO:

Dave Wasiela
ERM
8000 Corporate Center Drive
Suite 200
Charlotte NC 28226
USA

Date: 5/16/2013
Expires: 6/15/2013
Reference: C&D LF
Site: Maysville, NC
SalesPerson: Jim Bailey

Qty	Part Number / Description	Unit Cost	Your Cost
1	WSDPT 2-2 EPG SurePump, patented, stainless steel Wheeled Sump Drainer, size 4, with 1/2 HP, 460 V, 3Ø motor, 40' of jacketed 14-4 CP motor lead, 0-11' level sensor with built-in lightning arrestor and 40' Hytrel lead, and 30' of 1/8" stainless steel suspension cable and clamps.	$3,159.00 EA	$3,159.00
1	NW1.25SS EPG Discharge Adapter, 1.25", stainless steel discharge adapter.	$565.00 EA	$565.00
1	SSBV125 Ball Valve, 1.25", stainless steel.	$38.00 EA	$38.00
1	BJBP500 EPG Breakout Box, NEMA 4X non-metallic enclosure for 1 ea. motor lead, with connection terminals.	$160.00 EA	$160.00
1	BJBL600B EPG Breakout Box, NEMA 4X non-metallic enclosure, junction box for 1 ea. level sensor. Includes desiccant dryer, bellows, and connection terminals.	$200.00 EA	$200.00
1	L925PT EPG PumpMaster Control Panel, UL listed, 460 V, 3Ø, NEMA 4 enclosure, to operate 1/2 HP submersible pump motor with LevelMaster level control meter and simulator, tank high level dry input contact, amber panel mounted high level warning light, tank high-high level dry input contact, and red top mounted tank high-high level alarm strobe.	$4,025.00 EA	$4,025.00

Total amount quoted: $ 8,147.00

EPG Companies Inc.

19900 County Road 81
Maple Grove, MN 55311

Phone: 763-424-2613
800-443-7426
Fax: 763-493-4812
www.epgco.com

Quote Number: 15814

Thank you for allowing us to quote on this project. Prices quoted are based on information supplied for bidding and our interpretation of that information along with our recommendations and/or changes for fabrication. Prices are subject to review and possible adjustment for any changes made that deviate from our outline given.

Services such as startup supervision, operator training and testing services are available at our standard rate in effect at the time services are provided, plus documented travel expenses. See Bulletin 3120l for our current rates. Scheduling requires minimum ten (10) business days' notice and is subject to availability.

On all projects we supply electronic copies of submittals and Operation and Maintenance (O&M) manuals, and one (1) printed copy of the O&M with the equipment. Upon request, we can provide up to three (3) printed copies of submittals and three (3) printed copies of Operation and Maintenance manuals.

Orders placed and accepted by EPG can not be cancelled without written acceptance of cancellation by EPG. All orders accepted for cancellation by EPG are subject to cancellation charges based on progress of order through engineering and/or manufacturing.

Currently, this equipment would ship in approximately six (6) weeks from date of approved order. Please keep in mind that if submittals are required the lead time remains six (6) weeks after submittals are given final approval. Submittals are available in approximately 2-3 weeks after approved order is received.

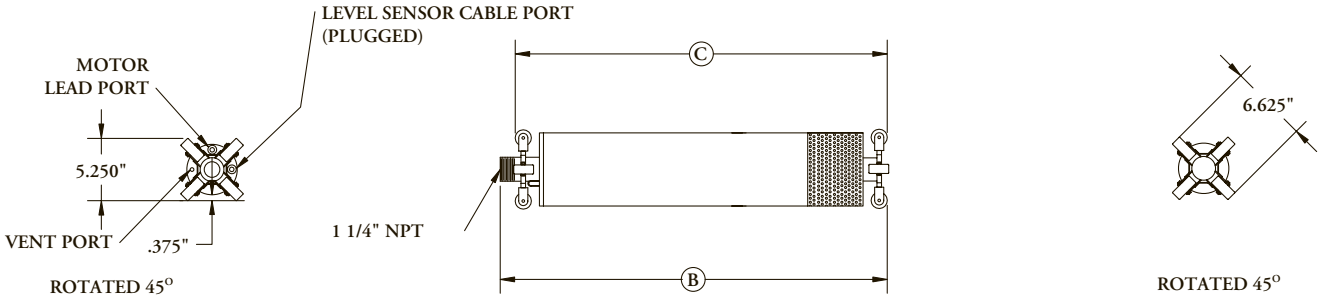
Prices quoted do not include freight charges F.O.B. our dock in Maple Grove, MN. Prices quoted do not include any applicable taxes. A down payment and progress payments may be required subject to credit approval. See Bulletin 3400e regarding Terms of Sale subject to credit approval, and Bulletin 0200d describing our Limited Warranty. If you have any questions or would like to place an order, please let me know.

Sincerely,
EPG Companies Inc.

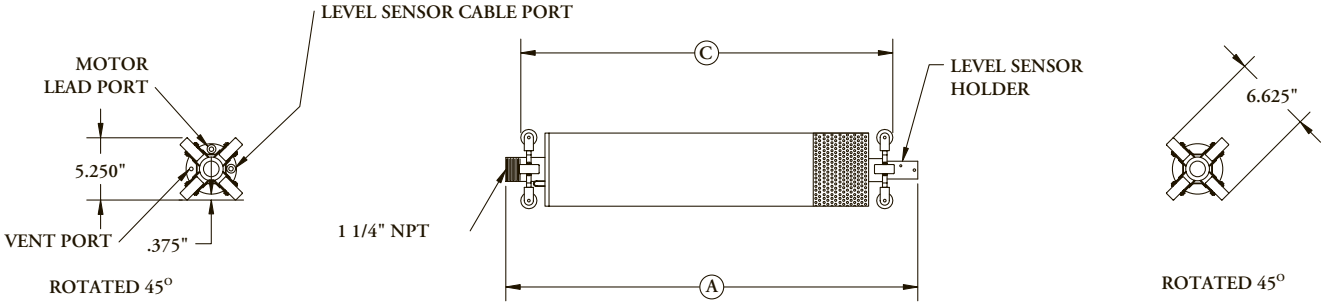
Jim Bailey

Jim Bailey
Applications Specialist

SERIES 2 SIZE 4 WHEELED SUMP DRAINER



WSD



WSDPT

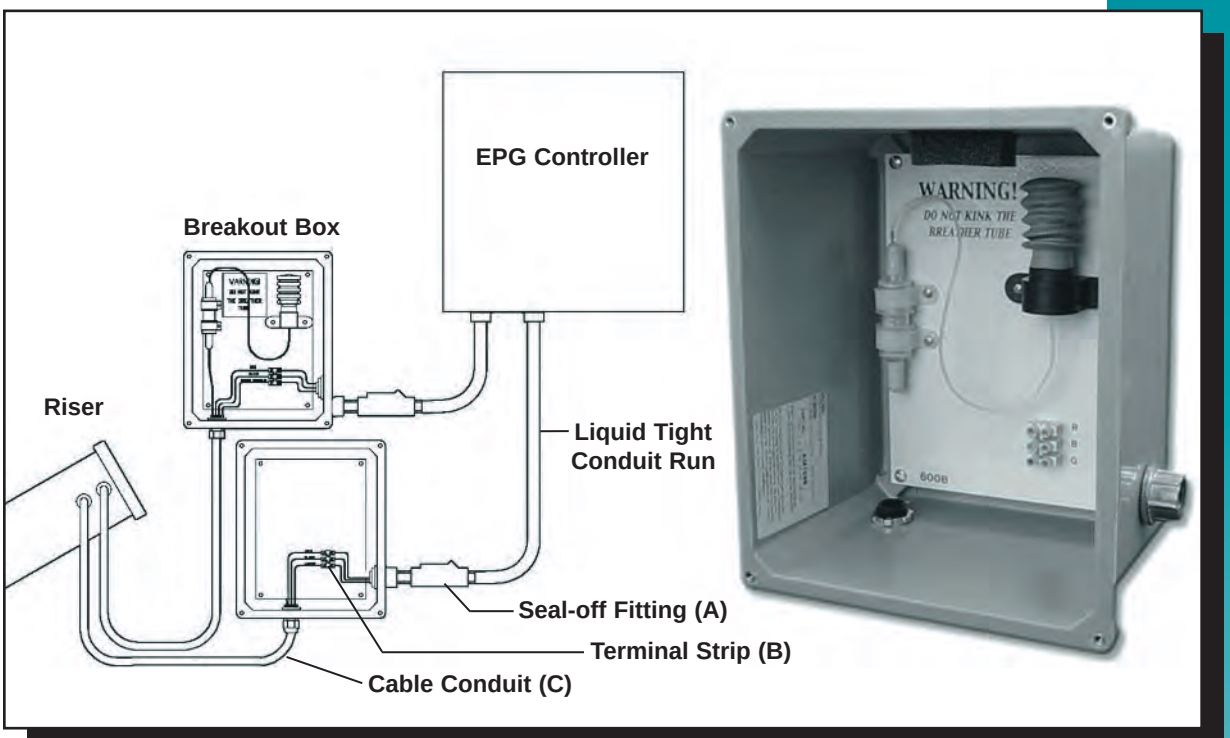
MODEL	HP	PHASE	A	B	C	*APPROX. SHIPPING WEIGHT	
						WSD	WSDPT
2-2	0.50	1	31.02	29.90	29.15	61.47	66.47
2-2	0.50	3	31.02	29.90	29.15	61.47	66.47
2-3	0.50	1	31.85	30.73	29.98	62.37	67.37
2-3	0.50	3	31.85	30.73	29.98	62.37	67.37
2-4	0.50	1	32.68	31.56	30.81	63.26	68.26
2-4	0.50	3	32.68	31.56	30.81	63.26	68.26
2-5	0.50	1	33.51	32.39	31.64	64.15	69.15
2-5	0.50	3	33.51	32.39	31.64	64.15	69.15
2-6	0.50	1	34.34	33.22	32.47	65.05	70.05
2-6	0.50	3	34.34	33.22	32.47	65.05	70.05
2-7	0.50	1	35.17	34.05	33.30	65.94	70.94
2-7	0.50	3	35.17	34.05	33.30	65.94	70.94
2-8	0.50	1	36.00	34.88	34.13	66.84	71.84
2-8	0.50	3	36.00	34.88	34.13	66.84	71.84
2-9	0.75	1	37.96	36.84	36.09	71.61	76.61
2-9	0.75	3	37.96	36.84	36.09	71.61	76.61
2-10	0.75	1	38.79	37.67	36.92	72.50	77.50
2-10	0.75	3	38.79	37.67	36.92	72.50	77.50

NOTE: ALL DIMENSIONS ARE IN INCHES.

*SHIPPING WEIGHT INCLUDES
WSD: CRATE, 50' OF 14-4 MOTOR LEAD, 50' OF 1/8" SS CABLE.
WSDPT: CRATE, 50' OF 14-4 MOTOR LEAD, 50' OF 1/8" SS CABLE,
LEVEL SENSOR AND CABLE.

© 2003 EPG Companies Inc.
SurePump is a Reg. TM of EPG Companies Inc.

Breakout (Junction) Boxes



Control failure and expensive repairs caused by methane gas and moisture are real and potentially dangerous possibilities. To simplify maintenance and repair and increase the safety and accuracy of your system, simply install an EPG Breakout (Junction) Box between your pump and control panel.

EPG Breakout (Junction) Boxes provide a simple and convenient way to disconnect power or sensor wires during maintenance and/or repair work and create a gas-tight seal between your riser, well or sump and your control panel. Corrosive gases migrating through motor and sensor cable conduit to the controller is one of the largest contributors to early control panel failure. Not only can these gases increase the chance for explosions, they also can corrode the contacts and make wires brittle. Give your system a break! Install an EPG Breakout Box close to the side slope riser and then hardwire the breakout box to the controller.

EPG Breakout (Junction) Boxes - a break you need for optimum landfill operation!

- Seals off harmful migrating gas (A)
- Equipped with FNPT waterproof exit hub
- Terminal strip to facility pump and sensor removal (B)
- Minimizes costs by running shorter motor or sensor cable (C)
- Available in a variety of configurations for one or more devices
- Weatherproof NEMA 4X enclosure with dryer tube & bellows to seal out moisture

Leachate Pumps ◆ Remediation ◆ Control Systems Integration ◆ Telemetry

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EPG COMPANIES

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Rogers, MN 55374

Corporate Offices
19900 County Road 81
Maple Grove, MN 55311
www.epgco.com
info@epgco.com

Bulletin 8201

[redacted]

DESIGN PRESSURE INTERNAL: ATMOS @ 100 DEG F
DESIGN PRESSURE EXTERNAL: ATMOS @ 100 DEG F
OPERATING PRESSURE:
HYDRO TEST: ATMOS @ 70 DEG F
MAWP: ATMOS
MAP: 16 PSI
MDMT: -20 DEG F
SEISMIC CODE: UBC 1997 GROUND SLOPE
HEAD TYPE: FLANGED & DISHED W/ 2" SF
ESTIMATED WEIGHTS:
FABRICATION: 13270 LBS
EMPTY: 13270 LBS
OPERATING: 162053 LBS
ESTIMATED CAPACITY: 20280 US GALLONS

INTERIOR FINISH:
SURFACE PREP: SSPC 6
COATING: 561 EPOXY PAINT

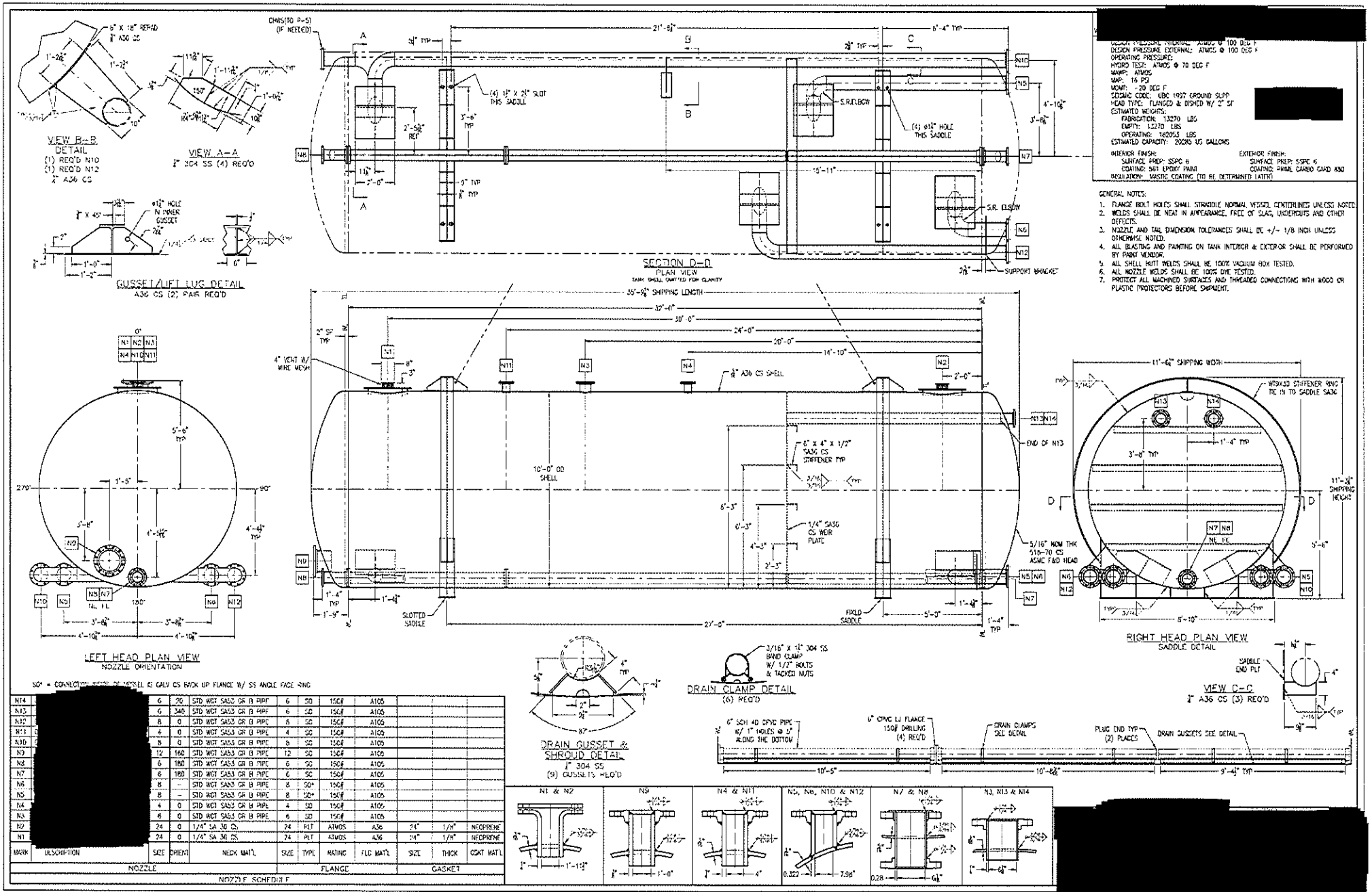
EXTERIOR FINISH:
SURFACE PREP: SSPC 6
COATING: PARK CARBO GARD 630

INSULATION: MASTIC COATING (TO BE DETERMINED LATER)

[redacted]

GENERAL NOTES:

1. FLANGE BOLT HOLES SHALL STRADDLE NORMAL VESSEL CENTERLINES UNLESS NOTED.
2. WELDS SHALL BE NEAT IN APPEARANCE, FREE OF SLAG, UNDERCUTS AND OTHER DEFECTS.
3. NOZZLE AND TAIL DIMENSION TOLERANCES SHALL BE +/- 1/8 INCH UNLESS OTHERWISE NOTED.
4. ALL BLASTING AND PAINTING ON TANK INTERIOR & EXTERIOR SHALL BE PERFORMED BY PARK VENDOR.
5. ALL SHELL BUTT WELDS SHALL BE 100% VACUUM BOX TESTED.
6. ALL NOZZLE WELDS SHALL BE 100% DYE TESTED.
7. PROTECT ALL MACHINED SURFACES AND THREADED CONNECTIONS WITH WOOD OR PLASTIC PROTECTORS BEFORE SHIPMENT.



SO1 = CONNECTION WELD OF NOZZLE IS GALV CS BACK UP FLANGE W/ SS ANGLE FACE RING

MARK	DESCRIPTION	SIZE	ORIENT	NECK MAT'L	SIZE	TYPE	RATING	FLG MAT'L	SIZE	THICK	GSKT MAT'L
N14	[redacted]	6	20	STD WGT SA53 GR B PIPE	6	SO	150#	A105			
N13		6	340	STD WGT SA53 GR B PIPE	6	SO	150#	A105			
N12		8	0	STD WGT SA53 GR B PIPE	6	SO	150#	A105			
N11		4	0	STD WGT SA53 GR B PIPE	4	SO	150#	A105			
N10		8	0	STD WGT SA53 GR B PIPE	8	SO	150#	A105			
N9		12	160	STD WGT SA53 GR B PIPE	12	SO	150#	A105			
N8		6	180	STD WGT SA53 GR B PIPE	6	SO	150#	A105			
N7		6	180	STD WGT SA53 GR B PIPE	6	SO	150#	A105			
N6		8	–	STD WGT SA53 GR B PIPE	8	SO*	150#	A105			
N5		8	–	STD WGT SA53 GR B PIPE	8	SO*	150#	A105			
N4		4	0	STD WGT SA53 GR B PIPE	4	SO	150#	A105			
N3		6	0	STD WGT SA53 GR B PIPE	6	SO	150#	A105			
N2		24	0	1/4" SA 36 CS	24	FLT	ATMOS	A36	24"	1/8"	NEOPRENE
N1		24	0	1/4" SA 36 CS	24	FLT	ATMOS	A36	24"	1/8"	NEOPRENE

NOZZLE | FLANGE | GASKET

NOZZLE SCHEDULE

[redacted]

[redacted]

DESIGN PRESSURE, INTERNAL: ATMOS @ 100 DEG F
OPERATING PRESSURE:
HYDRO TEST: ATMOS @ 70 DEG F
MAWP: ATMOS
MAP: 16 PSI
MDMT: -20 DEG F
SEISMIC CODE: UBC 1997 GROUND SUPP
HEAD TYPE: FLANGED & DISHED W/ 2" SF
ESTIMATED WEIGHTS:
FABRICATION: 13270 LBS
EMPTY: 13270 LBS
OPERATING: 182053 LBS
ESTIMATED CAPACITY: 20285 US GALLONS

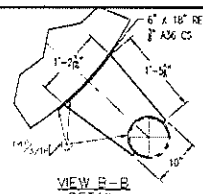
[redacted]

INTERIOR FINISH:
SURFACE PREP: SSPC 6
COATING: 561 EPOXY PAINT
INSULATION: NONE

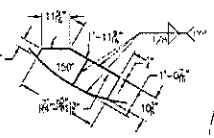
EXTERIOR FINISH:
SURFACE PREP: SSPC 6
COATING: PRIME CARBO GARD 880

GENERAL NOTES:

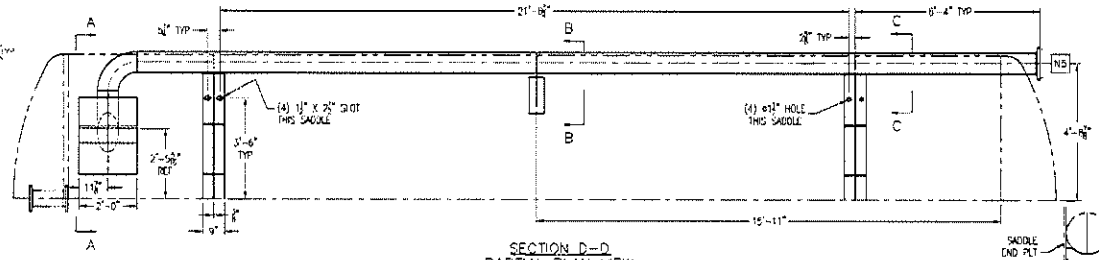
1. FLANGE BOLT HOLES SHALL STRADDLE NORMAL VESSEL CENTERLINES UNLESS NOTED.
2. WELDS SHALL BE NEAT IN APPEARANCE, FREE OF SLAG, UNDERCUTS AND OTHER DEFECTS.
3. NOZZLE AND TAIL DIMENSION TOLERANCES SHALL BE +/- 1/8 INCH UNLESS OTHERWISE NOTED.
4. ALL BLASTING AND PAINTING OF TANK INTERIOR & EXTERIOR, SHALL BE PERFORMED BY PAINT VENDOR.
5. ALL SHELL BUTT WELDS SHALL BE 100% VACUUM BOX TESTED.
6. ALL NOZZLE WELDS SHALL BE 100% DYE TESTED.
7. PROTECT ALL MACHINED SURFACES AND THREADED CONNECTIONS WITH WOOD OR PLASTIC PROTECTORS BEFORE SHIPMENT.



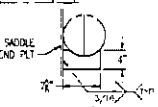
VIEW B-B
DETAIL
(1) REQ'D N5
(1) REQ'D N6
3/8" A36 CS



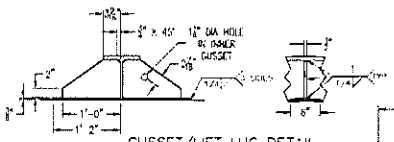
VIEW A-A
3/8" 304 SS (2) REQ'D



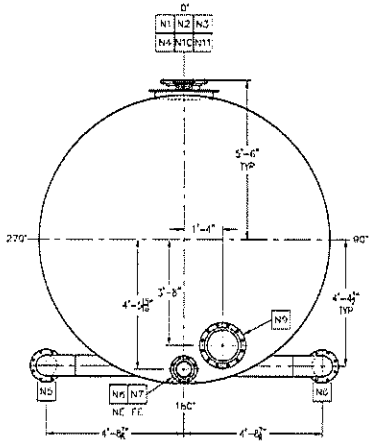
SECTION D-D
PARTIAL PLAN VIEW



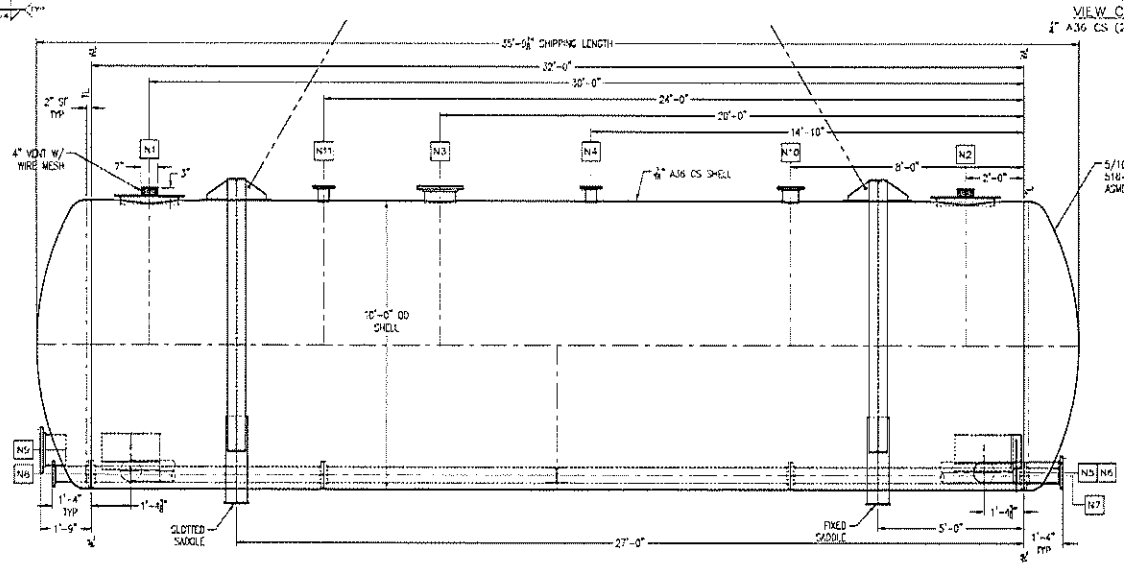
VIEW C-C
3/8" A36 CS (2) REQ'D

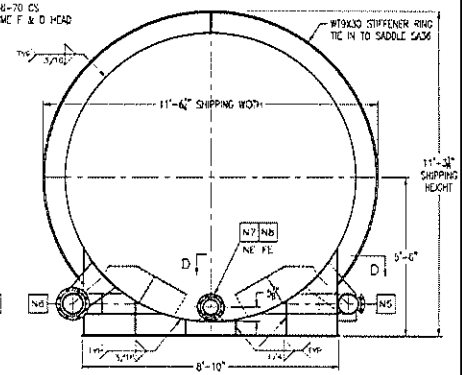


CUSSET/LIFT LUG DETAIL
A36 CS (2) PAIR REQ'D

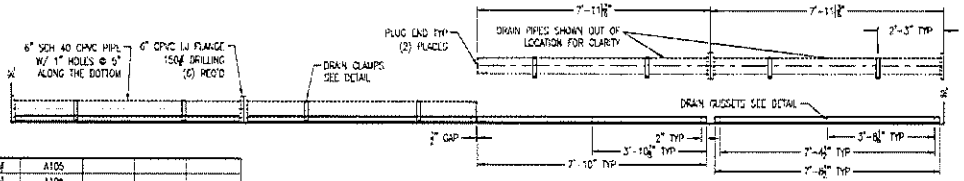


LEFT HEAD PLAN VIEW
NOZZLE ORIENTATION

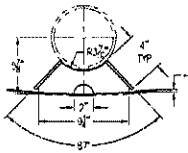




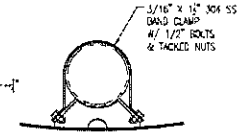
RIGHT HEAD PLAN VIEW
SADDLE DETAIL



DRAIN GUSSET & SHROUD
ELEVATION



DRAIN GUSSET & SHROUD DETAIL
3/8" 304 SS
(12) GUSSETS REQ'D

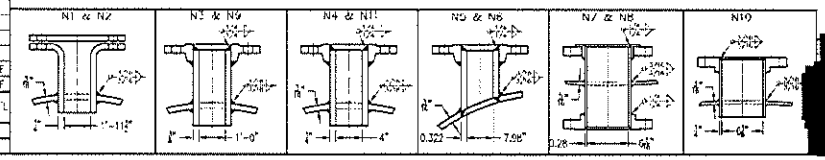


DRAIN CLAMP DETAIL
(8) REQ'D

50* = CONNECTION INSIDE OF VESSEL IS GALV CS BACK UP FLANGE W/ SS ANGLE FACE RING

MARK	DESCRIPTION	NOZZLE SIZE	NOZZLE ORIENT	NOZZLE MAT'L	FLANGE SIZE	FLANGE TYPE	FLANGE RATING	FLANGE MAT'L	GASKET SIZE	GASKET THICK	GASKET MAT'L
N11	[redacted]	4	0	SCH STD SA53 GR B PIPE	4	SO	150#	A105			
N10	[redacted]	6	0	SCH STD SA53 GR B PIPE	6	SO	150#	A105			
N9	[redacted]	12	180	SCH STD SA53 GR B PIPE	12	SO	150#	A105			
N8	[redacted]	6	180	SCH STD SA53 GR B PIPE	6	SO	150#	A105			
N7	[redacted]	6	180	SCH STD SA53 GR B PIPE	6	SO	150#	A105			
N6	[redacted]	8	-	SCH STD SA53 GR B PIPE	8	50*	150#	A105			
N5	[redacted]	8	-	SCH STD SA53 GR B PIPE	8	50*	150#	A105			
N4	[redacted]	4	0	SCH STD SA53 GR B PIPE	4	SO	150#	A105			
N3	[redacted]	12	0	SCH STD SA53 GR B PIPE	12	SO	150#	A105			
N2	[redacted]	24	0	1/4" SA 36 CS	24	PLT	ATMOS	A36	24"	1/8"	NEOPRENE
N1	[redacted]	24	0	1/4" SA 36 CS	24	PLT	ATMOS	A36	24"	1/8"	NEOPRENE

NOZZLE SCHEDULE



[redacted]

Appendix 16

Leak Detection Survey Report

(Services Provided by Bunnel-Lammons Engineering)

BUNNELL-LAMMONS ENGINEERING, INC.
GEOTECHNICAL, ENVIRONMENTAL AND CONSTRUCTION MATERIALS CONSULTANTS
NORTH CAROLINA BUSINESS LICENSE C-1538

January 23, 2015

Mr. James Maides
Green Recycling Solutions, Inc.
166 Center St.
Jacksonville, NC 28546

Subject: **Report of Geomembrane Leak Location Survey**
Dipole Survey
Phase 1, Cell 1
Maysville C&D Landfill
Maysville, North Carolina
BLE Project Number J15-9640-01

Dear Mr. Maides:

Bunnell-Lammons Engineering, Inc. (BLE) is pleased to submit this report for the Geomembrane Leak Location Survey (GLLS) services associated with the construction of Phase 1, Cell 1 at the Maysville C&D Landfill. This report documents the methods and results for an electrical leak location survey conducted by BLE on the geomembrane installed for the approximately 1-acre cell

PROJECT INFORMATION

Maysville C&D Landfill is operated by Green Recycling Solutions LLC. The site is located in Maysville, North Carolina. Our understanding of the project is based on our correspondence with Mr. David Wasiela, P.E. of EMR NC, Inc., and a project documents titled *Phase 1, Cell 1 Grading Plan* dated *Revised September 11, 2013* prepared by ERM NC, Inc.

The liner system consists, from top to bottom, of a minimum of 2 feet of native soil protective cover, a double sided geocomposite drainage media, a 60-mil thick HDPE geomembrane, and 2 feet of low permeability clay liner .

The principle of the electrical leak location dipole method is to place a voltage across a geomembrane resulting in electrical potential gradients in the conductive material overlying the geomembrane. If a hole in the geomembrane is present, anomalous electrical potential distribution can be observed using the GLLS equipment indicating locations of current flow through this hole.

FIELD SURVEY

Personnel representing BLE were onsite on January 19, 2015 to perform the GLLS services for Phase 1, Cell 1 at the Maysville C&D Landfill. During the survey, weather conditions consisted of lows in the low 40s to highs in the low 60s (degrees Fahrenheit) and partly cloudy. Prior to the survey date, the site had received several inches of rainfall resulting in wet site conditions within the cell. Standing water was present within the cell limits. The approximately 1 acre geoelectric leak detection survey was performed using the soil-covered dipole method (ASTM D7007). A DC voltage was applied to the native soil protective cover material over the geomembrane and the

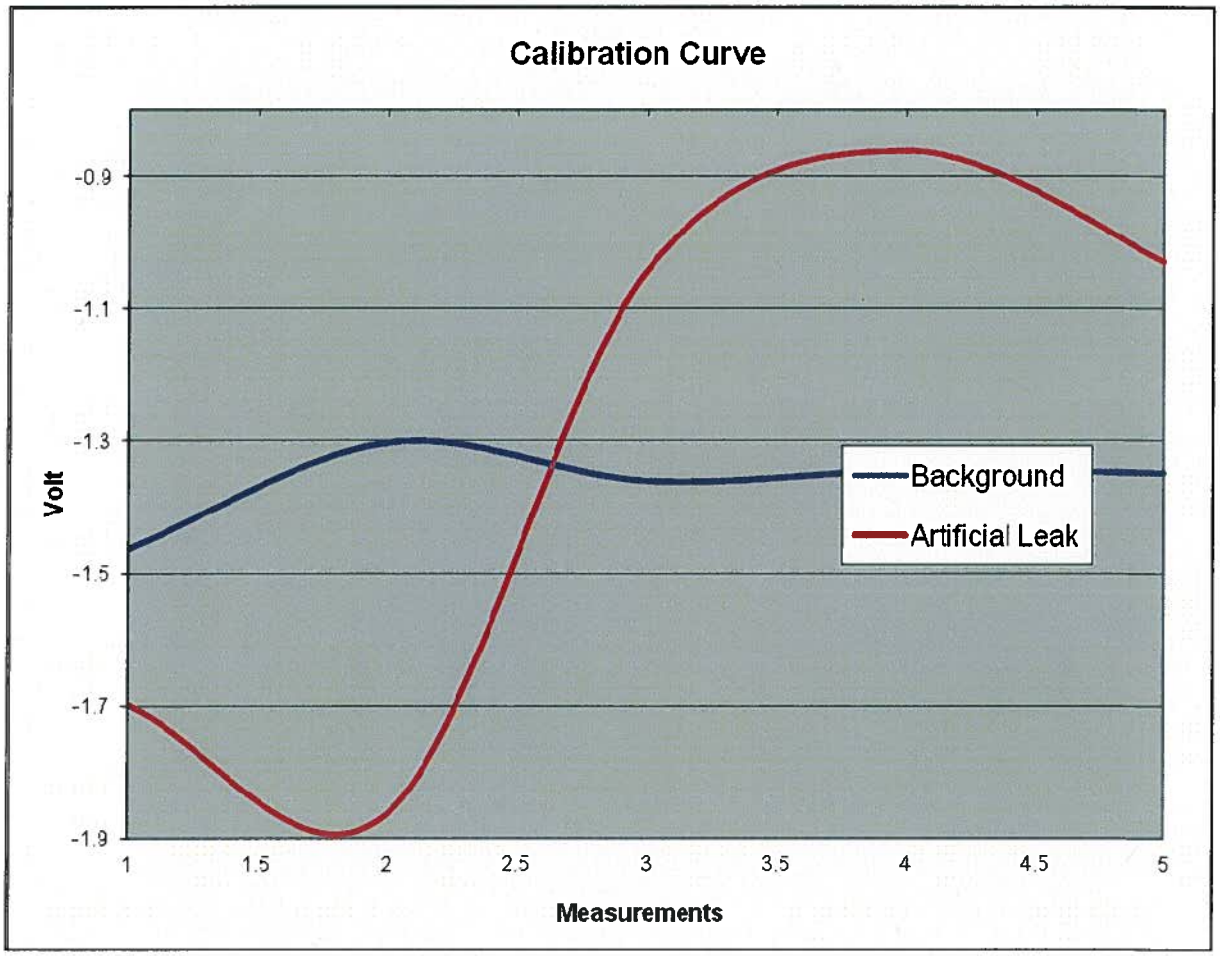
power source was grounded to the subgrade soils outside the cell limits. A GPS equipped roving double dipole (LISA 2000 Series) was used to measure electric potential (voltage).

The operator observed and recorded voltage potential measurements every ten feet in a grid pattern throughout the survey area. At the beginning and termination of the survey, the dipole operator verified that an artificial leak was detectable by the leak detection equipment.

Prior to the survey, a sensitivity test was performed to verify the proposed grid spacing and the maximum distance from the current injector electrode. The artificial leak consisted of a simulated rip in the geomembrane approximately nine inches long.

The sensitivity test showed that the simulated rip could be located five feet away from the roving dipole. ASTM procedures require that the target hole size produce a signal to noise ratio of at least 3. For the 1-acre survey area, a signal to noise ratio of 6.2 was created by the artificial leak.

Graph 1: Sensitivity Testing Results



Note: Measurements represent positions in increments of 3 meters each (e.g., Measurement position 1.5 equals 4.5 meters from the articifial leak).

RESULTS

Four anomaly locations were investigated after analyzing the voltage data collected during the survey. Three locations were confirmed not to exhibit typical leak signatures when surveyed at a closer grid spacing. The fourth location was detected directly over the installed leachate collection sump. The leachate sump pump was then electrically disconnected and the area where the signal had been detected was rechecked. The anomaly was no longer present after the sump pump was disconnected. No geomembrane damage was detected during the survey. The survey data are attached.

CLOSING

We appreciate the opportunity to be of assistance to ERM NC, Inc and to provide the required services for this project. If you have any questions regarding this report, please do not hesitate to contact us at (864) 288-1265.

Sincerely,

BUNNELL - LAMMONS ENGINEERING, INC.

Andrew A. Colby
Engineering Associate

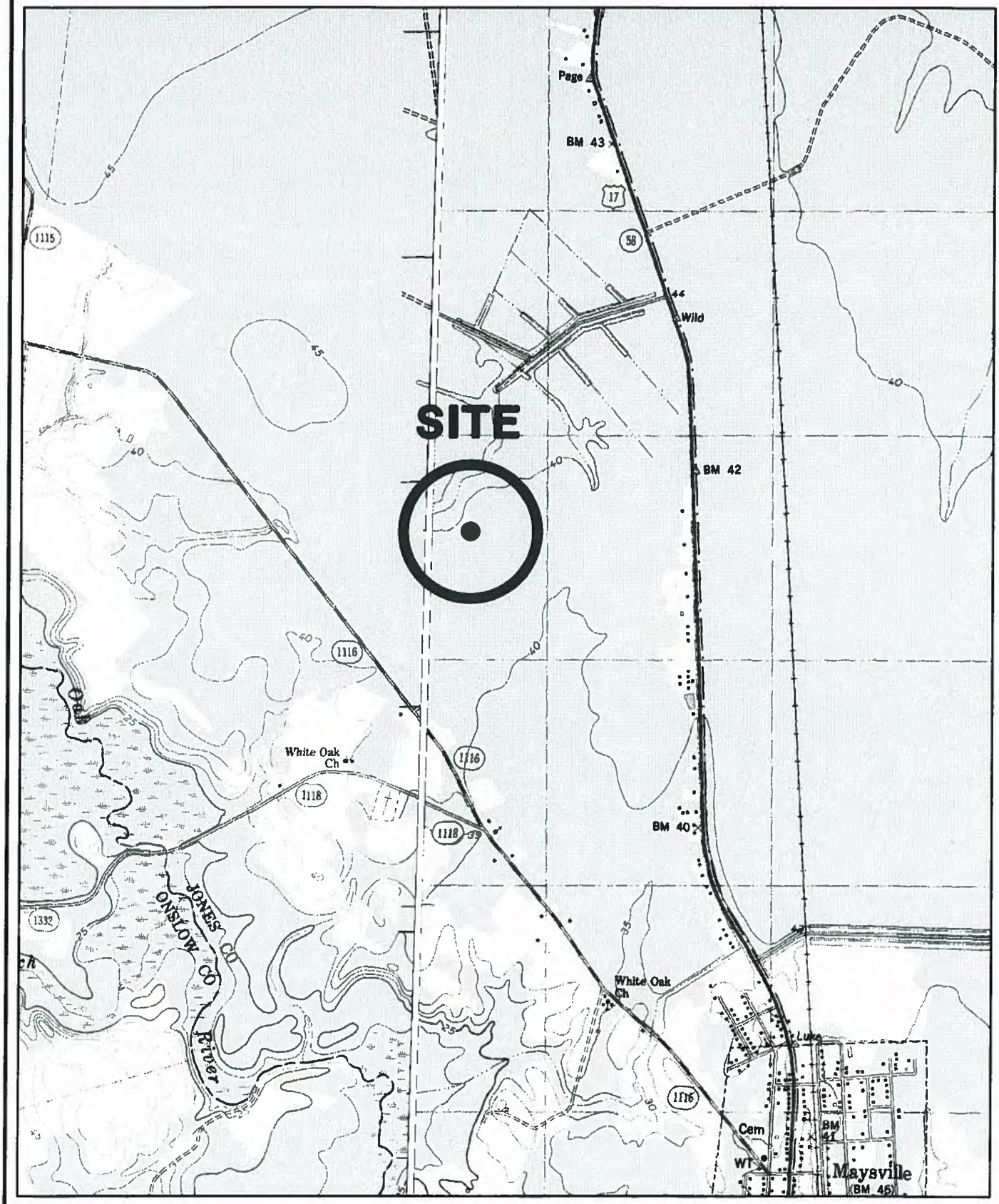
Jeffrey C. Helvey, P.E.
Senior Engineer
Licensed NC #33318

NORTH CAROLINA PROFESSIONAL SEAL NO. 033318 ENGINEER JEFFREY C. HELVEY
1-26-15

Attachment: Figure 1: Vicinity Map
Figure 2: Leak Detection Survey Testing Locations
Photographs

Copy: Mr. David Wasiela, P.E.

FIGURE 1: VICINITY MAP



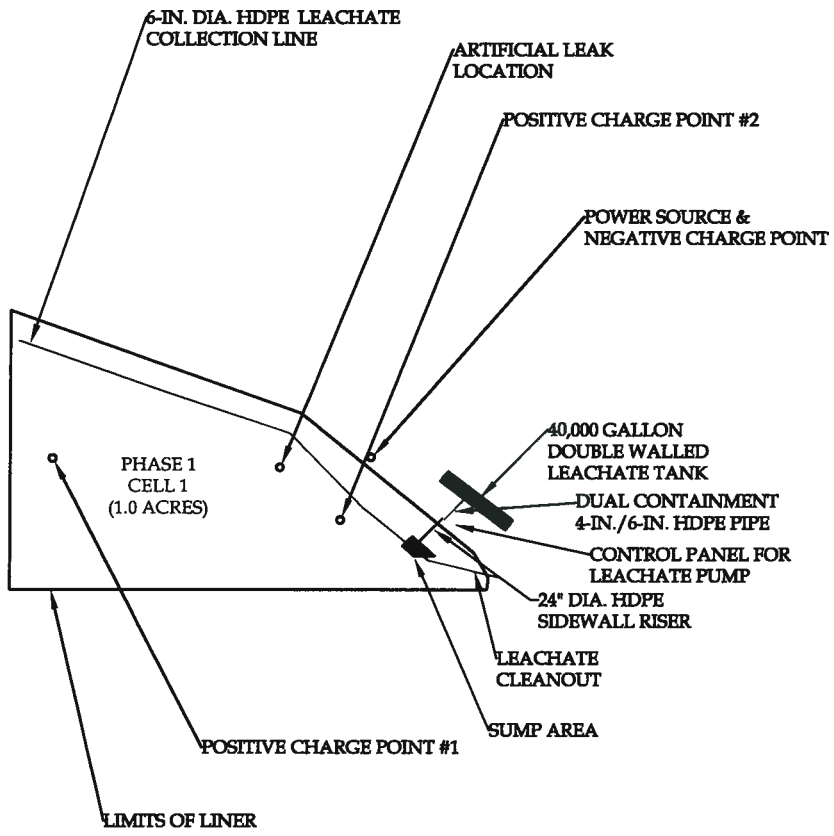
2000 1000 0 2000 4000

APPROXIMATE SCALE IN FEET

REFERENCE:
USGS TOPOGRAPHIC MAP, 7.5 MINUTE SERIES,
JACKSONVILLE NE AND MAYSVILLE, N.C. QUADRANGLES, 1978.

DRAWN: ACE	DATE: 01-26-15	BLE INC. BUNNELL-LAMMONS ENGINEERING, INC. 6004 PONDERS COURT GREENVILLE, SOUTH CAROLINA 29615 PHONE: (864)288-1265 FAX: (864)288-4430	VICINITY MAP MAYSVILLE C&D LANDFILL MAYSVILLE, NORTH CAROLINA
CHECKED: AAC	CAD: MAYSVILLELF-VM		FIGURE 1
APPROVED:	JOB NO: J15-9640-01		

FIGURE 2: LEAK DETECTION SURVEY TEST LOCATIONS



REFERENCE:
DRAWING BY ERM NC, INC. TITLED, "LEACHATE COLLECTION REMOVAL PLAN" DATED JUNE 2013.

150 75 0 150 300
APPROXIMATE SCALE IN FEET

DRAWN: AAC	DATE: 01-26-15	BLE INC. BUNNELL-LAMMONS ENGINEERING, INC. 6004 PONDERS COURT GREENVILLE, SOUTH CAROLINA 29615 PHONE: (864)288-1265 FAX: (864)288-4430	LEAK DETECTION SURVEY TEST LOCATIONS MAYSVILLE C&D LANDFILL MAYSVILLE, NORTH CAROLINA	FIGURE 2
CHECKED: JCH	CAD: FS-9640-01			
APPROVED:	JOB NO: J15-9640-01			

PHOTOGRAPHS

Photograph No. 1: Excavation of isolation trench along the south side of Phase 1, Cell 1.

Photograph No. 2: Completed isolation trench along the north side of Phase 1, Cell 1.

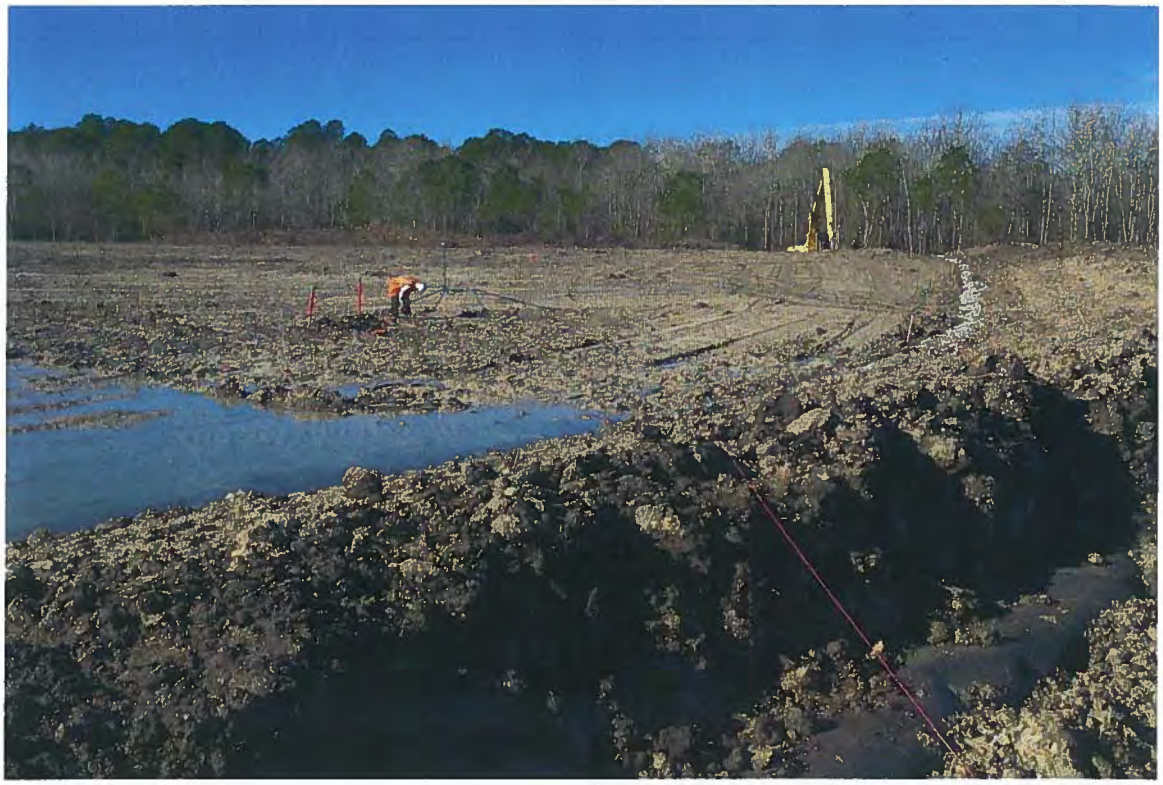
Photograph No. 3: Phase 1, Cell 1 viewed from the east to the west.

Photograph No. 4: Phase 1, Cell 1 viewed from the west to the east.

Photograph No. 5: West end of Phase 1, Cell 1 viewed from the south to the north.

Photograph No. 6: Power source, GPS station and negative charge point outside of the cell area on the north side.

Photograph No. 7: Excavation of in-place protective cover soils in cell floor to install artificial leak.



Photograph No. 8: Preparing for survey with sensitivity testing near the artificial leak location.

Photograph No. 9: Performing the geomembrane leak location survey using a GPS equipped double diploe (LISA 2000 Series) in the floor of Phase 1, Cell l.

Photograph No. 10: Finalizing the geomembrane leak location survey by re-checking potential leak areas in the sump of Phase 1, Cell l. (Potential leak signals, but ultimately not leaks detected).

Appendix 17

Background Groundwater Quality and Landfill Gas Migration Report

Atlantic GeoScience, Ltd.
8633 Vintage Club Drive
Wilmington, NC 28411
910-612-4853

***Mining/Exploration *Hydrogeology *Water Resources *Geotechnical**

January 25, 2015

Ms. Elizabeth Werner
North Carolina Department of Environment and Natural Resources
Division of Waster Management
1646 Mail Service Center
Raleigh, NC 27699-1646

(Via Email)

Reference: Groundwater and Methane /Air-gas Monitoring Results for
Phase I, Cells 1 through 3 (October 2014)
Background Sampling -Pre-Waste Disposal
Green Recycling Solutions, LLC
Proposed Construction & Demolition Debris Landfill
Maysville, North Carolina

Dear Ms. Werner,

Atlantic GeoScience, Ltd. (Atlantic Geoscience) is pleased to submit the following report on behalf of Green Recycling Solutions, LLC summarizing groundwater sampling results conditions and methane/air-gas monitoring to establish background conditions prior to disposal of any waste in Phase 1, Cells 1 through 3 at the above referenced facility. This background sampling event was performed in anticipation of approval of the "Application for Permit to Construct Phase I" submitted by ERM and the forthcoming permit authorizing waste disposal operations at this site.

In closing, you may feel free to contact me at 910-612-4853 or Mr. Dave Wasiela, P.E./ERM NC Inc. at 980-355-4535 if you have any questions concerning this report.

Kindest regards,

ATLANTIC GEOSCIENCE, LTD.

Rudy A. Smithwick

Rudy A. Smithwick, P.G.
Senior Principal Geologist

Cc: Kevin Dail-Green Recycling Solutions, LLC
Dave Wasiela, P.E.- ERM NC Inc.

GROUNDWATER MONITORING RESULTS FOR PHASE 1- CELLS 1, 2, and 3 (BACKGROUND SAMPLING EVENT-OCTOBER 2014)

PROJECT:

GREEN RECYCLING SOLUTIONS, LLC
CONSTRUCTION & DEMOLITION DEBRIS LANDFILL (CDLF)
PHASE 1, CELLS 1-3
MAYSVILLE, NORTH CAROLINA

PREPARED FOR:

MS. ELIZABETH WERNER
NCDENR-DIVISION OF WASTE MANAGEMENT
1646 MAIL SERVICE CENTER ST.
RALEIGH, NORTH CAROLINA 27699-1646

JANAUARY 25, 2015

PREPARED BY:

ATLANTIC GEOSCIENCE INTERNATIONAL, LTD.
8633 VINTAGE CLUB DRIVE
WILMINGTON, NORTH CAROLINA 28411
(910) 612-4853

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Groundwater Monitoring Results for Phase I, Cells 1-3
Background Sampling Event-October 2014
Green Recycling Solutions, LLC
Proposed Construction & Demolition Debris Landfill (CDLF)
Maysville, North Carolina

January 25, 2015

1.0 BACKGROUND

Atlantic Geoscience International, Ltd (Atlantic Geoscience) was contracted by Green Recycling Solutions, LLC (GRS) to assist the project design firm, ERM NC Inc. (ERM) with performing background groundwater sampling and methane/air-gas sampling (pre-waste disposal) at the above CDLF facility. The purpose was to establish baseline groundwater conditions at the site prior to Phase I, Cells 1 through 3 receiving any waste products. In addition to this initial background sampling event, required future bi-annual groundwater sampling and quarterly methane/air-gas monitoring will be performed to meet permit requirements for monitoring at the proposed GRS-CDLF site. The GRS-CDLF site is located at 11710 Hwy 17 North in Maysville, NC. The newly constructed CDLF site is comprised of ±58-acre tract and is located within the town limits of Maysville, North Carolina. The general location of the newly constructed CDLF site is shown in Figure 1.

The background groundwater and methane/air-gas sampling event at the site was performed by Atlantic Geoscience on October 10, 2014. This "background sampling event" was conducted using five detection monitoring wells located adjacent to Phase 1, Cells 1-3 and one upgradient monitoring well for the purpose of establishing ambient groundwater conditions beneath the site prior to waste disposal operations occurring in the initial Phase I cells of the new CDLF operation. At the time of background sampling, site work was actively underway to construct the first cells comprising Phase I. The site work consisted largely of earthwork, sub-base preparation, compaction, and placement of fill for diked containment walls. Sampling was performed to comply with the requirements of NCAC, Title 15A, Subchapter 13B, .0544 Monitoring Plans and Requirements for C&DLF facilities governed by the NC Division of Waste Management (DWM). In addition, this sampling event, as performed, complies with the "Groundwater Monitoring Plan" and "Operations Plan" prepared by ERM dated June 2013 and submitted to the NC-Division of Waste Management (DWM) for acceptance.

The following report will provide a description of the field methods implemented, field observations, field measurements, analytical laboratory methods, analytical laboratory results, conclusions, and recommendations.

2.0 OBJECTIVE

The workscope and primary objective of the services provided by Atlantic Geoscience has been outlined in Proposal No. 09272014 submitted to GRS. The workscope objective was to perform background sampling of six selected groundwater monitoring wells to determine ambient groundwater conditions (and methane/air-gas concentrations) beneath and adjacent to Phase I, Cells 1 through 3 prior to these cells receiving any C&D waste. The following specific tasks were undertaken in order to accomplish the sampling objective:

- Conduct groundwater purging and groundwater sample collection utilizing detection wells MW-1, MW-2, MW-3, MW-4, MW-6, and background well MW-10.
- Collect groundwater elevation measurements at each of the above six wells.
- Perform laboratory analytical testing for specified metals, volatile organic compounds (VOCs), cations/anions, and other indicator parameters specified in the Groundwater Monitoring Plan.
- Perform methane/air-gas sampling in the shallow subsurface soils adjacent to each of the above six monitoring well pads for the following: methane, hydrogen sulfide, oxygen, and explosive limits.
- Provide a technical report of findings, maps, tabulated data, and drawings summarizing the site groundwater conditions and develop conclusions from review of the above data collected during the background sampling event.

Following is a description of the field sampling methods, analytical methods, and results derived from performing this sampling event.

3.0 GROUNDWATER SAMPLING AND ANALYTICAL METHODS

The following is a summary of the field sampling methods that were implemented during this sampling event. This summary describes the methods used for performing groundwater purging, groundwater sampling, methane/air-gas field testing, and collection of groundwater samples for laboratory analysis by an NC certified laboratory.

3.1 Monitoring Wells and Construction

A total of 15 monitoring wells were constructed at this site during August of 2011 by Geologic Exploration (Registration No. 2402). Drilling and well construction enabled and ERM to perform the "Site Hydrogeologic Study", site design plans/specifications, and the "Application to Construct Phase I" required by DWM.

Of the 15 wells constructed at that time, a total of six monitoring wells were designated for use as the proposed monitoring network for background sampling of Phase I as specified by the "Groundwater Monitoring Plan". There are five

detection wells designated for performing background groundwater sampling adjacent to Phase I, Cells 1 through 3. The five detection wells are: MW-1, 2, 3, 4, and 6. One additional well, (MW-10) was selcted to serve as the up-gradient "background well" and is located approximately 1500 ft. up-gradient and east-southeast of Phase I, Cells I through 3. For clarification, Atlantic Geoscience used (MW) nomenclature for referencing these wells. The MW nomenclature corresponds equivalently with the OWB-1, OWB-2, OWB-3. OWB-4, OWB-6, and OWB-10 designation used by ERM in the Groundwater Monitoring Plan.

Drilling and well construction was performed by Geologic Exploration using a Diedrich D-120 mobile drill rig equipped with hollow-stem augers. Drilling and borehole advancement was performed in accordance with ASTM D-1452, "Standard Method for Soil Investigation and Sampling by Auger Method". Monitoring wells were constructed in general accordance with ASTM D-5092, "Standard Practice for Design and Installation of Groundwater Monitoring Wells in Aquifers." Standard penetration testing was also performed in general accordance with ASTM D-1586 "Standard Penetration Test and Split Barrel Sampling of Soils.

All monitoring wells are 2.0 inch-diameter PVC wells constructed in accordance with NCAC, Subchapter 2C, "Well Construction Standards". Well Construction Records and Boring Logs for MW-1, 2,3,4,6, and 10 are included in Appendix 1.

3.2 Monitoring Well Survey Data

Well-head elevations (top of casing), ground surface elevation, and x-y locations were established by a survey perfromed by Parker & Associates, Inc., Registered Land Surveyors in October of 2011. Pertinent survey data for the six monitoring wells sampled during this background sampling event are shown in the below table.

Well No.	Date Drilled	Ground Surface Elevation (MSL)	Top of Casing Elevation (MSL)	Casing Riser Stick-up (ft)	Well Depth (ft)	Screen Interval (ft)	Northing (NC State Plane)	Easting (NC State Plane)
MW-1	8/25/11	39.28	42.03	2.75	20.0	7.0-20.0	435174.413	2525011.768
MW-2	8/25/11	38.02	40.89	2.87	20.0	7.0-20.0	434771.627	2524752.429
MW-3	8/25/11	37.61	40.32	2.71	20.0	8.0-20.0	434364.284	2524821.444
MW-4	8/25/11	39.09	41.68	2.59	20.0	8.0-20.0	434374.970	2525231.562
MW-6	8/24/11	39.25	42.18	2.93	15.0	8.0-20.0	435037.893	2525353.871
MW-10	8/22/11	39.67	42.40	2.73	20.0	8.0-20.0	434276.543	2526606.821

The locations of the six monitoring wells shown in the table above and sampled during the October 10, 2014 background sampling event are illustrated in Figure 2.

3.3 Groundwater Elevation Measurements

Groundwater elevation measurements were performed at each of the six specified monitoring well using a Heron audible water level probe with a polyethylene Kevlar reinforced graduated engineering tape divided in one tenth and one-hundredth inch increments. Static groundwater elevation measurements were collected from all six wells prior to performing purging and sampling. After obtaining each water level measurement, the probe tip and submerged polyethylene tape surface was thoroughly decontaminated using a three step decon-process. The probe and tape surface was vigorously scrubbed/brushed using a non-phosphorous detergent and then followed by an isopropyl alcohol rinse. Two de-ionized water rinses were then utilized to remove all cleaning agents. The probe tip and tape were allowed to thoroughly air dry between measurements and prior to re-use.

The groundwater field elevations gauged at each of the six monitoring wells were recorded in the field log and are shown in Table 1. The groundwater measurements from well gauging during the October 10, 2014 background sampling event show a range of elevation from the highest point at 33.87 ft. above mean sea level (AMSL) at MW-10 to the lowest at 32.17 ft. AMSL at MW-3. Measurements from this sampling event are noted to be approximately 1.86 ft. to 2.63 ft. lower than the elevations acquired from these same wells during the December 22, 2011 gauging event.

Groundwater elevation measurements collected from this event were used to develop an iso-contour map illustrating the surficial aquifer's potentiometric surface. The iso-contour map also indicates the direction of groundwater flow beneath the Phase I cell is west at the time of this sampling event. A groundwater iso-contour map is provided in Figure 3.

3.4 Groundwater Purging and Sampling

Background groundwater sampling was performed in general accordance with the standards and methods outlined in the project "Groundwater Monitoring Plan" accepted by DWM. In addition, sampling methods specified by the American Society for Testing and Materials (ASTM), and USEPA Methods and Protocols described in the *RCRA Ground Water Monitoring Technical Enforcement Guidance Document (TEGD)*-OSWER-9950.1 were also followed. Decontamination of sampling equipment used during this field sampling program was also performed in accordance with the specifications described by USEPA in the TEGD.

Prior to collecting groundwater samples, each monitoring well was first gauged for static water level using an audible level probe as described above. Measurements for each well were recorded in the project field log.

Prior to sampling, groundwater was purged by evacuating a minimum of three well volumes or more, or until turbidity was reduced to yield clear samples. Purging and sampling was performed using a Pegasus Athena Peristaltic Pump®. The purging and sampling process incorporated Low-Flow sampling techniques by collecting samples with flow rates as low as 40 milliliters per minute to ensure that representative groundwater samples were derived. Groundwater was evacuated from each monitoring well during the purging process using higher withdrawal rates than during the sampling process. Prior to collection of groundwater samples from each well location. the peristaltic pump head was equipped with new Tigon tubing and new disposable lab-grade Teflon tubing for the drop tube. Spent tubing was disposed after completing sampling at each well to prevent cross-contamination or the compromise of sample quality with subsequent sampling.

Low-Flow sampling methods were implemented to reduce turbidity and the probability of sample bias often caused by suspended sediments/silts indigenous to aquifers comprised of silty/clayey marine sediments. A flow-through cell was utilized in conjunction with the YSI Model 63 field instrument to continuously monitor groundwater field parameters as they fluctuated during the purging process. Once turbidity cleared and the field parameters stabilized (including pH, temperature, and specific conductivity) groundwater was then sampled with flow rates reduced so as to not exceed 40 milliliters per minute. Field parameters were recorded at the conclusion of purging each well volume. Once these parameters reached less than a 5% deviation within three successive measurements, Low Flow sampling was then commenced.

All groundwater samples were placed into sealed laboratory provided glassware and bottle-ware. All samples were then immediately packed on ice and chilled to approximately 4° Centigrade for transport/shipment to GEL Laboratories, LLC in Charleston, South Carolina. All groundwater samples were handled, transported, and conveyed in strict accordance with EPA chain of custody methods and procedures to ensure that sample integrity was not compromised during the handling process.

Copies of the laboratory results reported and chain-of-custody records are shown in Appendix I.

3.5 Field Measurements for pH, Specific Conductivity, and Temp.

As purging and sampling of groundwater was performed, field measurements for pH, specific conductivity, and temperature were collected on a continuous basis using a flow-through cell and Low-Flow sampling techniques. An Aqua-Phoenix YSI Model 63 handheld monitoring instrument and data-logger was utilized to

monitoring groundwater. The YSI Model 63 monitoring device was calibrated prior to field use using a three-point calibration procedure while at room temperature. The field parameter measurements for each well volume purged during the purging process prior to sample collection are shown in Table 1.

3.6 Analytical Testing

Groundwater samples collected from six monitoring wells (MW-1, 2, 3, 4, 6, and 10) were analyzed by an independent testing laboratory using EPA and SW-846 approved methods and procedures for performing laboratory analyses. The analytical methods used for testing each sample collected are specified below. The analyses were performed by GEL Laboratories, LLC a North Carolina certified lab. Analytes and parameters identified for lab testing are cited in Table I of the "Groundwater Monitoring Plan" prepared by ERM which has been previously submitted to DWM for acceptance. A summary of the wells sampled, the target analytes, and EPA test methods for each well are shown below.

	Metals (1)	VOC's (2))	TDS (3)	TSS (4)	BOD (5)	IC Anions) (6)	NO_2+ NO_3 (7)	Cl (8)	COD (9)	TOC (10)
MW-1	X	X	X	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X	X	X	X
MW-3	X	X	X	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X	X	X	X
MW-6	X	X	X	X	X	X	X	X	X	X

Notes:

(1) Metals by EPA Method 6010 (As,Ba,Cd,Cr,Cu,Fe,Pb,Mn,Se,Ag,Zn)
Mercury by EPA Method 7470
(2) VOC's by EPA Method 8260
(3) TDS by EPA Method 2540 C
(4) TSS by EPA Method 2540 C
(5) BOD by EPA Method 5210 B
(6) IC Anions by EPA Method 300.0
(7) Nitrogen and Nitrate by EPA Method 353.2
(8) Chloride by Method 4500-Cl-E
(9) COD by Method 5220 D
(10) TOC by Method 5310 B

VOC=volatile organic compounds (48 compounds included)
TDS=Total Dissolved Solids
TSS=Total Suspended Solids
BOD=Biological Oxygen Demand
COD=Chemical Oxygen Demand
TOC=Total Organic Carbon

4.0 SITE HYDROGEOLOGIC CONDITIONS

Site hydrogeologic conditions existing at the GRS site have been previously described in detail by ERM in "Groundwater Monitoring Plan". In summary, the site is generally characterized as being underlain by sequences of Pleistocene and Holocene marine sediments of variable thickness. Borings advanced at each monitoring well location confirm this and demonstrate the presence of surficial sediments comprised of silts, sands, clays, and inter-bedded shell fragments to depths of 20.0 ft. or greater below grade. The surficial aquifer at the site is an unconfined silty-clayey-sand with low hydraulic conductivity and is predominantly recharged by annual precipitation. The unit is dissected by a silty-clay shell hash that pinches and thickens spatially. The water table elevation at the site varies by several feet depending on seasonal rainfall. Surface waters throughout the region typically serve as discharge features where shallow unconfined aquifers discharge and contribute to their base flow.

In the "Application for Permit to Construct Phase I" prepared by ERM dated May 27, 2011, geologic cross-sections are provided to depict the site geologic conditions to a depth of up to 35.0 ft. below grade. Groundwater elevation conditions are also shown on Sheets 4 and 5 of the application.

4.1 Groundwater Flow Direction

Typical groundwater flow direction in the unconfined surficial aquifer beneath the site was determined previously in the "Application for Permit to Construct Phase 1". From groundwater elevations acquired from 15 monitoring wells across the site during August to November of 2011, ERM determined the direction of groundwater flow beneath Phase I, Cell 1 through 3 to generally be in a southwest direction toward an unnamed tributary of the White Oak River. The tributary is located approximately 2500 ft. west of the site. A subtle groundwater mound or ridge is evident from that gauging event (elevation 36.5 ft. AMSL) and is oriented in a northwest-southeast alignment beneath the undeveloped future Phase 3, 4, 5, and 6 cells based on ERM's data.

During the October 10, 2014 background sampling event, only six monitoring wells (MW-1, 2, 3, 4, 6, and 10) were gauged as specified by the "Groundwater Monitoring Plan". The highest groundwater elevation noted during this event was 33.87 ft. AMSL at MW-10, the up-gradient background well located on the far east-southeast flank of the site. The lowest elevation noted during this event was 32.17 ft. at MW-3, which is the well located south and adjacent to Phase I. The range of groundwater elevations noted during this event shows a difference in gradient across the site of 1.70 feet. From these measurements, groundwater flow is generally noted to be in a westerly direction. Slight variability in the direction of groundwater flow due to seasonal changes is not uncommon in unconfined surficial aquifer flow regimes in the Coastal Plains. It is expected that future gauging events will demonstrate some variability in flow direction.

The groundwater elevations obtained during the October 2014 sampling event are found in Table 1.

4.2 Hydraulic Conductivity

Typical hydraulic conductivity of the unconfined surficial aquifer was determined through a field testing program performed by ERM during the Hydrogeologic Site Investigation phase. Field testing and slug tests were performed by ERM at each monitoring well on the GRS site prior to submittal of the " Application for Approval of Phase I".

The results of the slug testing performed on the six monitoring wells used for the background sampling event show the following average hydraulic conductivities (K):

Monitoring Well	Type of K-Test	K-Value (cm/sec)
MW-1	Slug	2.11E -04
MW-2	Slug	9.62E -05
MW-3	Slug	8.91E -05
MW-4	Slug	2.72E -04
MW-6	Slug	9.85E -05
MW-10	Slug	6.74E -04

The calculated values shown above generally indicate low hydraulic conductivity ranges for the unconfined surficial aquifer at the site. Based on these values, with respect to soil types, the sediments comprising the unconfined surficial aquifer would be considered a silty-loess to clayey-type strata. These soil types and strata do not characteristically yield high groundwater production when pumped or high horizontal flow velocities. (Groundwater-AWWA Manual of Water Supply M21, 2nd Edition, 1989).

4.3 Groundwater Flow Velocity

The rate of groundwater movement through the shallow surficial aquifer at this site can be estimated using Darcy's equation. Where K=hydraulic conductivity; n=effective porosity; and dh/dl=hydraulic=gradient. An average velocity (V_{Avg}) of the entire cross-sectional area can be expressed as follows:

$$V_{Avg} = K\left(K(dh)/n(dl)\right)$$

The following values for equation variables may be used to estimate average velocity of groundwater movement across the site:

Monitoring Well	K-Value (cm/sec)	Gradient (Ft/ft)	Effective Porosity* (n)
MW-1	2.11E -04	0.00038	0.30
MW-2	9.62E -05	0.00038	0.40
MW-3	8.91E -05	0.00053	0.40
MW-4	2.72E -04	0.00033	0.30
MW-6	9.85E -05	0.00092	0.40
MW-10	6.74E -04	0.00059	0.30

* Source for Porosity= Groundwater-AWWA Manual of Water Supply M21, 2nd Edition, 1989).

The "Groundwater Monitoring Plan" prepared by ERM references data from the Hydrogeologic Study dated December 16, 2011 and states "the horizontal hydraulic gradient is essentially flat and the calculated groundwater velocities are on the order of 1 foot/year of less." Also, ERM's Groundwater Potentiometric Map, Drawing No. 5 dated December 2011, illustrates low hydraulic gradients across the site. Data cited on the potentiometric map (Drawing No. 5) were used to derive the following estimated velocities to describe typical hydrogeologic conditions as of October 2014.

(V_{Avg}) estimated from MW-7⟶MW-5= 0.215 ft./year

(V_{Avg}) estimated from MW-11⟶MW-7= 0.44 ft./year

(V_{Avg}) estimated from MW-11⟶MW-10= 0.91 ft./year

From the above groundwater flow velocity estimates, it is apparent that typical average groundwater flow velocities across the site are consistent with earlier estimates by ERM and can range from approximately 0.2 ft/year to 0.91 ft/year. Flow velocities of this magnitude are considered to be very low for an unconfined surficial aquifer comprised of marine sediments within the Coastal Plains physiographic province. The low velocity is primarily a function of two variables; low hydraulic gradients observed across the site and low hydraulic conductivities determined by slug testing. In addition, the low estimated values of effective porosity (based on the soil types existing beneath this site) contribute to retarding the rate of groundwater flow and discharge from this site.

5.0 RESULTS OF GROUNDWATER ANALTYICAL TESTING

During the October 10, 2014 groundwater sampling event, a total of five down gradient/lateral detection wells and one up-gradient monitoring well were sampled and analyzed for metals, volatile organic compounds, cations/anions, biological oxygen demand, chemical oxygen demand, total organic carbon, total suspended solids, and total dissolved solids. Review of the analytical results provided by GEL Labs, shows that three metal constituents (arsenic, chromium, and iron) are present in groundwater samples analyzed from the site and exceed

NCAC, Subchapter 2L, "Groundwater Quality Standards." Each of the groundwater samples from the five detection wells adjacent to and down gradient of Phase I, Cells 1 through 3 revealed concentrations of at least one dissolved metal specie exceeding NCAC 2L Standards. This phenomenon is extraordinary since no C&D waste has ever been disposed at this CDLF. Since this is a "virgin site" where no waste disposal, waste storage, or known industrial operations have existed, the metals detected in groundwater at the site may be indigenous, or may be a cause of historic activities that may have occurred at the site. These findings, and the cause of metals present in groundwater at the site, will be discussed in detail in the following paragraphs. Groundwater analytical results for all constituents tested and discussed herein are provided in Table 3. Copies of all lab reports and chain-of-custody records from GEL are included in Appendix 2.

5.1 Compliant Analytical Results

From the laboratory analytical results, our review has determined that no target volatile organic compounds (VOCs) were detected in any of the six groundwater samples collected from the six monitoring wells sampled during this background characterization event. Therefore, samples analyzed from each of the six monitoring wells tested, demonstrate compliance with NCAC 2L Standards with respect to VOCs due to no detection of such compounds in samples. In addition to VOC results, the results for the "indicator parameters" including TOC, TDS, TSS, BOD, COD, IC Anions (Fl and SO_4), NO_2 + NO_3, and Cl generally appear within ranges that are consistent with USGS published literature describing groundwater quality in the southeastern Coastal Plains of North Carolina.

With regard to metals sample results, samples from only one monitoring well in the monitoring network displayed compliant concentrations of all eleven (11) metals when tested by EPA Method 6010. The single well exhibiting compliant concentrations of all 11 metals was the background well, MW-10, which is the farthest well to the east-southeast of CDLF site. None of the five down gradient detection wells exhibited compliant concentrations for all 11 metals in the metals panel analyzed by EPA Method 6010.

5.2 Non-Compliant Analytical Results

The most significant finding of the background analytical testing regime was the detection of non-compliant metals concentrations in detection wells MW-1, 2, 3, 4, and 6,

As stated above, none of the five down gradient detection wells exhibited compliant concentrations for all 11 metals in the metals panel analyzed by EPA Method 6010. MW-1 exhibited concentrations of arsenic and iron at 13.1 and 3450 ug/L respectively; each above the NCAC 2L Standards of 10 and 300 ug/L respectively. MW-2 exhibited an iron concentration at 1840 ug/L which is above the 2L Standard of 300 ug/L. MW-3 exhibited concentrations of arsenic,

chromium, and iron at 18.1, 13.4, and 5140 ug/L. The standards for these three metals are 10, 10, and 300 ug/L respectively. MW-4 exhibited concentrations of arsenic and iron at 16.1 and 3700 ug/L respectively; each above the NCAC 2L Standards of 10 and 300 ug/L respectively. MW-6 exhibited concentrations of chromium and iron at 18.7 and 7470 ug/L respectively, each above the NCAC 2L Standards of 10 and 300 ug/L respectively. Samples from MW-10, the background well, were the only groundwater samples tested that exhibit no detectable concentrations of metals above the NCAC 2L Standards.

None of the analytical results for "indicator parameters" analyzed from each detection well for TOC, TDS, TSS, BOD, COD, IC Anions (Fl and SO_4), NO_2 + NO_3, and Cl show abnormally elevated concentrations or exceed 2L Standards.

5.3 Potential Causes for Non-Compliant Results

Since this background sampling event is the first and only sampling event to have occurred at this site, the single data point that these results provide do not provide a sufficient data set to enable genuine correlation or comparison to historic groundwater conditions. It is uncertain if the analytical results generated by this sampling event represent indigenous/naturally occurring groundwater conditions, or if the samples demonstrate that the non-compliant metals concentrations discovered in groundwater are a function of historic site land uses that could activities such as agriculture, silvi-culture, timbering, military operations, wood-treatment, rail-way operations, or a variety of other industrial land uses.

Below is a discussion of potential causes that may, or may not be correlated to the presence of elevated to arsenic, chromium, and iron concentrations in groundwater samples analyzed from this site:

Arsenic

Arsenic was detected in groundwater samples from MW-1, 3, 4, and 6 ranging from 11.8 to 18.7 ug/L. Though these levels are not excessively high, they still exceed the NCAC 2L Standard of 10 ug/L. There are many potential non-naturally occurring sources that may be causing or contributing to the elevated arsenic concentrations detected, A potential key source for arsenic's presence on this undeveloped 58-acre site is historical agricultural operations that occurred on portions of the site during the early-mid 1900's. Fertilizers, pesticides, and herbicides typically contain arsenic, chromium and other complex inorganic metals in their formulation in order to create high toxicity to plant growth and in turn kill the vegetation it contacts. It is uncertain that arsenic based materials were used on this site for agriculture purposes, however if such materials were used historically, they may serve as the source contributing or causing the presence of arsenic (and chromium) that has been detected in groundwater samples analyzed.

In addition to the herbicides use in early agricultural practices, herbicides were also heavily relied upon by the railroad industry to control vegetation and weed growth along track beds and corridors throughout the United States. According to Mr. Kevin Dail, GRS-Site Manager, a railroad line ran dissected this 58-acre tract during the early-mid 1900's and it's purpose was primarily for shipment of pine related products and goods to serve southeastern North Carolina. The former elevated track bed is still evident on the site today and required removal to enable construction of the Phase I cells and entrance roads of the CDLF It appears to have run in a southwest alignment beginning north of MW-6 and continuing southwesterly past MW-3. The relic track bed appears to have transected at least through a portion of Phase I of the CDLF site which is the location of elevated arsenic occurring in groundwater. If arsenic based herbicide products were used to control vegetation growth along the track bed when the line was active, it is a reasonable that this may be the cause for the occurrence of arsenic appearing in MW-1, 3, 4 and 6.

Arsenic is also a naturally occurring abundant element found in soil throughout the United States and is derived from parent sources that are commonly igneous or metamorphic. Organic arsenic compounds (carbon based) are mainly found in sea-life and marine organisms. The marine clays deposited beneath the GRS site exists in highly reduced sulfide environment with clay beds that are inter-bedded with skeletonoid carbonate micro-fossils. Groundwater recharge in this aquifer system predominantly occurs from rainfall and downward infiltration of precipitation through these inter-bedded clays, sands, silty-clays, and fossiliferous limestone units that under-lies the site. Since the geologic sequence is largely comprised of marine sediments and micro-fossils, this geologic setting could potential serve as a source contributing to the introduction of elevated arsenic concentrations into the hydrogeologic cycle.

Arsenic exist naturally as either an organic or inorganic compound and is found in many marine organisms. In addition, when arsenic is dissolved in water it can transform and be present in several different forms including arsenate and arsenite. Some chemical forms of arsenic have a strong affinity to clay mineral surfaces and organic matter. This can affect the stability of the element and how it behaves in the environment. There is a potential for arsenic to be released from water and sediments depending on the chemical and biological conditions it exist under. Arsenic is particularly vulnerable to release when there is fluctuation in Eh, pH, soluble arsenic concentration, and sediment organic content (Source: IPCS-"Environment Health Criteria for Arsenic and Arsenic Compounds", EHC 224, Chapter 1:Summary, Section 2 and 3).

It is likely that further evaluation will be required to provide more definition of the cause of elevated arsenic occurring in groundwater at the site, however a likely cause is from fertilizers from historic agricultural practices and/or use of

herbicides for vegetation control with the rail-way train line that operated at this site in the early-mid 1900's.

Chromium

The analytical results indicate that total chromium was present in only one groundwater sample collected at MW-3. The concentration detected from this sample was 13.4 ug/L which is above the corresponding NCAC 2L Standard of 10 ug/L. At the time this well was sampled (October 10, 2014), purge water was extremely turbid, ladened with sediment, and exhibited the appearance of chocolate milk. Rigorous purging of the well did not result in a high level of sample clarity at the time of sampling. It seems apparent that MW-3 was likely not developed thoroughly upon completion when it was drilled/constructed. Additional purging was initiated at the time of sampling to reduce turbidity however the samples did not reach absolute clarity. Therefore, an obvious source for the presence of the single occurrence of chromium in the groundwater sample collected from MW-3, is the poor quality of the groundwater sample yielded due to it's excessive sediment content.

Additional well development using either a centrifugal or submersible pump is recommended to improve the quality of future groundwater samples produced by this well. If additional well development efforts do not produce significantly improved sample quality, then the well screen is likely positioned so that it is bridging the clay unit lying beneath the site and colloidal clay is being introduced into the well as it is pumped. An improperly constructed sand-pack surrounding the annular space of the well screen is also a possible occurrence affecting the quality of the samples yielded from this well.

Iron

Iron concentrations exceeding NCAC 2L were detected in each of the five groundwater samples collected from each detection monitoring well in the network. The only well not exhibiting iron exceedances was the up-gradient background well, MW-10. Iron was detected in each of the five detection wells in concentrations ranging from 1,840 ug/L to 7470 ug/l. The 2L standard for iron is 300 ug/l. According to Well Construction Records, the well screens for MW-1, 2, 3, and 6 encounter (or are immediately proximate) to the 2.0 ft. to 6.0 ft. overlying clay unit underlying the site. In addition, the 10.0 ft. well screens of each of the six 20.0 ft. deep monitoring wells intersect the unit described in the Well Logs as a "dark grey clayey SAND with intermittent clay lenses." These intermittent post-Miocene surficial sands and clays that overlie shallow limestone comprising the Castle Hayne Formation are characteristically high in iron concentration (Source: NC Department of Water Resources, Geology and Ground-water Resources of the Wilmington to New Bern Area, GW Bulletin No. 1, 1960, Legrand, Harry.

The most probable cause of the occurrence of elevated iron concentrations in groundwater at this site is the iron-rich sources of clay that exist beneath the site and are in contact with the well screens and zones being targeted for sample collection.

6.0 RESULTS OF METHANE/AIR-GAS SAMPLING

6.1 Methane/ Air-gas Sampling Method

In accordance with the provisions of the approved facility "Operating Plan" dated June 2013 (revised September 30, 2013) prepared by ERM and the requirements of Title 15A, NCAC, Subchapter 13B, 0544 (d) Gas Control Plan, owners of C&D LF units must perform quarterly monitoring for methane gas and other explosive gases. To satisfy this requirement, Atlantic Geoscience performed methane/air-gas monitoring during the "background" sampling event prior to waste disposal in Phase I, Cells 1 through 3. Future methane air-gas monitoring will be performed at each forthcoming bi-annual sampling event as well as two additional quarters for a total of four methane air-gas sampling events per year.

Gas monitoring was performed in general accordance with the methods described in the plan prepared by ERM entitled "Operations Plan", Section 2.0-Facility Operations and Maintenance, Pages 13 through 15. Using the "punch probe" method, a small diameter boring was advanced into the vadose zone adjacent to each existing monitoring well pad for the purpose of collecting insitu soil-gas samples from the unsaturated soil column. A 1.0" diameter 0.01 slotted screen 3.0 ft. long was inserted in the borehole opening and the top of the tube was sealed. Sterile fine-grained sand-pack was used to fill the borehole annular space sealing the probe screen and casing. Gas samples were then collected using a RAE Systems QRAE II-4 gas meter for the parameters listed below. The air sampling instrument was fashioned with disposable Teflon tubing approximately 3.0 ft. long X 0.25" diameter. The disposable tubing was inserted into the top opening of the casing and lowered to an estimated depth of between two and three feet below grade. The tubing was sealed at the entry point where it entered the top of the push probe to prevent entry of errant ambient air into the top of the probe. The depth of air-sampling depended on the depth of the water table surface at each location. The screen was positioned in the vadose zone above saturated soils and above the water table surface. The following gases were measured during this sampling event:

Source Monitored	Type of Instrument
Methane	Micro FID IS w/ carbon/methane filter
Hydrogen Sulfide	RAE-QRAE II-4 Gas Detector
Oxygen	RAE-QRAE II-4 Gas Detector
Explosive Gases (%LEL)	RAE-QRAE II-4 Gas Detector

At the time of this sampling event, high water table conditions existed beneath the site. The water table depth below ground surface was determined to range from

2.73 ft. to 4.08 ft. below grade. Due to high water table conditions, care was initiated in advancing the methane air-gas probes to prevent placement into saturated soil.

6.2 Results of Methane/Air-gas Sampling

The results of the field methane air-gas monitoring results were recorded in the field log. From review of the methane air-gas sampling results, it was determined that no detectable concentrations of methane, hydrogen sulfide, or explosive gases (measured as %LEL) were revealed at any of the six monitoring well locations where methane air-gas monitoring was performed. Since no detectable background concentrations of methane, hydrogen sulfide, or explosive gases were revealed, it appears obvious that no impacts can be attributed to waste disposal or any other activities that pre-date the development of this site for a CDLF.

In addition, oxygen levels monitored in shallow soils were determined to range from 19.4 to 20.9% of O_2. These oxygen levels would be considered ambient and within normal expected background levels. With regard to carbon dioxide (CO_2) levels, only two sample locations showed any detectable concentrations of carbon dioxide. Air-gas sampling performed at MW-6 revealed 5 ppm of CO_2 and sampling at MW-3 revealed 2 ppm of CO_2. The low concentrations of CO_2 detected at these two methane/air-gas sampling locations are not considered significant.

The methane/air-gas concentrations detected adjacent to each of the six monitoring well locations are shown in Table 2.

7.0 CONCLUSIONS

In conclusion, the laboratory analytical results revealed no target volatile organic compounds (VOCs) present in any of the six groundwater samples collected from six monitoring wells sampled during this background sampling event. Therefore, based on these results, the analysis from each of the six monitoring wells tested demonstrate compliance with NCAC 2L Standards with respect to VOCs.

In addition to VOC test results, the test results for the "indicator parameters" including TOC, TDS, TSS, BOD, COD, IC Anions (Fl and SO_4), NO_2 + NO_3, and Cl appear within ranges that are consistent with USGS published literature describing groundwater quality in surficial aquifers in the southeastern Coastal Plains.

With regard to the presence of dissolved metals in groundwater at the site, none of the five detection wells (MW-1,2,3,4 and 6) exhibited compliant concentrations for all 11 metals in the metals panel analyzed by EPA Method 6010. Only one sample analyzed from the background monitoring well, MW-10 displayed compliant concentrations of all eleven (11) metals tested by EPA Method 6010.

MW-10 is the farthest well up-gradient in the monitoring network and is located on to the east-southeast side of the GRS-CDLF site. Each of the five detection wells (MW-1,2,3,4 and 6) exhibited non-compliant concentrations of arsenic, chromium, or iron (in cases more than one element). The concentrations of non-compliant metals detected varied in each of the five detection wells. The potential cause for the occurrence of these metals in the five detection wells will require additional evaluation. Elevated Iron concentrations is likely naturally occurring due to ferrous-rich clay soils in contact with the monitoring well screens and casing. Elevated arsenic is detected at three well locations is suspected to be a result of herbicides that may have been used for vegetation control on a relic railroad line that transects the interior of the CDLF site. Elevated chromium discovered at one well location is suspected to be a function of that well being improperly developed when it was initially drilled and/or improperly constructed/sand-packed thus allowing colloidal clay particles to penetrate the sand-pack filter.

Methane air-gas sampling performed adjacent to each of the six monitoring wells determined that no discernable concentration of methane, hydrogen sulfide, or explosive gases (measured as %LEL) were revealed. Since no detectable background concentrations of methane, hydrogen sulfide, or explosive gases were revealed, it appears obvious that no methane or air-gas impacts have occurred as waste disposal operations have not yet commenced at the site. Other activities that may have occurred pre-dating the development of the CDLF site also show no evidence of impacting ambient soil air-gas concentrations in the vadose zone.

8.0 RECOMMENDATIONS

It is recommended that a copy of this report be submitted to NCDENR-Division of Waste Management in the Raleigh Office, to comply with reporting requirements setforth in the "Groundwater Monitoring Plan" prepared by ERM. Though the facility has not yet been issued a permit to dispose of waste in Phase I, Cells 1 through 3, it is important that GRS place a copy of the report on file with DWM in a timely manner to establish background groundwater conditions prior to commencement of waste disposal at the facility.

With regard to the elevated concentrations of metals detected during this sampling event, it is recommended that additional evaluation be undertaken to determine the factors responsible for the elevated detections. A number of measures that could be considered in the interim include:

1. Re-develop each well that revealed high levels of turbidity and re-sample those monitoring wells that yielded elevated metals concentrations.

2. Collect additional samples for laboratory analysis from each well that revealed elevated metals; then, split the volume and submit one as a "filtered" sample and

one as an "unfiltered" sample for comparison. This would enable evaluation of the effects of suspended-colloid clays on sample quality.

3. Collect additional samples from each well showing elevated detections for metals and split sample using two different independent NC certified laboratories.

4. Take no additional action at this time to evaluate the cause for elevated metals from recent sampling; proceed with the next Bi-annual sampling event and upon receipt of results from that event make a further determination at that time.

5. Research historic land use, ownership, and practices that have taken place on this site prior to this project. Determine if past land use or historic operations conducted at the site may have impacted the site. Land uses such as agricultural (farming, fertilization, weed control, etc.), railroad operations, light or heavy industrial uses, military use, manufacturing, storage/warehousing, timbering, sawmilling, and ammunition storage (Civil War) should be considered.

At a minimum, it is recommended that ERM, GRS, and Atlantic Geoscience discuss this further and determine if an additional evaluation is warranted.

9.0 LIMITATIONS

This report has been prepared for exclusive use by GRS and DWM and should not be relied upon by third parties. The exploratory and evaluative methods implemented by Atlantic GeoScience, Ltd. in this evaluation are consistent with engineering and scientific standards routinely used by the environmental industry. The subsurface data presented in this report includes interpreted geological conditions encountered during drilling and subsurface sampling. This data is interpretive by nature and requires estimations, inferences, assumptions, and interpolation between known data points. Data describing site conditions in this report should not be relied upon for site development, construction, or excavation. The data presented in this report represents conditions that have been discovered to exist at the time of this evaluation. Additional drilling, analyses, testing, sampling, and modeling may be necessary to define site conditions with greater accuracy.

10.0 SEALS AND SIGNATURES

A copy of the executed Environmental Monitoring Form is found in Appendix 3.

Rudy A. Smithwick, P.G.
NC License No. 866

NORTH CAROLINA LICENSED SEAL 866 GEOLOGIST RUDY A. SMITHWICK

TABLES

Table 1- Groundwater Monitoring Field Measurements Log
Table 2- Methane/Air-gas Monitoring Results
Table 3- Groundwater Analytical Results Summary

TABLE 1
Groundwater Monitoring Field Measurements Log

Green Recycling Solutions, LLC
Background Groundwater Sampling Event-October 2014
Phase I, Cells 1-3, C&D Landfill
Maysville, NC
October 10, 2014

Well No.	DTW (Ft.)	Top of Casing Elevation (MSL)	Casing Riser Height (Ft.)	GW Elevation (MSL)	pH	Specific Conduct. (u/S)	Temp. (C°)
MW-1	6.84	42.03	2.75	32.44	V_1=4.92 V_2=4.90 V_3=4.95	58.8 59.1 59.5	19.7 19.9 19.9
MW-2	5.84	40.89	2.87	32.18	V_1=5.13 V_2=5.15 V_3=5.14	68.7 69.4 69.3	20.7 20.5 20.4
MW-3	5.44	41.32	2.71	32.17	V_1=4.54 V_2=4.40 V_3=4.37	36.4 37.1 37.4	20.2 19.7 19.6
MW-4	6.55	41.68	2.59	32.54	V_1=4.27 V_2=4.20 V_3=4.19	45.8 44.9 45.3	21.8 21.2 20.7
MW-6	6.58	42.18	2.93	32.67	V_1=5.62 V_2=5.72 V_3=5.75	131.7 151.1 153.2	20.0 19.9 19.8
MW-10	5.80	42.40	2.72	33.87	V_1=4.51 V_2=4.51 V_3=4.16	80.8 76.7 75.6	20.1 20.2 20.1

Notes: 1. Field parameters were measured using a calibrated Aqua-Phoenix YSI Model 63 handheld instrument.
2. The YSI/63 was calibrated prior to field use using a three-point calibration procedure performed at room temperature.
3. Three well volumes were removed from each monitoring well using an Athena peristaltic pump and Low-Flow sampling techniques. Field parameters for each well volume (V1,V2, and V3) were measured and recorded after removal.
4. Monitoring Well MW-10 is considered the "background" well and is outside and upgradient from the Phase 1 Cell.
5. DTW=depth to water measured from Top of Casing; groundwater elevation shown above is corrected to MSL.
6. MSL=mean sea level
7. u/S=micro Siemens

TABLE 2
Methane Air-gas Moniotring Results
Greeen Recycling Solutions, LLC
Phase I, Cells 1 through 3
Maysville, NC
October 10, 2014

Well Location	Hydrogen Sulfide (ppm)	Explosive Limits (% LEL)	Oxygen (% O_2)	Methane (pm)
MW-1	0	0	20.9	0
MW-2	0	0	20.9	0
MW-3	0	0	19.4	0
MW-4	0	0	20.9	0
MW-6	0	0	20.9	0
MW-10	0	0	19.4	0
Ambient Air	0	0	20.9	0

TABLE 3

Atlantic Geoscience, Ltd

GROUND WATER ANALYTICAL RESULTS SUMMARY

Green Recycling Solutions, LLC C&D Landfill

Maysville, North Carolina

Sample Location/ID	Date	Metals Analysis - 6010/3005 ICP SCAN										
		Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Selenium	Silver	Zinc
15A NCAC 2L .0202 *		10	700	2	10	1,000	300	15	50	20	20	1,000
Ground Water Monitoring Wells												
MW-1	10/10/14	13.1 J	20.5	<1.00	4.36 J	<3.00	3,450	<3.30	8.80 J	<6.00	<1.00	6.67 J
MW-2	10/10/14	6.08 J	15.4	<1.00	2.40 J	<3.00	1,840	<3.30	8.72 J	<6.00	<1.00	7.61 J
MW-3	10/10/14	11.8 J	83	<1.00	13.4	<3.00	5,140	<3.30	16.2	<6.00	<1.00	19.9
MW-4	10/10/14	16.1 J	16.5	<1.00	2.17 J	<3.00	3,700	<3.30	3.11 J	<6.00	<1.00	5.35 J

TABLE 3

Atlantic Geoscience, Ltd

GROUND WATER ANALYTICAL RESULTS SUMMARY

Green Recycling Solutions, LLC C&D Landfill

Maysville, North Carolina

Sample Location/ID	Date	Metals Analysis - 6010/3005 ICP SCAN										
		Arsenic	Barium	Cadmium	Chromium	Copper	Iron	Lead	Manganese	Selenium	Silver	Zinc
2L Groundwater Standards *		10	700	2	10	1,000	300	15	50	20	20	1,000
Ground Water Monitoring Wells												
MW-6	10/10/14	<5.0	51.5	<1.00	**18.7**	<3.00	**7,470**	4.40 J	36.3	10.4 J	<1.00	52.5
MW-10	10/10/14	<5.0	40.2	<1.00	1.05 J	<3.00	168	<3.30	10.8	<6.00	<1.00	<3.30

* North Carolina 15A NCAC 2L .0202 Groundwater Quality Standards for Class GA or GSA groundwaters (Amended April 1, 2013.

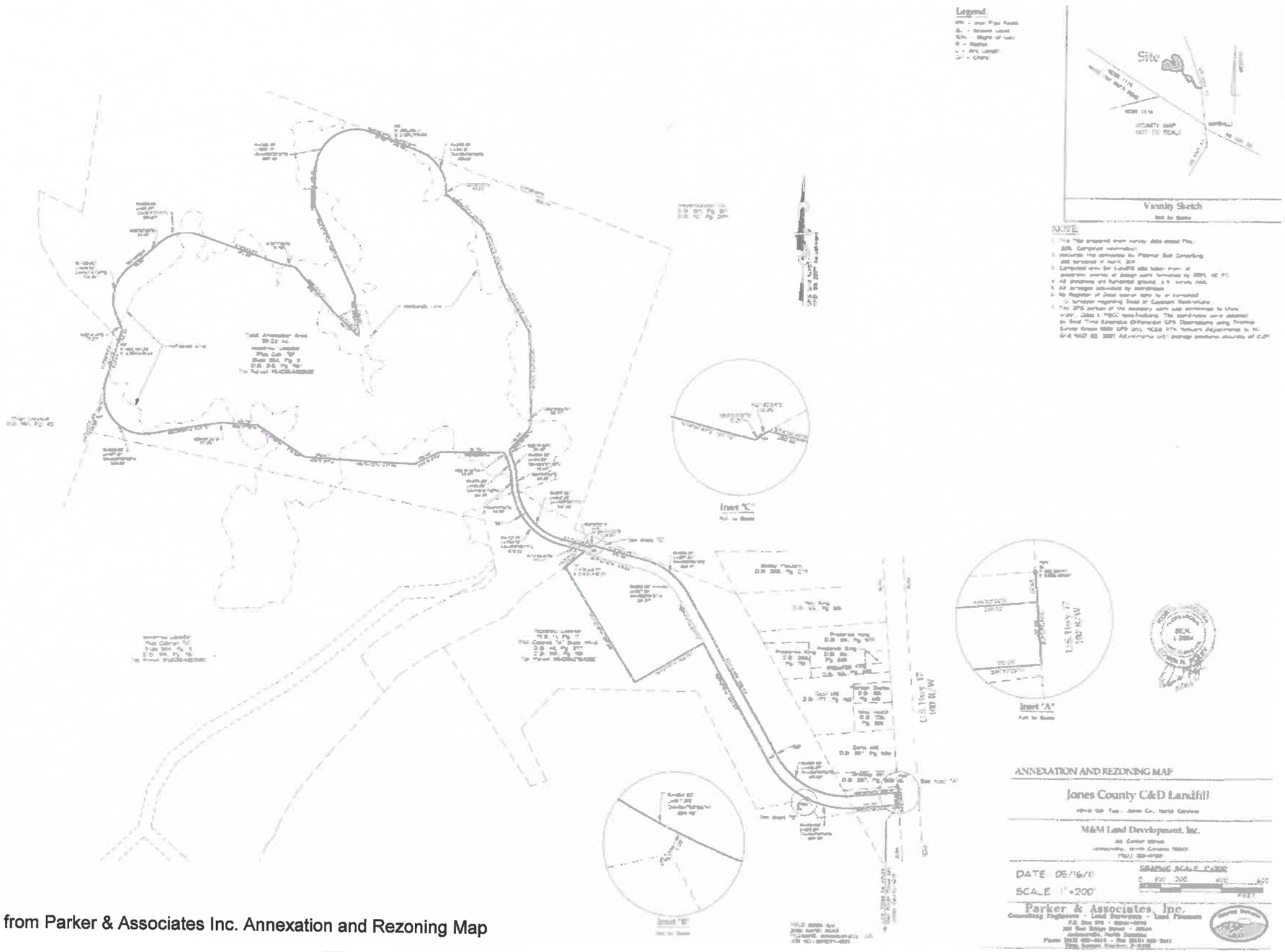
All 2L Standards and concentration figures in micrograms per Liter (ug/L), unless otherwise noted.

J = Concentration figure is estimated.

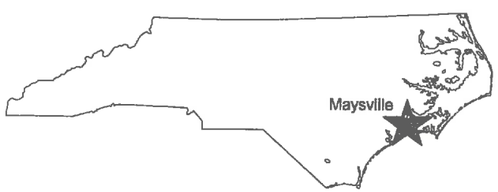
Bold figure indicates concentrations exceeds applicable 15A NCAC 2L .0202 groundwater standard.

FIGURES-

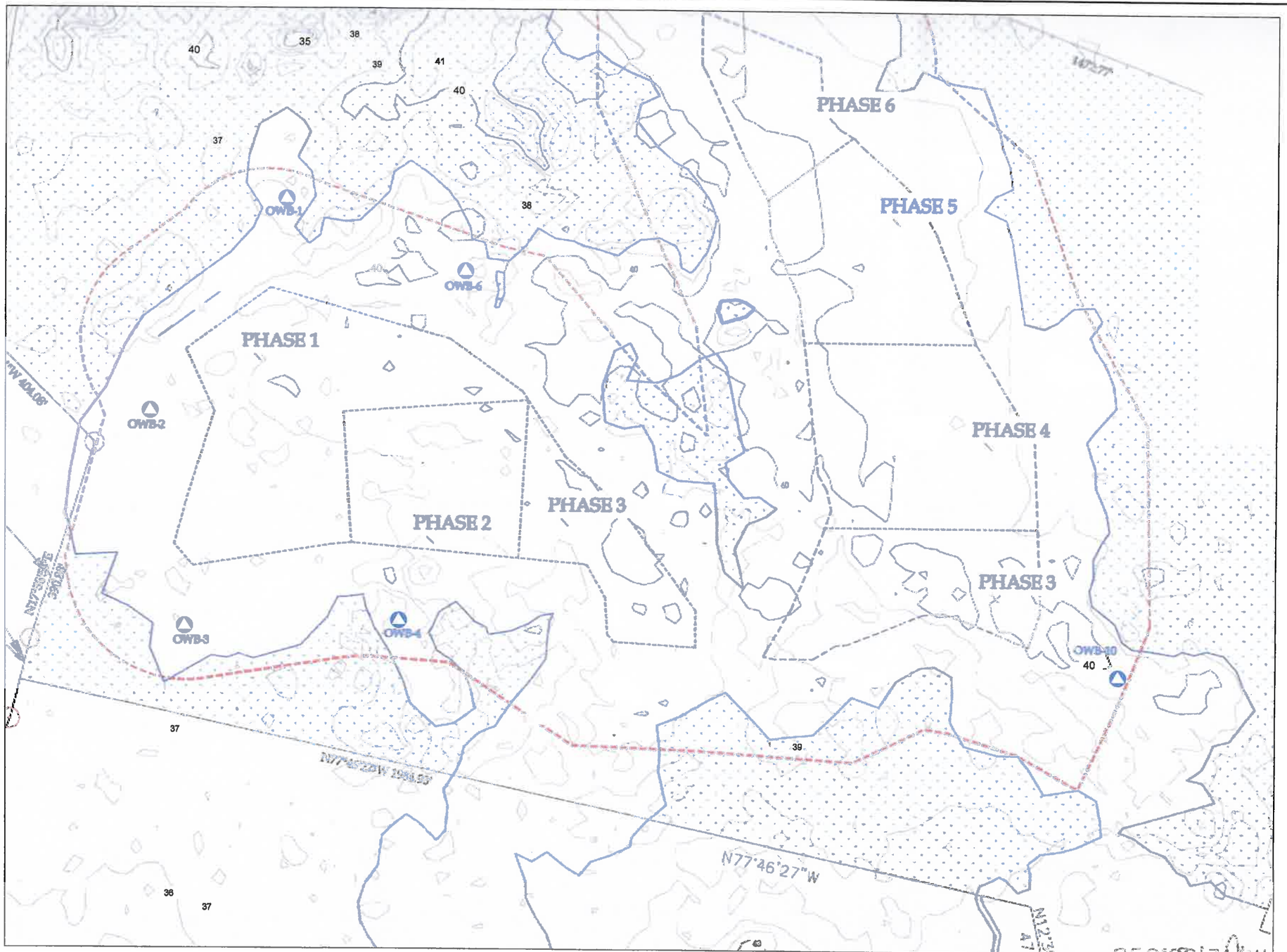
Figure I- General Site Location Map
Figure 2- Site Map with Monitoring Well Locations
Figure 3- Groundwater Iso-Contour Map
Figure 4- Metal Constituents Exceeding 2L Standards



Modified from Parker & Associates Inc. Annexation and Rezoning Map



Atlantic Geoscience, Ltd.		Green Recycling Solutions LLC Maysville C&D Landfill Maysville, North Carolina	FIGURE 1 Site Location Map
Drawn By: ST	Checked By: RS	Project: GSR C&DLandfill_Maysville,NC	File: 2141001 _GSR C&DLandfill_Maysville,NC_Fig 1



Groundwater Monitoring Well
Facility Boundary
Existing Ground Level Contour - 1 Foot Interval
Liner Limits/Phase Limits

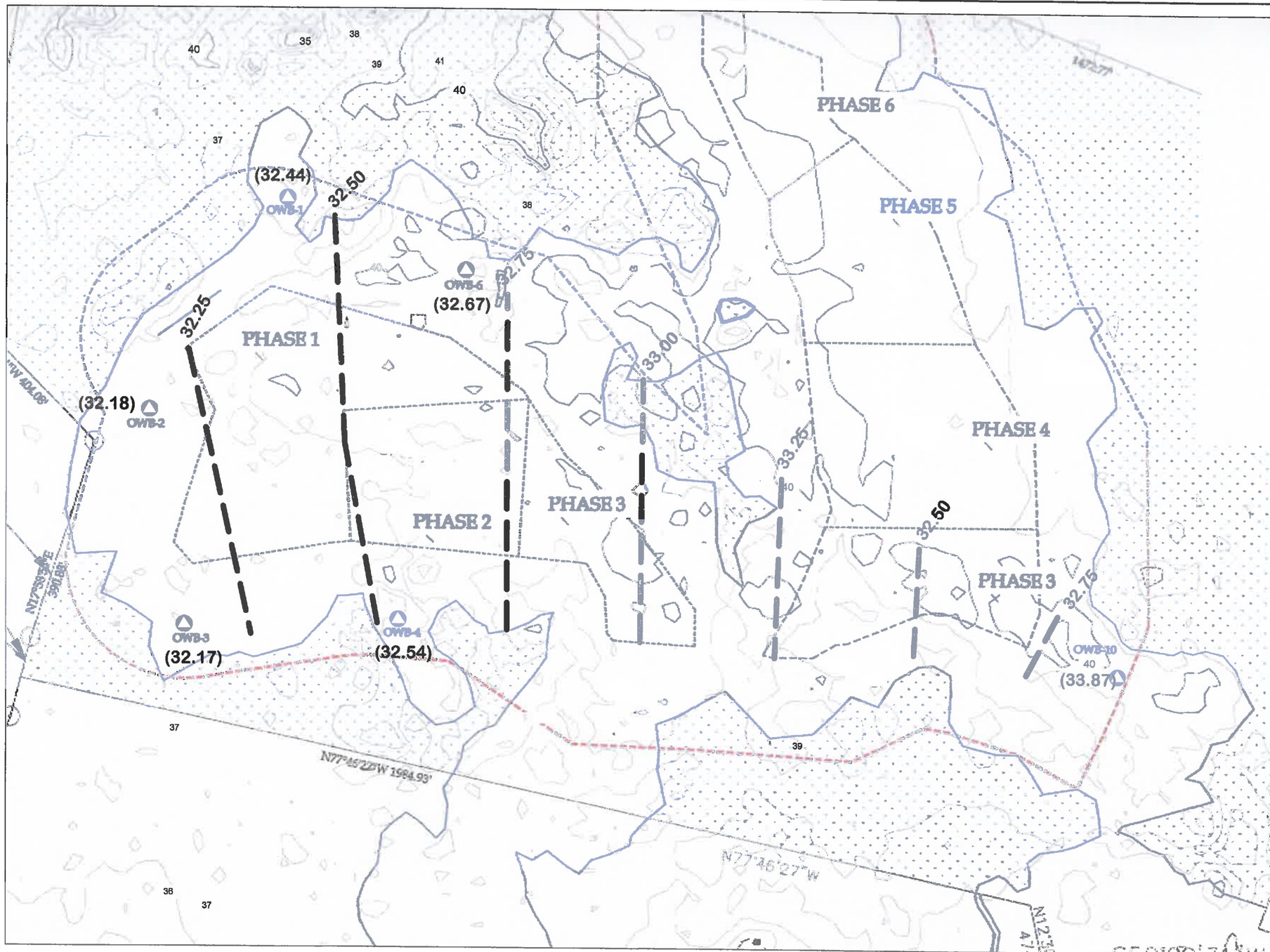
Atlantic Geoscience, Ltd.

Green Recycling Solutions LLC
Maysville C&D Landfill
Maysville, North Carolina

FIGURE 2

Monitoring Well Locations for October 10, 2015 Background Sampling Event

Drawn By: ST	Checked By: RS	Project: GSR C&DLandfill_Maysville,NC	File: 2141001 _GSR C&DLandfill_Maysville,NC_Fig 2



N

SCALE IN FEET
100 50 25 0 100

Groundwater Monitoring Well
Facility Boundary
Existing Ground Level Contour - 1 Foot Interval
Liner Limits/Phase Limits
Monitoring Well Groundwater Elevation ( )

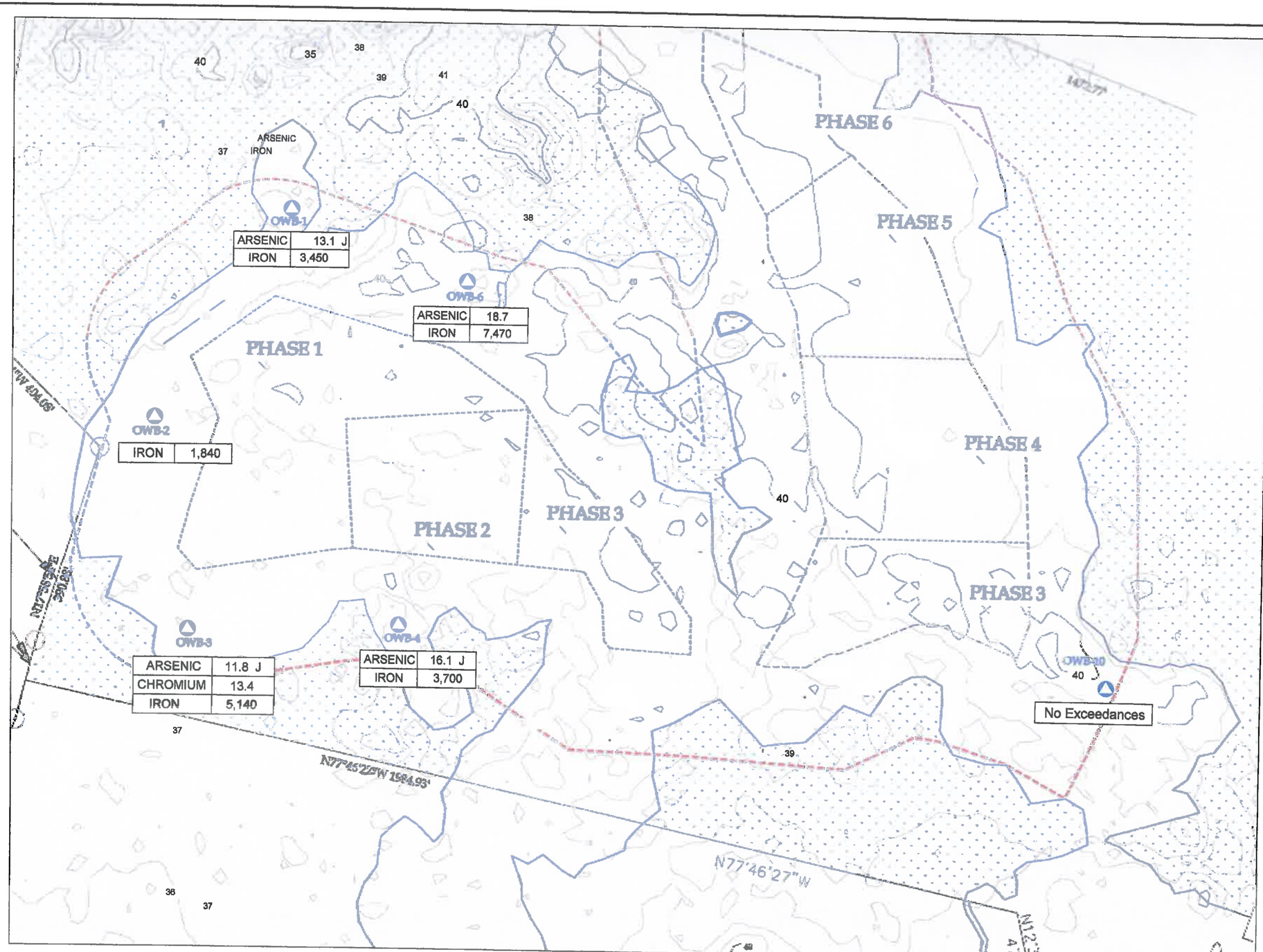
Atlantic Geoscience, Ltd.

Green Recycling Solutions LLC
Maysville C&D Landfill
Maysville, North Carolina

FIGURE 3

Groundwater Isocontour Map - October 10, 2014

Drawn By: ST | Checked By: RS | Project: GSR C&DLandfill_Maysville,NC | File: 2141001 _GSR C&DLandfill_Maysville,NC_Fig 3



Groundwater Monitoring Well
Facility Boundary
Existing Ground Level Contour - 1 Foot Interval
Liner Limits/Phase Limits

Atlantic Geoscience, Ltd.

Green Recycling Solutions LLC
Maysville C&D Landfill
Maysville, North Carolina

FIGURE 4

Metal Constituents Exceeding 15A NCAC 2L .0202 Groundwater Standards

Drawn By: ST | Checked By: RS | Project: GSR C&DLandfill_Maysville,NC | File: 2141001 _GSR C&DLandfill_Maysville,NC_Fig 4

APPENDICIES

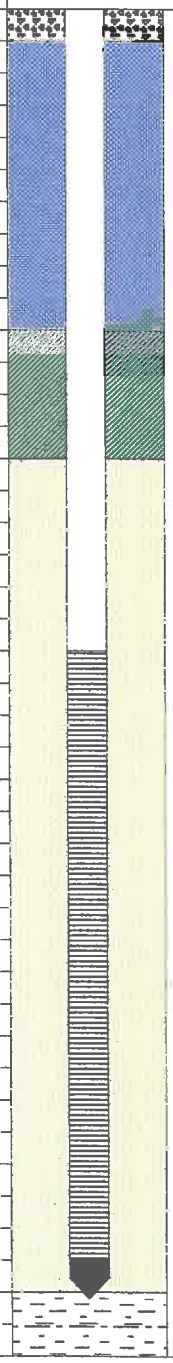
Appendix 1- Well Construction Records and Boring Logs
Appendix 2- Laboratory Analytical Results and Reports
Appendix 3- Environmental Monitoring Reporting Form

APPENDIX 1-
Well Construction Records and Boring Logs

PROJECT: Proposed Maysville C&D Landfill	OWB-1			
BORING LOCATION: Proposed Maysville C&D Landfill	GROUND SURFACE ELEVATION AND DATUM: TBD			
DRILLING CONTRACTOR: Geologic Exploration	DATE STARTED: 8/25/11			DATE FINISHED: 8/25/11
DRILLING METHOD: Hollow-stem auger	TOTAL DEPTH (ft.): 20			SCREEN INTERVAL (ft.): 10-20
DRILLING EQUIPMENT: Diedrich D-120 Truck Rig	DEPTH TO WATER:	FIRST: 13.55	COMPL. 13.92	CASING: 2" Sch.40PVC
SAMPLING METHOD: Split Spoon	LOGGED BY: Chris Means			
HAMMER WEIGHT: 142 Lbs. / DROP: 32"	DRILLER: Mike McConahey			REG. NO. 2402

DEPTH (feet)	SAMPLES Blows/ 6 Inches	OVM Reading	DESCRIPTION
0–1	4-4-5	N/A	Dark grey/Dark Brown, fine sandy SILT, dry
3–9	2-6-8		Light/medium brown, clayey medium SAND, dry/slightly moist
9–10			SM - Light brown, coarse SAND with very little clay with a few rounded quartz pieces, very moist
10–12	3-3-3		Light brown, silty CLAY, slightly moist
12–18	4-4-3		SM - Black, clayey coarse SAND with small well rounded quartz pieces, wet
18–21	woh-woh-woh		SP - Dark grey, clayey coarse SAND, wet

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

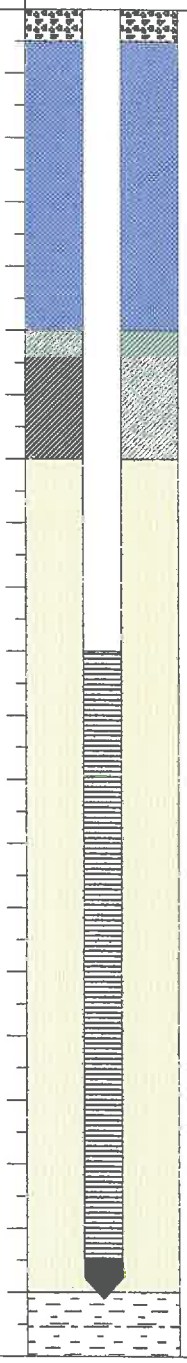


- Above Grade Well Monument
- 10" diameter borehole
- Neat cement grout.
- 2" diameter Schedule 40 PVC casing
- Bentonite Chip Seal
- #2 filter pack sand
- 2" diameter, 0.010" slot, Schedule 40 PVC screen
- 2" diameter Schedule 40 PVC end cap
- Slough

PROJECT: Proposed Maysville C&D Landfill				OWB-2	
BORING LOCATION: Proposed Maysville C&D Landfill				GROUND SURFACE ELEVATION AND DATUM: TBD	
DRILLING CONTRACTOR: Geologic Exploration				DATE STARTED: 8/25/11	DATE FINISHED: 8/25/11
DRILLING METHOD: Hollow-stem auger				TOTAL DEPTH (ft.): 20	SCREEN INTERVAL (ft.): 10-20
DRILLING EQUIPMENT: Diedrich D-120 Truck Rig				DEPTH TO WATER: FIRST: 13.62 COMPL. 13.62	CASING: 2" Sch.40PVC
SAMPLING METHOD: Split Spoon				LOGGED BY: Chris Means	
HAMMER WEIGHT: 142 Lbs.	DROP: 32"			DRILLER: Mike McConahey	REG. NO. 2402

DEPTH (feet)	SAMPLES Blows/ 6 Inches	OVM Reading	DESCRIPTION
0–1	4-4-4	N/A	Medium brown, clayey SILT, dry
1–8	5-5-4		Light/medium brown, silty CLAY, dry/slightly moist
8–13	3-3-3		SM - Medium brown, coarse SAND, very moist
13–21	2-1-1; wor-wor-1		SP - Dark grey, clayey coarse SAND, very wet, small clay lenses

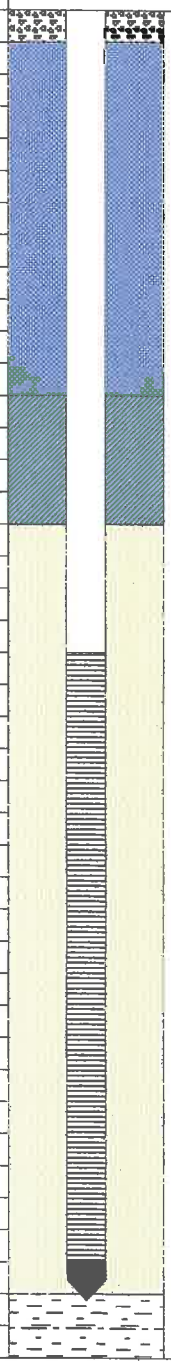
WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



PROJECT: Proposed Maysville C&D Landfill	OWB-3		
BORING LOCATION: Proposed Maysville C&D Landfill	GROUND SURFACE ELEVATION AND DATUM: TBD		
DRILLING CONTRACTOR: Geologic Exploration	DATE STARTED: 8/25/11	DATE FINISHED: 8/25/11	
DRILLING METHOD: Hollow-stem auger	TOTAL DEPTH (ft.): 20	SCREEN INTERVAL (ft.): 10-20	
DRILLING EQUIPMENT: Diedrich D-120 Truck Rig	DEPTH TO WATER: FIRST: 12.75	COMPL. 12.79	CASING: 2" Sch.40PVC
SAMPLING METHOD: Split Spoon	LOGGED BY: Chris Means		
HAMMER WEIGHT: 142 Lbs. / DROP: 32"	DRILLER: Mike McConahey	REG. NO. 2402	

DEPTH (feet)	SAMPLES Blows/ 6 Inches	OVM Reading	DESCRIPTION
0–3	2-3-4	N/A	Dark/medium brown, silty CLAY, dry, tight
3–7	3-3-3		Light/medium brown, fine sandy CLAY, slightly moist, very fine sand
7–10			Black, silty CLAY, moist
10–13	2-2-3		SM - Light/medium brown, coarse SAND, very moist
13–21	woh-woh-1; woh-woh-woh		SP - Dark grey, clayey SAND, wet, small intermittent clay lenses

WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS



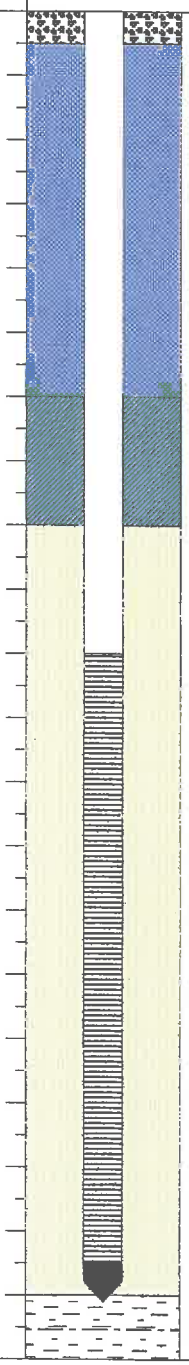
- Above Grade Well Monument
- 10" diameter borehole
- Neat cement grout.
- 2" diameter Schedule 40 PVC casing
- Bentonite Chip Seal
- #2 filter pack sand
- 2" diameter, 0.010" slot, Schedule 40 PVC screen
- 2" diameter Schedule 40 PVC end cap
- Slough

PROJECT: Proposed Maysville C&D Landfill				OWB-4
BORING LOCATION: Proposed Maysville C&D Landfill				GROUND SURFACE ELEVATION AND DATUM: TBD
DRILLING CONTRACTOR: Geologic Exploration			DATE STARTED: 8/25/11	DATE FINISHED: 8/25/11
DRILLING METHOD: Hollow-stem auger			TOTAL DEPTH (ft.): 20	SCREEN INTERVAL (ft.): 10-20
DRILLING EQUIPMENT: Diedrich D-120 Truck Rig			DEPTH TO WATER: FIRST: 13.93 / COMPL. 13.86	CASING: 2" Sch.40PVC
SAMPLING METHOD: Split Spoon			LOGGED BY: Chris Means	
HAMMER WEIGHT: 142 Lbs.	DROP: 32"		DRILLER: Mike McConahey	REG. NO. 2402

DEPTH (feet)	SAMPLES Blows/ 6 Inches	OVM Reading	DESCRIPTION	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0			Dark grey, fine sandy SILT, dry	Above Grade Well Monument
1	4-5-5	N/A		
2			Light/medium grey, silty CLAY, slightly moist, tight	10" diameter borehole Neat cement grout.
3				
4				2" diameter Schedule 40 PVC casing
5	5-9-8		Light brown, clayey medium SAND, slightly moist	
6				
7				Bentonite Chip Seal
8				#2 filter pack sand
9				
10	2-3-3		SM - Light/medium brown, silty SAND, moist	
11				
12				
13				
14				
15	wor-wor-wor			2" diameter, 0.010" slot, Schedule 40 PVC screen
16				
17			SP - Dark grey, clayey coarse SAND, wet, small intermittent clay lenses	
18				
19				
20	wor-wor-wor			2" diameter Schedule 40 PVC end cap
21				Slough

PROJECT: Proposed Maysville C&D Landfill	OWB-6			
BORING LOCATION: Proposed Maysville C&D Landfill	GROUND SURFACE ELEVATION AND DATUM: TBD			
DRILLING CONTRACTOR: Geologic Exploration	DATE STARTED: 8/24/11		DATE FINISHED: 8/24/11	
DRILLING METHOD: Hollow-stem auger	TOTAL DEPTH (ft.): 20		SCREEN INTERVAL (ft.): 10-20	
DRILLING EQUIPMENT: Diedrich D-120 Truck Rig	DEPTH TO WATER:	FIRST: 13.70	COMPL. 13.78	CASING: 2" Sch.40PVC
SAMPLING METHOD: Split Spoon	LOGGED BY: Chris Means			
HAMMER WEIGHT: 142 Lbs. DROP: 32"	DRILLER: Mike McConahey			REG. NO. 2402

DEPTH (feet)	SAMPLES Blows/ 6 Inches	OVM Reading	DESCRIPTION
0–4	3-3-3	N/A	Medium grey, fine sandy SILT, dry
4–8	2-1-3		Light grey, silty CLAY, slightly moist
8–13	3-2-3		SP - Black, silty coarse SAND, with a few well rounded pieces of quartz
13–18	2-8-9		SP-SM - Light/medium grey, silty coarse SAND, with some shell material, wet
18–20	woh-woh-6		SP - Dark grey, fine sandy SILT with a small amount of clay, wet
20–21			Light grey, shell material, SAND with some gravel

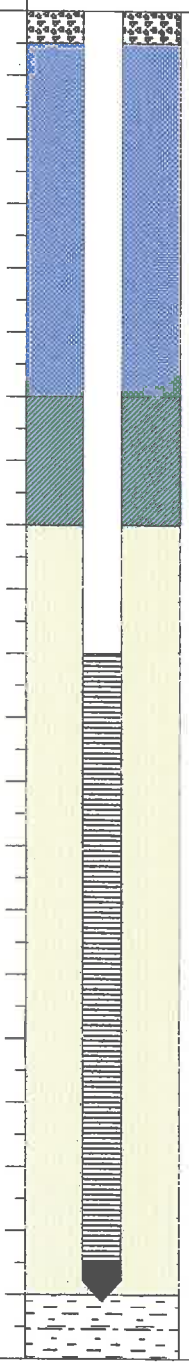


WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS

- Above Grade Well Monument
- 10" diameter borehole
- Neat cement grout.
- 2" diameter Schedule 40 PVC casing
- Bentonite Chip Seal
- #2 filter pack sand
- 2" diameter, 0.010" slot, Schedule 40 PVC screen
- 2" diameter Schedule 40 PVC end cap
- Slough

PROJECT: Proposed Maysville C&D Landfill	OWB-10		
BORING LOCATION: Proposed Maysville C&D Landfill	GROUND SURFACE ELEVATION AND DATUM: TBD		
DRILLING CONTRACTOR: Geologic Exploration	DATE STARTED: 8/22/11	DATE FINISHED: 8/23/11	
DRILLING METHOD: Hollow-stem auger	TOTAL DEPTH (ft.): 20	SCREEN INTERVAL (ft.): 10-20	
DRILLING EQUIPMENT: Diedrich D-120 Truck Rig	DEPTH TO WATER: FIRST: 13.68	COMPL. 13.70	CASING: 2" Sch.40PVC
SAMPLING METHOD: Split Spoon	LOGGED BY: Chris Means		
HAMMER WEIGHT: 142 Lbs. DROP: 32"	DRILLER: Mike McConahey	REG. NO. 2402	

DEPTH (feet)	SAMPLES Blows/ 6 Inches	OVM Reading	DESCRIPTION	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
0	N/A	N/A	Dark grey/black, silty CLAY, dry	Above Grade Well Monument
1				
2				10" diameter borehole Neat cement grout.
3				
4				2" diameter Schedule 40 PVC casing
5	9-5-4		Light/medium brown, SILT with some rock fragments, dry	
6				
7				Bentonite Chip Seal
8			SM - Light grey, silty medium SAND, very moist	
9				#2 filter pack sand
10	10-7-4		SM - Dark tan, coarse SAND, wet	
11				
12				
13				
14				
15	2-1-1			2" diameter, 0.010" slot, Schedule 40 PVC screen
16			SM - Black, medium/coarse SAND, wet	
17				
18				
19				
20	wor-woh-2			2" diameter Schedule 40 PVC end cap
21				Slough



NON-RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2402

1. WELL CONTRACTOR:

MIKE MCCONAHEY
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC
Well Contractor Company Name

176 COMMERCE BLVD
Street Address

STATESVILLE NC 28625
City or Town State Zip Code

(704) 872-7686
Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A

OTHER ASSOCIATED PERMIT#(if applicable)

SITE WELL ID #(if applicable) OBW-1

3. WELL USE (Check One Box) Monitoring ☑ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)

DATE DRILLED 08/25/11

4. WELL LOCATION:

WHITE OAK RIVER ROAD 28555
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: MAYSVILLE COUNTY JONES

TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐Slope ☐Valley ☐Flat ☐Ridge ☐Other

LATITUDE ___°___'___" DMS OR ___ DD

LONGITUDE ___°___'___" DMS OR ___ DD

Latitude/longitude source: ☐GPS ☐Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)

PROPOSED C&D LANDFILL N/A
Facility Name Facility ID# (if applicable)

WHITE OAK RIVER ROAD
Street Address

MAYSVILLE NC 28555
City or Town State Zip Code

GREEN RECYCLING SOLUTIONS, LLC
Contact Name

166 CENTER STREET
Mailing Address

JACKSONVILLE NC 28546
City or Town State Zip Code

( )
Area code Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 20.0 FEET

b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☑

c. **WATER LEVEL** Below Top of Casing: 11.0 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** N/A **METHOD OF TEST** N/A

f. **DISINFECTION: Type** N/A **Amount** N/A

g. **WATER ZONES** (depth):

Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom

7. CASING:

Depth		Diameter	Thickness/ Weight	Material
Top 0.0	Bottom 10.0 Ft.	2 INCH	SCH 40	PVC
Top	Bottom Ft.			
Top	Bottom Ft.			

8. GROUT:

Depth		Material	Method
Top 0.0	Bottom 5.0 Ft.	PORTLAND BENTONITE	SLURRY
Top	Bottom Ft.		
Top	Bottom Ft.		

9. SCREEN:

Depth		Diameter	Slot Size	Material
Top 10.0	Bottom 20.0 Ft.	2.0 in.	.010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
Top 8.0	Bottom 20.0 Ft.	20-40	FINE SILICA SAND
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
0.0	1.0	WOOD/WEEDS/TOPSOIL
1.0	10.0	TAN/WHITE SILTY CLAY
10.0	15.0	BLACK SILTY SAND/SHELL
15.0	20.0	GRAY/GREEN CLAY SILT SAND/SHELL

12. REMARKS:

BENTONITE SEAL FROM 5.0 TO 8.0 FEET

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 08/29/11 DATE

MIKE MCCONAHEY
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b
Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2402

1. WELL CONTRACTOR:

MIKE MCCONAHEY
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC
Well Contractor Company Name

176 COMMERCE BLVD
Street Address

STATESVILLE | NC | 28625
City or Town | State | Zip Code

(704) 872-7686
Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A

OTHER ASSOCIATED PERMIT#(if applicable)

SITE WELL ID #(if applicable) OBW-2

3. WELL USE (Check One Box) Monitoring ☑ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)

DATE DRILLED 08/25/11

4. WELL LOCATION:

WHITE OAK RIVER ROAD 28555
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: MAYSVILLE COUNTY JONES

TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐Slope ☐Valley ☐Flat ☐Ridge ☐Other

LATITUDE ___ ° ___ ' ___ " DMS OR ___ DD

LONGITUDE ___ ° ___ ' ___ " DMS OR ___ DD

Latitude/longitude source: ☐GPS ☐Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)

PROPOSED C&D LANDFILL | N/A
Facility Name | Facility ID# (if applicable)

WHITE OAK RIVER ROAD
Street Address

MAYSVILLE | NC | 28555
City or Town | State | Zip Code

GREEN RECYCLING SOLUTIONS, LLC
Contact Name

166 CENTER STREET
Mailing Address

JACKSONVILLE | NC | 28546
City or Town | State | Zip Code

( ) ___
Area code Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 20.0 FEET

b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☑

c. **WATER LEVEL** Below Top of Casing: 11.0 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** N/A **METHOD OF TEST** N/A

f. **DISINFECTION: Type** N/A **Amount** N/A

g. **WATER ZONES** (depth):

Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom

7. CASING:

	Depth		Diameter	Thickness/ Weight	Material
Top 0.0	Bottom 10.0	Ft.	2 INCH	SCH 40	PVC
Top	Bottom	Ft.			
Top	Bottom	Ft.			

8. GROUT:

	Depth		Material	Method
Top 0.0	Bottom 5.0	Ft.	PORTLAND BENTONITE	SLURRY
Top	Bottom	Ft.		
Top	Bottom	Ft.		

9. SCREEN:

	Depth		Diameter		Slot Size		Material
Top 10.0	Bottom 20.0	Ft.	2.0	in.	.010	in.	PVC
Top	Bottom	Ft.		in.		in.	
Top	Bottom	Ft.		in.		in.	

10. SAND/GRAVEL PACK:

	Depth		Size	Material
Top 8.0	Bottom 20.0	Ft.	20-40	FINE SILICA SAND
Top	Bottom	Ft.		
Top	Bottom	Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
0.0	1.0	WOOD/WEEDS/TOPSOIL
1.0	10.0	TAN/WHITE SILTY CLAY
10.0	15.0	BLACK SILTY SAND/SHELL
15.0	20.0	GRAY/GREEN CLAY SILT SAND/SHELL

12. REMARKS:

BENTONITE SEAL FROM 5.0 TO 8.0 FEET

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 08/29/11

MIKE MCCONAHEY
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone: (919) 807-6300

Form GW-1b
Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2402

1. WELL CONTRACTOR:

MIKE MCCONAHEY
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC
Well Contractor Company Name

176 COMMERCE BLVD
Street Address

STATESVILLE NC 28625
City or Town State Zip Code

(704) 872-7686
Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A

OTHER ASSOCIATED PERMIT#(if applicable)

SITE WELL ID #(if applicable) OBW-3

3. WELL USE (Check One Box) Monitoring ☑ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use)

DATE DRILLED 08/25/11

4. WELL LOCATION:

WHITE OAK RIVER ROAD 28555
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: MAYSVILLE COUNTY JONES

TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐ Slope ☐ Valley ☐ Flat ☐ Ridge ☐ Other

LATITUDE ___°___'___" DMS OR ___ DD

LONGITUDE ___°___'___" DMS OR ___ DD

Latitude/longitude source: ☐ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)

PROPOSED C&D LANDFILL — N/A
Facility Name — Facility ID# (if applicable)

WHITE OAK RIVER ROAD
Street Address

MAYSVILLE NC 28555
City or Town State Zip Code

GREEN RECYCLING SOLUTIONS, LLC
Contact Name

166 CENTER STREET
Mailing Address

JACKSONVILLE NC 28546
City or Town State Zip Code

( )
Area code Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 20.0 FEET

b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☑

c. **WATER LEVEL** Below Top of Casing: 11.0 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** N/A **METHOD OF TEST** N/A

f. **DISINFECTION: Type** N/A **Amount** N/A

g. **WATER ZONES** (depth):

Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom

7. CASING:

Depth		Diameter	Thickness/ Weight	Material
Top 0.0	Bottom 10.0 Ft.	2 INCH	SCH 40	PVC
Top	Bottom Ft.			
Top	Bottom Ft.			

8. GROUT:

Depth		Material	Method
Top 0.0	Bottom 5.0 Ft.	PORTLAND BENTONITE	SLURRY
Top	Bottom Ft.		
Top	Bottom Ft.		

9. SCREEN:

Depth		Diameter	Slot Size	Material
Top 10.0	Bottom 20.0 Ft.	2.0 in.	.010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
Top 8.0	Bottom 20.0 Ft.	20-40	FINE SILICA SAND
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
0.0	1.0	WOOD/WEEDS/TOPSOIL
1.0	10.0	TAN/WHITE SILTY CLAY
10.0	15.0	BLACK SILTY SAND/SHELL
15.0	20.0	GRAY/GREEN CLAY SILT SAND/SHELL

12. REMARKS:

BENTONITE SEAL FROM 5.0 TO 8.0 FEET

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 08/29/11

MIKE MCCONAHEY
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

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Form GW-1b
Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2402

1. WELL CONTRACTOR:

MIKE MCCONAHEY
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC
Well Contractor Company Name

176 COMMERCE BLVD
Street Address

STATESVILLE NC 28625
City or Town State Zip Code

(704) 872-7686
Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A

OTHER ASSOCIATED PERMIT#(if applicable)

SITE WELL ID #(if applicable) OBW-4

3. WELL USE (Check One Box) Monitoring ☑ Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use)

DATE DRILLED 08/25/11

4. WELL LOCATION:

WHITE OAK RIVER ROAD 28555
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: MAYSVILLE COUNTY JONES

TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐ Slope ☐ Valley ☐ Flat ☐ Ridge ☐ Other

LATITUDE ___° ___' ___" DMS OR ___ DD

LONGITUDE ___° ___' ___" DMS OR ___ DD

Latitude/longitude source: ☐ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)

PROPOSED C&D LANDFILL — N/A
Facility Name — Facility ID# (if applicable)

WHITE OAK RIVER ROAD
Street Address

MAYSVILLE NC 28555
City or Town State Zip Code

GREEN RECYCLING SOLUTIONS, LLC
Contact Name

166 CENTER STREET
Mailing Address

JACKSONVILLE NC 28546
City or Town State Zip Code

( )
Area code Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 20.0 FEET

b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☑

c. **WATER LEVEL** Below Top of Casing: 11.0 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** N/A **METHOD OF TEST** N/A

f. **DISINFECTION: Type** N/A **Amount** N/A

g. **WATER ZONES** (depth):

Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom

7. CASING:

Depth		Diameter	Thickness/ Weight	Material
Top 0.0	Bottom 10.0 Ft.	2 INCH	SCH 40	PVC
Top	Bottom Ft.			
Top	Bottom Ft.			

8. GROUT:

Depth		Material	Method
Top 0.0	Bottom 5.0 Ft.	PORTLAND BENTONITE	SLURRY
Top	Bottom Ft.		
Top	Bottom Ft.		

9. SCREEN:

Depth		Diameter	Slot Size	Material
Top 10.0	Bottom 20.0 Ft.	2.0 in.	.010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
Top 8.0	Bottom 20.0 Ft.	20-40	FINE SILICA SAND
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
0.0	1.0	WOOD/WEEDS/TOPSOIL
1.0	10.0	TAN/WHITE SILTY CLAY
10.0	15.0	BLACK SILTY SAND/SHELL
15.0	20.0	GRAY/GREEN CLAY SILT SAND/SHELL

12. REMARKS:

BENTONITE SEAL FROM 5.0 TO 8.0 FEET

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR — DATE 08/29/11

MIKE MCCONAHEY
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone : (919) 807-6300

Form GW-1b
Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2402

1. WELL CONTRACTOR:

MIKE MCCONAHEY
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC
Well Contractor Company Name

176 COMMERCE BLVD
Street Address

STATESVILLE NC 28625
City or Town State Zip Code

(704) 872-7686
Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A

OTHER ASSOCIATED PERMIT#(if applicable)

SITE WELL ID #(if applicable) OBW-6

3. WELL USE (Check One Box) Monitoring ☑ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)

DATE DRILLED 08/24/11

4. WELL LOCATION:

WHITE OAK RIVER ROAD 28555
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: MAYSVILLE COUNTY JONES

TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐ Slope ☐ Valley ☐ Flat ☐ Ridge ☐ Other

LATITUDE ___ ° ___ ' ___ " DMS OR ___ DD

LONGITUDE ___ ° ___ ' ___ " DMS OR ___ DD

Latitude/longitude source: ☐ GPS ☐ Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)

PROPOSED C&D LANDFILL N/A
Facility Name Facility ID# (if applicable)

WHITE OAK RIVER ROAD
Street Address

MAYSVILLE NC 28555
City or Town State Zip Code

GREEN RECYCLING SOLUTIONS, LLC
Contact Name

166 CENTER STREET
Mailing Address

JACKSONVILLE NC 28546
City or Town State Zip Code

( ) ___
Area code Phone number

6. WELL DETAILS:

a. TOTAL DEPTH: 20.0 FEET

b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☑

c. WATER LEVEL Below Top of Casing: 11.0 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): N/A METHOD OF TEST N/A

f. DISINFECTION: Type N/A Amount N/A

g. WATER ZONES (depth):
Top ___ Bottom ___ Top ___ Bottom ___
Top ___ Bottom ___ Top ___ Bottom ___
Top ___ Bottom ___ Top ___ Bottom ___

7. CASING:

Depth		Diameter	Thickness/ Weight	Material
Top 0.0	Bottom 10.0	Ft. 2 INCH	SCH 40	PVC
Top	Bottom	Ft.		
Top	Bottom	Ft.		

8. GROUT:

Depth		Material	Method
Top 0.0	Bottom 5.0	Ft. PORTLAND BENTONITE	SLURRY
Top	Bottom	Ft.	
Top	Bottom	Ft.	

9. SCREEN:

Depth		Diameter	Slot Size	Material
Top 10.0	Bottom 20.0	Ft. 2.0 in.	.010 in.	PVC
Top	Bottom	Ft. in.	in.	
Top	Bottom	Ft. in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
Top 8.0	Bottom 20.0	Ft. 20-40	FINE SILICA SAND
Top	Bottom	Ft.	
Top	Bottom	Ft.	

11. DRILLING LOG

Top	Bottom	Formation Description
0.0	1.0	WOOD/WEEDS/TOPSOIL
1.0	10.0	TAN/WHITE SILTY CLAY
10.0	15.0	BLACK SILTY SAND/SHELL
15.0	20.0	GRAY/GREEN CLAY SILT SAND/SHELL

12. REMARKS:

BENTONITE SEAL FROM 5.0 TO 8.0 FEET

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 08/29/11 DATE

MIKE MCCONAHEY
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

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Form GW-1b
Rev. 2/09

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 2402

1. WELL CONTRACTOR:

MIKE MCCONAHEY
Well Contractor (Individual) Name

GEOLOGIC EXPLORATION, INC
Well Contractor Company Name

176 COMMERCE BLVD
Street Address

STATESVILLE | NC | 28625
City or Town | State | Zip Code

(704) 872-7686
Area code Phone number

2. WELL INFORMATION:

WELL CONSTRUCTION PERMIT# N/A

OTHER ASSOCIATED PERMIT#(if applicable)

SITE WELL ID #(if applicable) OBW-10

3. WELL USE (Check One Box) Monitoring ☑ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)

DATE DRILLED 08/23/11

4. WELL LOCATION:

WHITE OAK RIVER ROAD 28555
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

CITY: MAYSVILLE COUNTY JONES

TOPOGRAPHIC / LAND SETTING: (check appropriate box)
☐Slope ☐Valley ☐Flat ☐Ridge ☐Other

LATITUDE ___°___'___" DMS OR ___ DD

LONGITUDE ___°___'___" DMS OR ___ DD

Latitude/longitude source: ☐GPS ☐Topographic map
(location of well must be shown on a USGS topo map andattached to this form if not using GPS)

5. FACILITY (Name of the business where the well is located.)

PROPOSED C&D LANDFILL | N/A
Facility Name | Facility ID# (if applicable)

WHITE OAK RIVER ROAD
Street Address

MAYSVILLE | NC | 28555
City or Town | State | Zip Code

GREEN RECYCLING SOLUTIONS, LLC
Contact Name

166 CENTER STREET
Mailing Address

JACKSONVILLE | NC | 28546
City or Town | State | Zip Code

(_____) _____
Area code Phone number

6. WELL DETAILS:

a. **TOTAL DEPTH:** 20.0 FEET

b. **DOES WELL REPLACE EXISTING WELL?** YES ☐ NO ☑

c. **WATER LEVEL** Below Top of Casing: 11.0 FT.
(Use "+" if Above Top of Casing)

d. **TOP OF CASING IS** 2.5 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. **YIELD (gpm):** N/A **METHOD OF TEST** N/A

f. **DISINFECTION: Type** N/A **Amount** N/A

g. **WATER ZONES** (depth):

Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom
Top	Bottom	Top	Bottom

7. CASING:

Depth		Diameter	Thickness/ Weight	Material
Top 0.0	Bottom 10.0 Ft.	2 INCH	SCH 40	PVC
Top	Bottom Ft.			
Top	Bottom Ft.			

8. GROUT:

Depth		Material	Method
Top 0.0	Bottom 5.0 Ft.	PORTLAND BENTONITE	SLURRY
Top	Bottom Ft.		
Top	Bottom Ft.		

9. SCREEN:

Depth		Diameter	Slot Size	Material
Top 10.0	Bottom 20.0 Ft.	2.0 in.	.010 in.	PVC
Top	Bottom Ft.	in.	in.	
Top	Bottom Ft.	in.	in.	

10. SAND/GRAVEL PACK:

Depth		Size	Material
Top 8.0	Bottom 20.0 Ft.	20-40	FINE SILICA SAND
Top	Bottom Ft.		
Top	Bottom Ft.		

11. DRILLING LOG

Top	Bottom	Formation Description
0.0	1.0	WOOD/WEEDS/TOPSOIL
1.0	10.0	TAN/WHITE SILTY CLAY
10.0	15.0	BLACK SILTY SAND/SHELL
15.0	20.0	GRAY/GREEN CLAY SILT SAND/SHELL

12. REMARKS:

BENTONITE SEAL FROM 5.0 TO 8.0 FEET

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR | 08/29/11 DATE

MIKE MCCONAHEY
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit within 30 days of completion to: Division of Water Quality - Information Processing, 1617 Mail Service Center, Raleigh, NC 27699-161, Phone: (919) 807-6300

Form GW-1b
Rev. 2/09

APPENDIX 2-
Laboratory Analytical Results and Reports

GEL Laboratories LLC

a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407

P 843.556.8171 F 843.766.1178

www.gel.com

October 24, 2014

Mr. Rudy Smithwick
Atlantic GeoScience International, Ltd.
8633 Vintage Club Drive
Wilmington, North Carolina 28411

Re: Green Recycling Solutions C&D Landfill
Work Order: 358841

Dear Mr. Smithwick:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 11, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4289.

Sincerely,

Julie Robinson

Julie Robinson
Project Manager

Enclosures

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis Report
for

AGES001 Atlantic GeoScience

Client SDG: 358841 GEL Work Order: 358841

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

H Analytical holding time was exceeded

J Value is estimated

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

d 5–day BOD—The 2:1 depletion requirement was not met for this sample

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Julie Robinson.

Reviewed by Julie Robinson

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-1
Sample ID: 358841001
Matrix: Water
Collect Date: 10-OCT-14 19:45
Receive Date: 11-OCT-14
Collector: Client

Project: AGES00214
Client ID: AGES001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SM 5310 B Total Organic Carbon "As Received"											
Total Organic Carbon Average		4.00	0.330	1.00	mg/L	1	TSM	10/13/14	1816	1426820	1
Ion Chromatography											
EPA 300.0 Anions - (Sulfate,Chloride,Fluoride) "As Received"											
Chloride		5.10	0.067	0.200	mg/L	1	MAR1	10/17/14	2334	1426698	2
Fluoride		0.212	0.033	0.100	mg/L	1					
Sulfate		5.58	0.133	0.400	mg/L	1					
Mercury Analysis-CVAA											
7470 Cold Vapor Hg Liquid "As Received"											
Mercury	U	ND	0.067	0.200	ug/L	1	MTM1	10/14/14	1245	1426761	3
Metals Analysis-ICP											
6010/3005 ICP SCAN Metals "As Received"											
Arsenic	J	13.1	5.00	30.0	ug/L	1	LS	10/15/14	1237	1427000	4
Barium		20.5	1.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	ug/L	1					
Chromium	J	4.36	1.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	ug/L	1					
Iron		3450	30.0	100	ug/L	1					
Lead	U	ND	3.30	10.0	ug/L	1					
Manganese	J	8.80	2.00	10.0	ug/L	1					
Selenium	U	ND	6.00	30.0	ug/L	1					
Silver	U	ND	1.00	5.00	ug/L	1					
Zinc	J	6.67	3.30	10.0	ug/L	1					
Micro-biology											
SM 5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND	1.00	2.00	mg/L		PXO1	10/11/14	1425	1426710	5
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite	U	ND	0.007	0.020	mg/L	1	KLP1	10/21/14	1418	1426796	6
Solids Analysis											
SM 2540D Total Suspended Liq "As Received"											
Total Suspended Solids		12.2	1.14	5.00	mg/L		MXB3	10/14/14	0841	1427104	7
SM2540C Solids, Dissolved "As Received"											
Total Dissolved Solids		34.3	3.40	14.3	mg/L		MXB3	10/13/14	0940	1426777	8

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-1 | Project: AGES00214
Sample ID: 358841001 | Client ID: AGES001

Spectrometric Analysis

EPA 410.4 Chem. Oxygen Demand "As Received"

COD	J	14.8	6.67	20.0	mg/L	1	SXC5	10/16/14	1654	1427833	9

Volatile Organics

Volatiles by SW846 8260B "As Received"

1,1,1-Trichloroethane	U	ND	0.300	1.00	ug/L	1	ACJ	10/23/14	1219	1429804	10
1,1,2,2-Tetrachloroethane	U	ND	0.300	1.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloropropane	U	ND	0.300	1.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	1.50	5.00	ug/L	1					
Acrolein	U	ND	1.50	5.00	ug/L	1					
Acrylonitrile	U	ND	1.50	5.00	ug/L	1					
Benzene	U	ND	0.300	1.00	ug/L	1					
Bromodichloromethane	U	ND	0.300	1.00	ug/L	1					
Bromoform	U	ND	0.300	1.00	ug/L	1					
Bromomethane	U	ND	0.300	1.00	ug/L	1					
Carbon tetrachloride	U	ND	0.300	1.00	ug/L	1					
Chlorobenzene	U	ND	0.300	1.00	ug/L	1					
Chloroethane	U	ND	0.300	1.00	ug/L	1					
Chloroform	U	ND	0.300	1.00	ug/L	1					
Chloromethane	U	ND	0.300	1.00	ug/L	1					
Dibromochloromethane	U	ND	0.300	1.00	ug/L	1					
Dichlorodifluoromethane	U	ND	0.300	1.00	ug/L	1					
Ethylbenzene	U	ND	0.300	1.00	ug/L	1					
Methylene chloride	U	ND	1.00	5.00	ug/L	1					
Tetrachloroethylene	U	ND	0.300	1.00	ug/L	1					
Toluene	U	ND	0.300	1.00	ug/L	1					
Trichloroethylene	U	ND	0.300	1.00	ug/L	1					
Trichlorofluoromethane	U	ND	0.300	1.00	ug/L	1					
Vinyl chloride	U	ND	0.300	1.00	ug/L	1					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-1 | Project: AGES00214
Sample ID: 358841001 | Client ID: AGES001

Volatile Organics

Volatiles by SW846 8260B "As Received"

trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-TRACE SW846 3005A	KXP3	10/14/14	0930	1426998
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	JXM5	10/13/14	1230	1426760

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	EPA 300.0	
3	SW846 7470A	
4	SW846 3005/6010B	
5	SM 5210B	
6	EPA 353.2 Low Level	
7	SM 2540D	
8	SM 2540C	
9	EPA 410.4	
10	SW846 8260B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	Volatiles by SW846 8260B "As Received"	52.0 ug/L	50.0	104	(77%-123%)
Bromofluorobenzene	Volatiles by SW846 8260B "As Received"	51.2 ug/L	50.0	102	(80%-120%)
Toluene-d8	Volatiles by SW846 8260B "As Received"	50.8 ug/L	50.0	102	(80%-120%)

Notes:

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-2
Sample ID: 358841002
Matrix: Water
Collect Date: 10-OCT-14 15:45
Receive Date: 11-OCT-14
Collector: Client

Project: AGES00214
Client ID: AGES001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SM 5310 B Total Organic Carbon "As Received"											
Total Organic Carbon Average		2.89	0.330	1.00	mg/L	1	TSM	10/13/14	1834	1426820	1
Ion Chromatography											
EPA 300.0 Anions - (Sulfate,Chloride,Fluoride) "As Received"											
Chloride		5.02	0.067	0.200	mg/L	1	MAR1	10/18/14	0103	1426698	2
Fluoride		0.730	0.033	0.100	mg/L	1					
Sulfate		4.66	0.133	0.400	mg/L	1					
Mercury Analysis-CVAA											
7470 Cold Vapor Hg Liquid "As Received"											
Mercury	U	ND	0.067	0.200	ug/L	1	MTM1	10/14/14	1250	1426761	3
Metals Analysis-ICP											
6010/3005 ICP SCAN Metals "As Received"											
Arsenic	J	6.08	5.00	30.0	ug/L	1	LS	10/15/14	1256	1427000	4
Barium		15.4	1.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	ug/L	1					
Chromium	J	2.40	1.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	ug/L	1					
Iron		1840	30.0	100	ug/L	1					
Lead	U	ND	3.30	10.0	ug/L	1					
Manganese	J	8.72	2.00	10.0	ug/L	1					
Selenium	U	ND	6.00	30.0	ug/L	1					
Silver	U	ND	1.00	5.00	ug/L	1					
Zinc	J	7.61	3.30	10.0	ug/L	1					
Micro-biology											
SM 5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND	1.00	2.00	mg/L		PXO1	10/11/14	1425	1426710	5
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite	U	ND	0.007	0.020	mg/L	1	KLP1	10/21/14	1422	1426796	6
Solids Analysis											
SM 2540D Total Suspended Liq "As Received"											
Total Suspended Solids		7.53	0.588	2.58	mg/L		MXB3	10/14/14	0841	1427104	7
SM2540C Solids, Dissolved "As Received"											
Total Dissolved Solids		38.6	3.40	14.3	mg/L		MXB3	10/13/14	0940	1426777	8

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-2 | Project: AGES00214
Sample ID: 358841002 | Client ID: AGES001

Spectrometric Analysis											
EPA 410.4 Chem. Oxygen Demand "As Received"											
COD	J	7.10	6.67	20.0	mg/L	1	SXC5	10/16/14	1654	1427833	9
Volatile Organics											
Volatiles by SW846 8260B "As Received"											
1,1,1-Trichloroethane	U	ND	0.300	1.00	ug/L	1	ACJ	10/23/14	1247	1429804	10
1,1,2,2-Tetrachloroethane	U	ND	0.300	1.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloropropane	U	ND	0.300	1.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	1.50	5.00	ug/L	1					
Acrolein	U	ND	1.50	5.00	ug/L	1					
Acrylonitrile	U	ND	1.50	5.00	ug/L	1					
Benzene	U	ND	0.300	1.00	ug/L	1					
Bromodichloromethane	U	ND	0.300	1.00	ug/L	1					
Bromoform	U	ND	0.300	1.00	ug/L	1					
Bromomethane	U	ND	0.300	1.00	ug/L	1					
Carbon tetrachloride	U	ND	0.300	1.00	ug/L	1					
Chlorobenzene	U	ND	0.300	1.00	ug/L	1					
Chloroethane	U	ND	0.300	1.00	ug/L	1					
Chloroform	U	ND	0.300	1.00	ug/L	1					
Chloromethane	U	ND	0.300	1.00	ug/L	1					
Dibromochloromethane	U	ND	0.300	1.00	ug/L	1					
Dichlorodifluoromethane	U	ND	0.300	1.00	ug/L	1					
Ethylbenzene	U	ND	0.300	1.00	ug/L	1					
Methylene chloride	U	ND	1.00	5.00	ug/L	1					
Tetrachloroethylene	U	ND	0.300	1.00	ug/L	1					
Toluene	U	ND	0.300	1.00	ug/L	1					
Trichloroethylene	U	ND	0.300	1.00	ug/L	1					
Trichlorofluoromethane	U	ND	0.300	1.00	ug/L	1					
Vinyl chloride	U	ND	0.300	1.00	ug/L	1					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: October 24, 2014

Company :	Atlantic GeoScience International, Ltd.
Address :	8633 Vintage Club Drive
	Wilmington, North Carolina 28411
Contact:	Mr. Rudy Smithwick
Project:	Green Recycling Solutions C&D Landfill

Client Sample ID:	MW-2	Project:	AGES00214
Sample ID:	358841002	Client ID:	AGES001

Volatile Organics

Volatiles by SW846 8260B "As Received"

trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-TRACE SW846 3005A	KXP3	10/14/14	0930	1426998
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	JXM5	10/13/14	1230	1426760

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	EPA 300.0	
3	SW846 7470A	
4	SW846 3005/6010B	
5	SM 5210B	
6	EPA 353.2 Low Level	
7	SM 2540D	
8	SM 2540C	
9	EPA 410.4	
10	SW846 8260B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	Volatiles by SW846 8260B "As Received"	51.5 ug/L	50.0	103	(77%-123%)
Bromofluorobenzene	Volatiles by SW846 8260B "As Received"	52.8 ug/L	50.0	106	(80%-120%)
Toluene-d8	Volatiles by SW846 8260B "As Received"	51.5 ug/L	50.0	103	(80%-120%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-3
Sample ID: 358841003
Matrix: Water
Collect Date: 10-OCT-14 14:45
Receive Date: 11-OCT-14
Collector: Client

Project: AGES00214
Client ID: AGES001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SM 5310 B Total Organic Carbon "As Received"											
Total Organic Carbon Average		3.33	0.330	1.00	mg/L	1	TSM	10/13/14	1852	1426820	1
Ion Chromatography											
EPA 300.0 Anions - (Sulfate,Chloride,Fluoride) "As Received"											
Chloride		3.93	0.067	0.200	mg/L	1	MAR1	10/18/14	0133	1426698	2
Fluoride	J	0.0653	0.033	0.100	mg/L	1					
Sulfate		4.13	0.133	0.400	mg/L	1					
Mercury Analysis-CVAA											
7470 Cold Vapor Hg Liquid "As Received"											
Mercury	U	ND	0.067	0.200	ug/L	1	MTM1	10/14/14	1252	1426761	3
Metals Analysis-ICP											
6010/3005 ICP SCAN Metals "As Received"											
Arsenic	J	11.8	5.00	30.0	ug/L	1	LS	10/15/14	1259	1427000	4
Barium		83.0	1.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	ug/L	1					
Chromium		13.4	1.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	ug/L	1					
Iron		5140	30.0	100	ug/L	1					
Lead	U	ND	3.30	10.0	ug/L	1					
Manganese		16.2	2.00	10.0	ug/L	1					
Selenium	U	ND	6.00	30.0	ug/L	1					
Silver	U	ND	1.00	5.00	ug/L	1					
Zinc		19.9	3.30	10.0	ug/L	1					
Micro-biology											
SM 5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND	1.00	2.00	mg/L		PXO1	10/11/14	1426	1426710	5
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite	U	ND	0.007	0.020	mg/L	1	KLP1	10/21/14	1423	1426796	6
Solids Analysis											
SM 2540D Total Suspended Liq "As Received"											
Total Suspended Solids		55.2	2.28	10.0	mg/L		MXB3	10/14/14	0841	1427104	7
SM2540C Solids, Dissolved "As Received"											
Total Dissolved Solids		406	3.40	14.3	mg/L		MXB3	10/13/14	0940	1426777	8

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-3 | Project: AGES00214
Sample ID: 358841003 | Client ID: AGES001

Spectrometric Analysis

EPA 410.4 Chem. Oxygen Demand "As Received"

COD		35.3	6.67	20.0	mg/L	1	SXC5	10/16/14	1655	1427833	9

Volatile Organics

Volatiles by SW846 8260B "As Received"

1,1,1-Trichloroethane	U	ND	0.300	1.00	ug/L	1	ACJ	10/23/14	1315	1429804	10
1,1,2,2-Tetrachloroethane	U	ND	0.300	1.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloropropane	U	ND	0.300	1.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	1.50	5.00	ug/L	1					
Acrolein	U	ND	1.50	5.00	ug/L	1					
Acrylonitrile	U	ND	1.50	5.00	ug/L	1					
Benzene	U	ND	0.300	1.00	ug/L	1					
Bromodichloromethane	U	ND	0.300	1.00	ug/L	1					
Bromoform	U	ND	0.300	1.00	ug/L	1					
Bromomethane	U	ND	0.300	1.00	ug/L	1					
Carbon tetrachloride	U	ND	0.300	1.00	ug/L	1					
Chlorobenzene	U	ND	0.300	1.00	ug/L	1					
Chloroethane	U	ND	0.300	1.00	ug/L	1					
Chloroform	U	ND	0.300	1.00	ug/L	1					
Chloromethane	U	ND	0.300	1.00	ug/L	1					
Dibromochloromethane	U	ND	0.300	1.00	ug/L	1					
Dichlorodifluoromethane	U	ND	0.300	1.00	ug/L	1					
Ethylbenzene	U	ND	0.300	1.00	ug/L	1					
Methylene chloride	U	ND	1.00	5.00	ug/L	1					
Tetrachloroethylene	U	ND	0.300	1.00	ug/L	1					
Toluene	U	ND	0.300	1.00	ug/L	1					
Trichloroethylene	U	ND	0.300	1.00	ug/L	1					
Trichlorofluoromethane	U	ND	0.300	1.00	ug/L	1					
Vinyl chloride	U	ND	0.300	1.00	ug/L	1					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					

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Certificate of Analysis

Report Date: October 24, 2014

Company :	Atlantic GeoScience International, Ltd.
Address :	8633 Vintage Club Drive
	Wilmington, North Carolina 28411
Contact:	Mr. Rudy Smithwick
Project:	Green Recycling Solutions C&D Landfill

Client Sample ID:	MW-3	Project:	AGES00214
Sample ID:	358841003	Client ID:	AGES001

Volatile Organics

Volatiles by SW846 8260B "As Received"

trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-TRACE SW846 3005A	KXP3	10/14/14	0930	1426998
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	JXM5	10/13/14	1230	1426760

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	EPA 300.0	
3	SW846 7470A	
4	SW846 3005/6010B	
5	SM 5210B	
6	EPA 353.2 Low Level	
7	SM 2540D	
8	SM 2540C	
9	EPA 410.4	
10	SW846 8260B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	Volatiles by SW846 8260B "As Received"	51.6 ug/L	50.0	103	(77%-123%)
Bromofluorobenzene	Volatiles by SW846 8260B "As Received"	50.8 ug/L	50.0	102	(80%-120%)
Toluene-d8	Volatiles by SW846 8260B "As Received"	51.1 ug/L	50.0	102	(80%-120%)

Notes:

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Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-4
Sample ID: 358841004
Matrix: Water
Collect Date: 10-OCT-14 12:25
Receive Date: 11-OCT-14
Collector: Client

Project: AGES00214
Client ID: AGES001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SM 5310 B Total Organic Carbon "As Received"											
Total Organic Carbon Average		2.49	0.330	1.00	mg/L	1	TSM	10/13/14	1910	1426820	1
Ion Chromatography											
EPA 300.0 Anions - (Sulfate,Chloride,Fluoride) "As Received"											
Chloride		5.03	0.067	0.200	mg/L	1	MAR1	10/18/14	0203	1426698	2
Fluoride	J	0.0368	0.033	0.100	mg/L	1					
Sulfate		5.14	0.133	0.400	mg/L	1					
Mercury Analysis-CVAA											
7470 Cold Vapor Hg Liquid "As Received"											
Mercury	U	ND	0.067	0.200	ug/L	1	MTM1	10/14/14	1254	1426761	3
Metals Analysis-ICP											
6010/3005 ICP SCAN Metals "As Received"											
Arsenic	J	16.1	5.00	30.0	ug/L	1	LS	10/15/14	1302	1427000	4
Barium		16.5	1.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	ug/L	1					
Chromium	J	2.17	1.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	ug/L	1					
Iron		3700	30.0	100	ug/L	1					
Lead	U	ND	3.30	10.0	ug/L	1					
Manganese	J	3.11	2.00	10.0	ug/L	1					
Selenium	U	ND	6.00	30.0	ug/L	1					
Silver	U	ND	1.00	5.00	ug/L	1					
Zinc	J	5.35	3.30	10.0	ug/L	1					
Micro-biology											
SM 5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND	1.00	2.00	mg/L		PXO1	10/11/14	1426	1426710	5
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite	U	ND	0.007	0.020	mg/L	1	KLP1	10/21/14	1424	1426796	6
Solids Analysis											
SM 2540D Total Suspended Liq "As Received"											
Total Suspended Solids		12.5	0.760	3.33	mg/L		MXB3	10/14/14	0841	1427104	7
SM2540C Solids, Dissolved "As Received"											
Total Dissolved Solids	J	5.71	3.40	14.3	mg/L		MXB3	10/13/14	0940	1426777	8

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-4 Project: AGES00214
Sample ID: 358841004 Client ID: AGES001

Spectrometric Analysis

EPA 410.4 Chem. Oxygen Demand "As Received"

COD		22.5	6.67	20.0	mg/L	1	SXC5	10/16/14	1655	1427833	9

Volatile Organics

Volatiles by SW846 8260B "As Received"

1,1,1-Trichloroethane	U	ND	0.300	1.00	ug/L	1	ACJ	10/23/14	1344	1429804	10
1,1,2,2-Tetrachloroethane	U	ND	0.300	1.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloropropane	U	ND	0.300	1.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	1.50	5.00	ug/L	1					
Acrolein	U	ND	1.50	5.00	ug/L	1					
Acrylonitrile	U	ND	1.50	5.00	ug/L	1					
Benzene	U	ND	0.300	1.00	ug/L	1					
Bromodichloromethane	U	ND	0.300	1.00	ug/L	1					
Bromoform	U	ND	0.300	1.00	ug/L	1					
Bromomethane	U	ND	0.300	1.00	ug/L	1					
Carbon tetrachloride	U	ND	0.300	1.00	ug/L	1					
Chlorobenzene	U	ND	0.300	1.00	ug/L	1					
Chloroethane	U	ND	0.300	1.00	ug/L	1					
Chloroform	U	ND	0.300	1.00	ug/L	1					
Chloromethane	U	ND	0.300	1.00	ug/L	1					
Dibromochloromethane	U	ND	0.300	1.00	ug/L	1					
Dichlorodifluoromethane	U	ND	0.300	1.00	ug/L	1					
Ethylbenzene	U	ND	0.300	1.00	ug/L	1					
Methylene chloride	U	ND	1.00	5.00	ug/L	1					
Tetrachloroethylene	U	ND	0.300	1.00	ug/L	1					
Toluene	U	ND	0.300	1.00	ug/L	1					
Trichloroethylene	U	ND	0.300	1.00	ug/L	1					
Trichlorofluoromethane	U	ND	0.300	1.00	ug/L	1					
Vinyl chloride	U	ND	0.300	1.00	ug/L	1					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					

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Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-4 Project: AGES00214
Sample ID: 358841004 Client ID: AGES001

Volatile Organics

Volatiles by SW846 8260B "As Received"

trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-TRACE SW846 3005A	KXP3	10/14/14	0930	1426998
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	JXM5	10/13/14	1230	1426760

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	EPA 300.0	
3	SW846 7470A	
4	SW846 3005/6010B	
5	SM 5210B	
6	EPA 353.2 Low Level	
7	SM 2540D	
8	SM 2540C	
9	EPA 410.4	
10	SW846 8260B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	Volatiles by SW846 8260B "As Received"	52.3 ug/L	50.0	105	(77%-123%)
Bromofluorobenzene	Volatiles by SW846 8260B "As Received"	51.1 ug/L	50.0	102	(80%-120%)
Toluene-d8	Volatiles by SW846 8260B "As Received"	51.4 ug/L	50.0	103	(80%-120%)

Notes:

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Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-10
Sample ID: 358841005
Matrix: Water
Collect Date: 10-OCT-14 10:45
Receive Date: 11-OCT-14
Collector: Client

Project: AGES00214
Client ID: AGES001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SM 5310 B Total Organic Carbon "As Received"											
Total Organic Carbon Average		4.77	0.330	1.00	mg/L	1	TSM	10/13/14	1928	1426820	1
Ion Chromatography											
EPA 300.0 Anions - (Sulfate,Chloride,Fluoride) "As Received"											
Chloride		3.93	0.067	0.200	mg/L	1	MAR1	10/18/14	0233	1426698	2
Fluoride		0.108	0.033	0.100	mg/L	1					
Sulfate		18.1	0.133	0.400	mg/L	1					
Mercury Analysis-CVAA											
7470 Cold Vapor Hg Liquid "As Received"											
Mercury	U	ND	0.067	0.200	ug/L	1	MTM1	10/14/14	1255	1426761	3
Metals Analysis-ICP											
6010/3005 ICP SCAN Metals "As Received"											
Arsenic	U	ND	5.00	30.0	ug/L	1	LS	10/15/14	1305	1427000	4
Barium		40.2	1.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	ug/L	1					
Chromium	J	1.05	1.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	ug/L	1					
Iron		168	30.0	100	ug/L	1					
Lead	U	ND	3.30	10.0	ug/L	1					
Manganese		10.8	2.00	10.0	ug/L	1					
Selenium	U	ND	6.00	30.0	ug/L	1					
Silver	U	ND	1.00	5.00	ug/L	1					
Zinc	U	ND	3.30	10.0	ug/L	1					
Micro-biology											
SM 5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND	1.00	2.00	mg/L		PXO1	10/11/14	1426	1426710	5
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite		0.0242	0.007	0.020	mg/L	1	KLP1	10/21/14	1426	1426796	6
Solids Analysis											
SM 2540D Total Suspended Liq "As Received"											
Total Suspended Solids	J	1.13	0.588	2.58	mg/L		MXB3	10/14/14	0841	1427104	7
SM2540C Solids, Dissolved "As Received"											
Total Dissolved Solids	U	ND	3.40	14.3	mg/L		MXB3	10/13/14	0940	1426777	8

Certificate of Analysis

Report Date: October 24, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-10 Project: AGES00214
Sample ID: 358841005 Client ID: AGES001

Spectrometric Analysis											
EPA 410.4 Chem. Oxygen Demand "As Received"											
COD	J	14.8	6.67	20.0	mg/L	1	SXC5	10/16/14	1655	1427833	9
Volatile Organics											
Volatiles by SW846 8260B "As Received"											
1,1,1-Trichloroethane	U	ND	0.300	1.00	ug/L	1	ACJ	10/23/14	1413	1429804	10
1,1,2,2-Tetrachloroethane	U	ND	0.300	1.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloropropane	U	ND	0.300	1.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	1.50	5.00	ug/L	1					
Acrolein	U	ND	1.50	5.00	ug/L	1					
Acrylonitrile	U	ND	1.50	5.00	ug/L	1					
Benzene	U	ND	0.300	1.00	ug/L	1					
Bromodichloromethane	U	ND	0.300	1.00	ug/L	1					
Bromoform	U	ND	0.300	1.00	ug/L	1					
Bromomethane	U	ND	0.300	1.00	ug/L	1					
Carbon tetrachloride	U	ND	0.300	1.00	ug/L	1					
Chlorobenzene	U	ND	0.300	1.00	ug/L	1					
Chloroethane	U	ND	0.300	1.00	ug/L	1					
Chloroform	U	ND	0.300	1.00	ug/L	1					
Chloromethane	U	ND	0.300	1.00	ug/L	1					
Dibromochloromethane	U	ND	0.300	1.00	ug/L	1					
Dichlorodifluoromethane	U	ND	0.300	1.00	ug/L	1					
Ethylbenzene	U	ND	0.300	1.00	ug/L	1					
Methylene chloride	U	ND	1.00	5.00	ug/L	1					
Tetrachloroethylene	U	ND	0.300	1.00	ug/L	1					
Toluene	U	ND	0.300	1.00	ug/L	1					
Trichloroethylene	U	ND	0.300	1.00	ug/L	1					
Trichlorofluoromethane	U	ND	0.300	1.00	ug/L	1					
Vinyl chloride	U	ND	0.300	1.00	ug/L	1					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					

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Certificate of Analysis

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Company :	Atlantic GeoScience International, Ltd.
Address :	8633 Vintage Club Drive
	Wilmington, North Carolina 28411
Contact:	Mr. Rudy Smithwick
Project:	Green Recycling Solutions C&D Landfill

Client Sample ID:	MW-10	Project:	AGES00214
Sample ID:	358841005	Client ID:	AGES001

Volatile Organics

Volatiles by SW846 8260B "As Received"

trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-TRACE SW846 3005A	KXP3	10/14/14	0930	1426998
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	JXM5	10/13/14	1230	1426760

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	EPA 300.0	
3	SW846 7470A	
4	SW846 3005/6010B	
5	SM 5210B	
6	EPA 353.2 Low Level	
7	SM 2540D	
8	SM 2540C	
9	EPA 410.4	
10	SW846 8260B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	Volatiles by SW846 8260B "As Received"	52.1 ug/L	50.0	104	(77%-123%)
Bromofluorobenzene	Volatiles by SW846 8260B "As Received"	51.7 ug/L	50.0	103	(80%-120%)
Toluene-d8	Volatiles by SW846 8260B "As Received"	52.2 ug/L	50.0	104	(80%-120%)

Notes:

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QC Summary

Report Date: October 24, 2014

Atlantic GeoScience International, Ltd.
8633 Vintage Club Drive
Wilmington, North Carolina

Contact: Mr. Rudy Smithwick

Workorder: 358841

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Carbon Analysis											
Batch 1426820											
QC1203186215 358687003 DUP											
Total Organic Carbon Average		J	0.421	J	0.450	mg/L	6.66 ^		(+/-1.00)	TSM	10/13/14 17:48
QC1203186214 LCS											
Total Organic Carbon Average	10.0				9.57	mg/L		95.7	(85%-115%)		10/13/14 17:06
QC1203186213 MB											
Total Organic Carbon Average				U	ND	mg/L					10/13/14 16:57
QC1203186217 358687003 PS											
Total Organic Carbon Average	10.0	J	0.421		10.8	mg/L		103	(65%-120%)		10/13/14 18:08
Ion Chromatography											
Batch 1426698											
QC1203185930 358841001 DUP											
Chloride			5.10		5.09	mg/L	0.253		(0%-20%)	MAR1	10/18/14 00:04
Fluoride			0.212		0.217	mg/L	2.05 ^		(+/-0.100)		
Sulfate			5.58		5.58	mg/L	0.086		(0%-20%)		
QC1203185929 LCS											
Chloride	5.00				4.82	mg/L		96.3	(90%-110%)		10/17/14 23:04
Fluoride	2.50				2.42	mg/L		96.9	(90%-110%)		
Sulfate	10.0				9.80	mg/L		98	(90%-110%)		
QC1203185928 MB											
Chloride				U	ND	mg/L					10/17/14 22:34
Fluoride				U	ND	mg/L					
Sulfate				U	ND	mg/L					
QC1203185931 358841001 PS											
Chloride	5.00		5.10		10.3	mg/L		104	(90%-110%)		10/18/14 00:33
Fluoride	2.50		0.212		2.53	mg/L		92.8	(90%-110%)		
Sulfate	10.0		5.58		15.5	mg/L		98.7	(90%-110%)		

QC Summary

Workorder: 358841

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1427000										
QC1203186640 358841001 DUP										
Arsenic	J	13.1	J	15.8	ug/L	18.6 ^		(+/-30.0)	LS	10/15/14 12:41
Barium		20.5		20.3	ug/L	1.15 ^		(+/-5.00)		
Cadmium	U	ND	U	ND	ug/L	N/A				
Chromium	J	4.36	J	3.87	ug/L	11.9 ^		(+/-5.00)		
Copper	U	ND	U	ND	ug/L	N/A				
Iron		3450		3550	ug/L	2.85		(0%-20%)		
Lead	U	ND	U	ND	ug/L	N/A				
Manganese	J	8.80	J	8.50	ug/L	3.49 ^		(+/-10.0)		
Selenium	U	ND	U	ND	ug/L	N/A				
Silver	U	ND	U	ND	ug/L	N/A				
Zinc	J	6.67	J	5.78	ug/L	14.2 ^		(+/-10.0)		
QC1203186639 LCS										
Arsenic	500			472	ug/L		94.4	(80%-120%)		10/15/14 12:34
Barium	500			484	ug/L		96.8	(80%-120%)		
Cadmium	500			479	ug/L		95.7	(80%-120%)		
Chromium	500			482	ug/L		96.4	(80%-120%)		
Copper	500			489	ug/L		97.7	(80%-120%)		
Iron	5000			4880	ug/L		97.6	(80%-120%)		
Lead	500			480	ug/L		95.9	(80%-120%)		
Manganese	500			489	ug/L		97.8	(80%-120%)		
Selenium	500			467	ug/L		93.4	(80%-120%)		
Silver	500			478	ug/L		95.6	(80%-120%)		
Zinc	500			499	ug/L		99.7	(80%-120%)		

QC Summary

Workorder: 358841

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1427000											
QC1203186638 MB											
Arsenic				J	7.56	ug/L				LS	10/15/14 12:31
Barium				U	ND	ug/L					
Cadmium				U	ND	ug/L					
Chromium				U	ND	ug/L					
Copper				U	ND	ug/L					
Iron				U	ND	ug/L					
Lead				U	ND	ug/L					
Manganese				U	ND	ug/L					
Selenium				U	ND	ug/L					
Silver				U	ND	ug/L					
Zinc				U	ND	ug/L					
QC1203186641 358841001 MS											
Arsenic	500	J	13.1		489	ug/L		95.2	(75%-125%)		10/15/14 12:44
Barium	500		20.5		510	ug/L		98	(75%-125%)		
Cadmium	500	U	ND		481	ug/L		96.2	(75%-125%)		
Chromium	500	J	4.36		490	ug/L		97	(75%-125%)		
Copper	500	U	ND		502	ug/L		100	(75%-125%)		
Iron	5000		3450		8730	ug/L		106	(75%-125%)		
Lead	500	U	ND		488	ug/L		97.6	(75%-125%)		
Manganese	500	J	8.80		503	ug/L		98.9	(75%-125%)		
Selenium	500	U	ND		460	ug/L		91.3	(75%-125%)		
Silver	500	U	ND		484	ug/L		96.9	(75%-125%)		

QC Summary

Workorder: 358841

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1427000											
Zinc	500	J	6.67		506	ug/L		99.9	(75%-125%)	LS	10/15/14 12:4
QC1203186642 358841001 SDILT											
Arsenic		J	13.1	J	5.61	ug/L	114		(0%-10%)		10/15/14 12:4
Barium			20.5	J	4.30	ug/L	4.6		(0%-10%)		
Cadmium		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Chromium		J	4.36	U	ND	ug/L	N/A		(0%-10%)		
Copper		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Iron			3450		661	ug/L	4.06		(0%-10%)		
Lead		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Manganese		J	8.80	U	ND	ug/L	N/A		(0%-10%)		
Selenium		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Silver		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Zinc		J	6.67	U	ND	ug/L	N/A		(0%-10%)		
Metals Analysis-Mercury											
Batch 1426761											
QC1203186060 358793001 DUP											
Mercury		U	ND	U	ND	ug/L	N/A			MTM1	10/14/14 12:3
QC1203186059 LCS											
Mercury	2.00				2.00	ug/L		99.9	(80%-120%)		10/14/14 12:01
QC1203186058 MB											
Mercury				U	ND	ug/L					10/14/14 12:0
QC1203186061 358793001 MS											
Mercury	2.00	U	ND		1.65	ug/L		81.9	(75%-125%)		10/14/14 12:3
QC1203186062 358793001 SDILT											
Mercury		U	ND	U	ND	ug/L	N/A		(0%-10%)		10/14/14 12:3
Micro-biology											
Batch 1426710											

QC Summary

Workorder: 358841

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Micro-biology											
Batch 1426710											
QC1203185950 358841001 DUP											
BOD, 5 DAY		Ud	ND	Ud	ND	mg/L	N/A			PXO1	10/11/14 14:2(
QC1203185948 LCS											
BOD, 5 DAY	198			J	194	mg/L		97.8	(85%-115%)		10/11/14 14:2:
QC1203185947 MB											
BOD, 5 DAY				U	ND	mg/L					10/11/14 14:2:
QC1203185949 SEED											
BOD, 5 DAY				U	ND	mg/L					10/11/14 14:2:
Nutrient Analysis											
Batch 1426796											
QC1203186169 358841001 DUP											
Nitrogen, Nitrate/Nitrite		U	ND	U	ND	mg/L	N/A			KLP1	10/21/14 14:2(
QC1203186168 LCS											
Nitrogen, Nitrate/Nitrite	1.00				1.02	mg/L		102	(90%-110%)		10/21/14 14:1:
QC1203186167 MB											
Nitrogen, Nitrate/Nitrite				U	ND	mg/L					10/21/14 14:1(
QC1203186170 358841001 PS											
Nitrogen, Nitrate/Nitrite	1.00	U	ND		0.891	mg/L		89.1*	(90%-110%)		10/21/14 14:2:
Solids Analysis											
Batch 1426777											
QC1203186119 358776001 DUP											
Total Dissolved Solids			663		690	mg/L	4.07		(0%-10%)	MXB3	10/13/14 09:4(
QC1203186117 MB											
Total Dissolved Solids				U	ND	mg/L					10/13/14 09:4(
Batch 1427104											
QC1203186972 358841001 DUP											
Total Suspended Solids			12.2		11.6	mg/L	5.04 ^		(+/-5.00)	MXB3	10/14/14 08:41
QC1203186971 LCS											
Total Suspended Solids	500				505	mg/L		101	(95%-105%)		10/14/14 08:41
QC1203186970 MB											
Total Suspended Solids				U	ND	mg/L					10/14/14 08:41
Spectrometric Analysis											
Batch 1427833											
QC1203188769 359093004 DUP											

QC Summary

Workorder: 358841

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis										
Batch 1427833										
COD		45.6		45.6	mg/L	0.00 ^		(+/-20.0)	SXC5	10/16/14 16:5
QC1203188762 LCS										
COD	500			525	mg/L		105	(90%-110%)		10/16/14 16:5
QC1203188761 MB										
COD			U	ND	mg/L					10/16/14 16:5
QC1203188770 359093004 MS										
COD	500	45.6		507	mg/L		92.3	(90%-110%)		10/16/14 16:5
Volatile-GC/MS										
Batch 1429804										
QC1203193549 LCS										
1,1-Dichloroethylene	50.0			42.8	ug/L		85.6	(70%-127%)	ACJ	10/22/14 10:5
Benzene	50.0			44.8	ug/L		89.5	(75%-120%)		
Chlorobenzene	50.0			45.1	ug/L		90.2	(77%-120%)		
Toluene	50.0			44.9	ug/L		89.7	(75%-120%)		
Trichloroethylene	50.0			45.4	ug/L		90.7	(77%-123%)		
'1,2-Dichloroethane-d4	50.0			48.3	ug/L		96.7	(77%-123%)		
'Bromofluorobenzene	50.0			48.0	ug/L		96	(80%-120%)		
'Toluene-d8	50.0			49.9	ug/L		99.8	(80%-120%)		
QC1203194325 LCS										
1,1-Dichloroethylene	50.0			53.5	ug/L		107	(70%-127%)		10/23/14 10:2
Benzene	50.0			52.7	ug/L		105	(75%-120%)		
Chlorobenzene	50.0			52.4	ug/L		105	(77%-120%)		
Toluene	50.0			52.7	ug/L		105	(75%-120%)		
Trichloroethylene	50.0			53.3	ug/L		107	(77%-123%)		
'1,2-Dichloroethane-d4	50.0			49.8	ug/L		99.6	(77%-123%)		
'Bromofluorobenzene	50.0			49.1	ug/L		98.2	(80%-120%)		

QC Summary

Workorder: 358841

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1429804										
*Toluene-d8	50.0			49.3	ug/L		98.5	(80%-120%)		
QC1203193548 MB										
1,1,1-Trichloroethane			U	ND	ug/L				ACJ	10/22/14 13:1
1,1,2,2-Tetrachloroethane			U	ND	ug/L					
1,1,2-Trichloroethane			U	ND	ug/L					
1,1-Dichloroethane			U	ND	ug/L					
1,1-Dichloroethylene			U	ND	ug/L					
1,2-Dichlorobenzene			U	ND	ug/L					
1,2-Dichloroethane			U	ND	ug/L					
1,2-Dichloropropane			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2-Chloroethylvinyl ether			U	ND	ug/L					
Acrolein			U	ND	ug/L					
Acrylonitrile			U	ND	ug/L					
Benzene			U	ND	ug/L					
Bromodichloromethane			U	ND	ug/L					
Bromoform			U	ND	ug/L					
Bromomethane			U	ND	ug/L					
Carbon tetrachloride			U	ND	ug/L					
Chlorobenzene			U	ND	ug/L					
Chloroethane			U	ND	ug/L					
Chloroform			U	ND	ug/L					

QC Summary

Workorder: 358841

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1429804										
Chloromethane			U	ND	ug/L				ACJ	10/22/14 13:1:
Dibromochloromethane			U	ND	ug/L					
Dichlorodifluoromethane			U	ND	ug/L					
Ethylbenzene			U	ND	ug/L					
Methylene chloride			U	ND	ug/L					
Tetrachloroethylene			U	ND	ug/L					
Toluene			U	ND	ug/L					
Trichloroethylene			U	ND	ug/L					
Trichlorofluoromethane			U	ND	ug/L					
Vinyl chloride			U	ND	ug/L					
cis-1,3-Dichloropropylene			U	ND	ug/L					
trans-1,2-Dichloroethylene			U	ND	ug/L					
trans-1,3-Dichloropropylene			U	ND	ug/L					
1,2-Dichloroethane-d4	50.0			52.2	ug/L		104	(77%-123%)		
Bromofluorobenzene	50.0			53.0	ug/L		106	(80%-120%)		
Toluene-d8	50.0			51.2	ug/L		102	(80%-120%)		
QC1203194324 MB										
1,1,1-Trichloroethane			U	ND	ug/L					10/23/14 11:5(
1,1,2,2-Tetrachloroethane			U	ND	ug/L					
1,1,2-Trichloroethane			U	ND	ug/L					
1,1-Dichloroethane			U	ND	ug/L					
1,1-Dichloroethylene			U	ND	ug/L					

QC Summary

Workorder: 358841

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1429804										
1,2-Dichlorobenzene			U	ND	ug/L				ACJ	10/23/14 11:5(
1,2-Dichloroethane			U	ND	ug/L					
1,2-Dichloropropane			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2-Chloroethylvinyl ether			U	ND	ug/L					
Acrolein			U	ND	ug/L					
Acrylonitrile			U	ND	ug/L					
Benzene			U	ND	ug/L					
Bromodichloromethane			U	ND	ug/L					
Bromoform			U	ND	ug/L					
Bromomethane			U	ND	ug/L					
Carbon tetrachloride			U	ND	ug/L					
Chlorobenzene			U	ND	ug/L					
Chloroethane			U	ND	ug/L					
Chloroform			U	ND	ug/L					
Chloromethane			U	ND	ug/L					
Dibromochloromethane			U	ND	ug/L					
Dichlorodifluoromethane			U	ND	ug/L					
Ethylbenzene			U	ND	ug/L					
Methylene chloride			U	ND	ug/L					

QC Summary

Workorder: 358841

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1429804											
Tetrachloroethylene				U	ND	ug/L					
Toluene				U	ND	ug/L				ACJ	10/23/14 11:5(
Trichloroethylene				U	ND	ug/L					
Trichlorofluoromethane				U	ND	ug/L					
Vinyl chloride				U	ND	ug/L					
cis-1,3-Dichloropropylene				U	ND	ug/L					
trans-1,2-Dichloroethylene				U	ND	ug/L					
trans-1,3-Dichloropropylene				U	ND	ug/L					
'1,2-Dichloroethane-d4	50.0				50.5	ug/L		101	(77%-123%)		
'Bromofluorobenzene	50.0				51.9	ug/L		104	(80%-120%)		
'Toluene-d8	50.0				51.6	ug/L		103	(80%-120%)		
QC1203193550 359022001 PS											
1,1-Dichloroethylene	50.0	U	ND		42.7	ug/L		85.4	(65%-129%)		10/22/14 20:2
Benzene	50.0	U	ND		45.1	ug/L		90.3	(71%-118%)		
Chlorobenzene	50.0	U	ND		43.7	ug/L		87.4	(71%-119%)		
Toluene	50.0	U	ND		44.3	ug/L		88.5	(69%-119%)		
Trichloroethylene	50.0	U	ND		44.6	ug/L		89.2	(68%-130%)		
'1,2-Dichloroethane-d4	50.0		51.4		51.5	ug/L		103	(77%-123%)		
'Bromofluorobenzene	50.0		51.4		48.3	ug/L		96.7	(80%-120%)		
'Toluene-d8	50.0		51.3		49.8	ug/L		99.6	(80%-120%)		
QC1203193551 359022001 PSD											
1,1-Dichloroethylene	50.0	U	ND		43.5	ug/L	1.69	86.9	(0%-20%)		10/22/14 20:5
Benzene	50.0	U	ND		45.5	ug/L	0.838	91	(0%-20%)		
Chlorobenzene	50.0	U	ND		44.9	ug/L	2.64	89.7	(0%-20%)		

QC Summary

Workorder: 358841

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1429804											
Toluene	50.0	U	ND		45.2	ug/L	2.01	90.3	(0%-20%)	ACJ	10/22/14 20:5
Trichloroethylene	50.0	U	ND		45.4	ug/L	1.82	90.9	(0%-20%)		
*1,2-Dichloroethane-d4	50.0		51.4		50.8	ug/L		102	(77%-123%)		
*Bromofluorobenzene	50.0		51.4		48.9	ug/L		97.8	(80%-120%)		
*Toluene-d8	50.0		51.3		50.4	ug/L		101	(80%-120%)		

Notes:

The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B The target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- E Concentration of the target analyte exceeds the instrument calibration range
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded
- J Value is estimated
- JNX Non Calibrated Compound
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

QC Summary

Workorder: 358841

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UJ	Compound cannot be extracted
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
d	5-day BOD--The 2:1 depletion requirement was not met for this sample
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
21–OCT–14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LACHAT Flow Injection Analyzer	EPA 353.2 Low Level	Liquid	AGES, NCSW
Batch ID:	**Sample Numbers:**		
1426796	See Below		

Potentially affected work order(s)(SDG): 358841,359004,359258

Application Issues:

Failed Recovery for MS/PS

Specification and Requirements Exception Description:	DER Disposition:
1. Failed Recovery for MS/PS: QC 1203186170(MW–1)PS	1. The spike recovery falls outside of the established acceptance limits due to matrix interference.

Originator's Name:

Kristen Parson 21–OCT–14

Data Validator/Group Leader:

Aubrey Kingsbury 22–OCT–14

358841 %

Page: 1 of 1
Project #:
GEL Quote #: GELP14-0904
COC Number (1):
PO Number:

GEL Chain of Custody and Analytical Request

GEL Work Order Number:

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Atlantic Geoscience Ltd Phone #: (910) 612 4853
Project/Site Name: Green Recycling Solutions Fax #:
Address: 11710 Hwy 17 N Maysville NC
Collected by: R. Smithwick Send Results To: Atlantic Geoscience Ltd

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive	TSCA Regulated	Total number of containers	VOA/8260 HA	Metals 6010/7470 NI	TDS	TSS	Anions S, Cl, F	BOD	NO_2+NO_3	COD	TOC		<-- Preservative Type (6)
															H_2SO_4	H_2SO_4	H_2SO_4		
MW-1	10-10-14	1945	G	N	GW			12	3	1	1	1	1	1	1	1	2		
MW-2		1545						12									2		
MW-3		1445						11									1		
MW-4		1225						12									2		
MW-10		1045						11									1		
																		*	Standard turn-around for all analyses.

Comments
Note: extra sample is required for sample specific QC

TAT Requested: Normal: Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards

Sample Collection Time Zone: Eastern, Central, Mountain, Pacific, Other _____

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 [signature]	10.11.2014	1000	1 P. Hulent	10/11/14	10:00
2			2		
3			3		

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 3 C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ABES	SDG/AR/COC/Work Order: 3588419 6
Received By: MK	Date Received: 10-11-14

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): CPD
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample contatiners < action levels?
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) 3C *all temperatures are recorded in Celsius
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 13058776 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	✓			Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?	✓			Sample ID's affected:
12	Are sample containers identifiable as GEL provided?			✓	
13	COC form is properly signed in relinquished/received sections?	✓			
14	Carrier and tracking number.	✓			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other WALK-IN

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JM Date 10/13/14 Page 1 of 1

GL-CHL-SR-001

List of current GEL Certifications as of 24 October 2014

State	Certification
Alaska	UST–110
Arkansas	88–0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH–0169
Delaware	SC000122013–10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330–12–00283, P330–12–00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013–10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C–SC–01
Kansas NELAP	E–10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M–SC012
Michigan	9976
Mississippi	SC000122013–10
Nebraska	NE–OS–26–13
Nevada	SC000122014–1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	**11501**
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68–00485
Plant Material Permit	PDEP–12–00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235–14–9
Utah NELAP	SC000122014–16
Vermont	VT87156
Virginia NELAP	460202
Washington	C780–12
Wisconsin	999887790

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171 F 843.766.1178

www.gel.com

October 29, 2014

Mr. Rudy Smithwick
Atlantic GeoScience International, Ltd.
8633 Vintage Club Drive
Wilmington, North Carolina 28411

Re: Green Recycling Solutions C&D Landfill
Work Order: 359004

Dear Mr. Smithwick:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on October 15, 2014. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4289.

Sincerely,

Julie Robinson

Julie Robinson
Project Manager

Enclosures

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556–8171 – www.gel.com

Certificate of Analysis Report
for

AGES001 Atlantic GeoScience

Client SDG: 359004 GEL Work Order: 359004

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

J Value is estimated

U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.

d 5–day BOD—The 2:1 depletion requirement was not met for this sample

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Julie Robinson.

Reviewed by Julie Robinson

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: October 29, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-6
Sample ID: 359004001
Matrix: Water
Collect Date: 14-OCT-14 12:50
Receive Date: 15-OCT-14
Collector: Client

Project: AGES00214
Client ID: AGES001

Parameter	Qualifier	Result	DL	RL	Units	DF	Analyst	Date	Time	Batch	Method
Carbon Analysis											
SM 5310 B Total Organic Carbon "As Received"											
Total Organic Carbon Average		2.83	0.330	1.00	mg/L	1	TSM	10/16/14	1927	1427849	1
Ion Chromatography											
EPA 300.0 Anions - (Sulfate,Chloride,Fluoride) "As Received"											
Chloride		6.32	0.067	0.200	mg/L	1	RXB5	10/16/14	1133	1427777	2
Fluoride		1.04	0.033	0.100	mg/L	1					
Sulfate		12.5	0.133	0.400	mg/L	1					
Mercury Analysis-CVAA											
7470 Cold Vapor Hg Liquid "As Received"											
Mercury	U	ND	0.067	0.200	ug/L	1	MTM1	10/22/14	1217	1429266	3
Metals Analysis-ICP											
6010/3005 ICP SCAN Metals "As Received"											
Arsenic	U	ND	5.00	30.0	ug/L	1	TXT1	10/17/14	1233	1427727	4
Barium		51.5	1.00	5.00	ug/L	1					
Cadmium	U	ND	1.00	5.00	ug/L	1					
Chromium		18.7	1.00	5.00	ug/L	1					
Copper	U	ND	3.00	10.0	ug/L	1					
Iron		7470	30.0	100	ug/L	1					
Lead	J	4.40	3.30	10.0	ug/L	1					
Manganese		36.3	2.00	10.0	ug/L	1					
Selenium	J	10.4	6.00	30.0	ug/L	1					
Silver	U	ND	1.00	5.00	ug/L	1					
Zinc		52.5	3.30	10.0	ug/L	1					
Micro-biology											
SM 5210B BOD, 5DAY "As Received"											
BOD, 5 DAY	Ud	ND	6.00	12.0	mg/L		SXC4	10/15/14	1507	1427461	5
Nutrient Analysis											
EPA 353.2 Nitrogen, Nitrate/Nitrite "As Received"											
Nitrogen, Nitrate/Nitrite	J	0.0121	0.007	0.020	mg/L	1	KLP1	10/21/14	1427	1426796	6
Solids Analysis											
SM 2540D Total Suspended Liq "As Received"											
Total Suspended Solids		80.0	2.28	10.0	mg/L		MXB3	10/17/14	1116	1427600	7
SM2540C Solids, Dissolved "As Received"											
Total Dissolved Solids		84.3	3.40	14.3	mg/L		MXB3	10/16/14	1011	1427683	8

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: October 29, 2014

Company : Atlantic GeoScience International, Ltd.
Address : 8633 Vintage Club Drive

Wilmington, North Carolina 28411
Contact: Mr. Rudy Smithwick
Project: Green Recycling Solutions C&D Landfill

Client Sample ID: MW-6 Project: AGES00214
Sample ID: 359004001 Client ID: AGES001

Spectrometric Analysis											
EPA 410.4 Chem. Oxygen Demand "As Received"											
COD		32.7	6.67	20.0	mg/L	1	SXC5	10/16/14	1655	1427833	9
Volatile Organics											
Volatiles by SW846 8260B "As Received"											
1,1,1-Trichloroethane	U	ND	0.300	1.00	ug/L	1	ACJ	10/23/14	1441	1429804	10
1,1,2,2-Tetrachloroethane	U	ND	0.300	1.00	ug/L	1					
1,1,2-Trichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,1-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloroethane	U	ND	0.300	1.00	ug/L	1					
1,2-Dichloropropane	U	ND	0.300	1.00	ug/L	1					
1,3-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
1,4-Dichlorobenzene	U	ND	0.300	1.00	ug/L	1					
2-Chloroethylvinyl ether	U	ND	1.50	5.00	ug/L	1					
Acrolein	U	ND	1.50	5.00	ug/L	1					
Acrylonitrile	U	ND	1.50	5.00	ug/L	1					
Benzene	U	ND	0.300	1.00	ug/L	1					
Bromodichloromethane	U	ND	0.300	1.00	ug/L	1					
Bromoform	U	ND	0.300	1.00	ug/L	1					
Bromomethane	U	ND	0.300	1.00	ug/L	1					
Carbon tetrachloride	U	ND	0.300	1.00	ug/L	1					
Chlorobenzene	U	ND	0.300	1.00	ug/L	1					
Chloroethane	U	ND	0.300	1.00	ug/L	1					
Chloroform	U	ND	0.300	1.00	ug/L	1					
Chloromethane	U	ND	0.300	1.00	ug/L	1					
Dibromochloromethane	U	ND	0.300	1.00	ug/L	1					
Dichlorodifluoromethane	U	ND	0.300	1.00	ug/L	1					
Ethylbenzene	U	ND	0.300	1.00	ug/L	1					
Methylene chloride	U	ND	1.00	5.00	ug/L	1					
Tetrachloroethylene	U	ND	0.300	1.00	ug/L	1					
Toluene	U	ND	0.300	1.00	ug/L	1					
Trichloroethylene	U	ND	0.300	1.00	ug/L	1					
Trichlorofluoromethane	U	ND	0.300	1.00	ug/L	1					
Vinyl chloride	U	ND	0.300	1.00	ug/L	1					
cis-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1					
trans-1,2-Dichloroethylene	U	ND	0.300	1.00	ug/L	1					

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Certificate of Analysis

Report Date: October 29, 2014

Company :	Atlantic GeoScience International, Ltd.
Address :	8633 Vintage Club Drive
	Wilmington, North Carolina 28411
Contact:	Mr. Rudy Smithwick
Project:	Green Recycling Solutions C&D Landfill

Client Sample ID:	MW-6	Project:	AGES00214
Sample ID:	359004001	Client ID:	AGES001

Volatile Organics

Volatiles by SW846 8260B "As Received"

trans-1,3-Dichloropropylene	U	ND	0.300	1.00	ug/L	1

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
SW846 3005A	ICP-TRACE SW846 3005A	EXF1	10/16/14	1149	1427726
SW846 7470A Prep	EPA 7470A Mercury Prep Liquid	AXS5	10/21/14	1400	1429263

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	SM 5310 B	
2	EPA 300.0	
3	SW846 7470A	
4	SW846 3005/6010B	
5	SM 5210B	
6	EPA 353.2 Low Level	
7	SM 2540D	
8	SM 2540C	
9	EPA 410.4	
10	SW846 8260B	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
1,2-Dichloroethane-d4	Volatiles by SW846 8260B "As Received"	52.1 ug/L	50.0	104	(77%-123%)
Bromofluorobenzene	Volatiles by SW846 8260B "As Received"	52.6 ug/L	50.0	105	(80%-120%)
Toluene-d8	Volatiles by SW846 8260B "As Received"	52.4 ug/L	50.0	105	(80%-120%)

Notes:

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: October 29, 2014

Atlantic GeoScience International, Ltd.
8633 Vintage Club Drive
Wilmington, North Carolina

Contact: Mr. Rudy Smithwick

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Carbon Analysis										
Batch 1427849										
QC1203188791 359045001 DUP										
Total Organic Carbon Average		14.1		13.9	mg/L	1.66		(0%-20%)	TSM	10/16/14 20:03
QC1203188790 LCS										
Total Organic Carbon Average	10.0			10.4	mg/L		104	(85%-115%)		10/16/14 19:19
QC1203188789 MB										
Total Organic Carbon Average			U	ND	mg/L					10/16/14 19:10
QC1203188793 359045001 PS										
Total Organic Carbon Average	10.0	7.07		17.5	mg/L		104	(65%-120%)		10/16/14 20:23
Ion Chromatography										
Batch 1427777										
QC1203188651 359004001 DUP										
Chloride		6.32		6.32	mg/L	0.00475		(0%-20%)	RXB5	10/16/14 12:05
Fluoride		1.04		1.04	mg/L	0.144		(0%-20%)		
Sulfate		12.5		12.4	mg/L	0.595		(0%-20%)		
QC1203188650 LCS										
Chloride	5.00			5.04	mg/L		101	(90%-110%)		10/16/14 11:02
Fluoride	2.50			2.62	mg/L		105	(90%-110%)		
Sulfate	10.0			10.2	mg/L		102	(90%-110%)		
QC1203188649 MB										
Chloride			U	ND	mg/L					10/16/14 10:30
Fluoride			U	ND	mg/L					
Sulfate			U	ND	mg/L					
QC1203188652 359004001 PS										
Chloride	5.00	6.32		12.1	mg/L		117*	(90%-110%)		10/16/14 12:36
Fluoride	2.50	1.04		3.74	mg/L		108	(90%-110%)		
Sulfate	10.0	12.5		23.8	mg/L		113*	(90%-110%)		

QC Summary

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP										
Batch 1427727										
QC1203188498 359004001 DUP										
Arsenic	U	ND	U	ND	ug/L	N/A			TXT1	10/17/14 12:35
Barium		51.5		47.4	ug/L	8.38		(0%-20%)		
Cadmium	U	ND	U	ND	ug/L	N/A				
Chromium		18.7		18.6	ug/L	0.429 ^		(+/-5.00)		
Copper	U	ND	U	ND	ug/L	N/A				
Iron		7470		7510	ug/L	0.621		(0%-20%)		
Lead	J	4.40	U	ND	ug/L	200 ^				
Manganese		36.3		36.6	ug/L	0.785 ^		(+/-10.0)		
Selenium	J	10.4	U	ND	ug/L	200 ^				
Silver	U	ND	U	ND	ug/L	N/A				
Zinc		52.5		23.6	ug/L	75.9*^		(+/-10.0)		
QC1203188497 LCS										
Arsenic	500			479	ug/L		95.7	(80%-120%)		10/17/14 12:30
Barium	500			488	ug/L		97.6	(80%-120%)		
Cadmium	500			468	ug/L		93.6	(80%-120%)		
Chromium	500			481	ug/L		96.3	(80%-120%)		
Copper	500			496	ug/L		99.1	(80%-120%)		
Iron	5000			5010	ug/L		100	(80%-120%)		
Lead	500			473	ug/L		94.7	(80%-120%)		
Manganese	500			490	ug/L		98	(80%-120%)		
Selenium	500			452	ug/L		90.4	(80%-120%)		
Silver	500			482	ug/L		96.5	(80%-120%)		
Zinc	500			490	ug/L		98	(80%-120%)		

QC Summary

Workorder: 359004

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1427727											
QC1203188496 MB											
Arsenic				U	ND	ug/L				TXT1	10/17/14 12:26
Barium				U	ND	ug/L					
Cadmium				U	ND	ug/L					
Chromium				U	ND	ug/L					
Copper				U	ND	ug/L					
Iron				U	ND	ug/L					
Lead				U	ND	ug/L					
Manganese				U	ND	ug/L					
Selenium				U	ND	ug/L					
Silver				U	ND	ug/L					
Zinc				J	5.38	ug/L					
QC1203188499 359004001 MS											
Arsenic	500	U	ND		488	ug/L		97.5	(75%-125%)		10/17/14 12:38
Barium	500		51.5		540	ug/L		97.7	(75%-125%)		
Cadmium	500	U	ND		470	ug/L		94	(75%-125%)		
Chromium	500		18.7		507	ug/L		97.7	(75%-125%)		
Copper	500	U	ND		513	ug/L		102	(75%-125%)		
Iron	5000		7470		13100	ug/L		114	(75%-125%)		
Lead	500	J	4.40		474	ug/L		94	(75%-125%)		
Manganese	500		36.3		527	ug/L		98.1	(75%-125%)		
Selenium	500	J	10.4		450	ug/L		87.9	(75%-125%)		
Silver	500	U	ND		486	ug/L		97.2	(75%-125%)		

QC Summary

Workorder: 359004

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Metals Analysis-ICP											
Batch 1427727											
Zinc	500		52.5		513	ug/L		92.1	(75%-125%)	TXT1	10/17/14 12:38
QC1203188500 359004001 SDILT											
Arsenic		U	ND	U	ND	ug/L	N/A		(0%-10%)		10/17/14 12:41
Barium			51.5		10.7	ug/L	3.98		(0%-10%)		
Cadmium		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Chromium			18.7	J	3.57	ug/L	4.46		(0%-10%)		
Copper		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Iron			7470		1530	ug/L	2.27		(0%-10%)		
Lead		J	4.40	U	ND	ug/L	N/A		(0%-10%)		
Manganese			36.3	J	7.38	ug/L	1.64		(0%-10%)		
Selenium		J	10.4	U	ND	ug/L	N/A		(0%-10%)		
Silver		U	ND	U	ND	ug/L	N/A		(0%-10%)		
Zinc			52.5		12.8	ug/L	21.3		(0%-10%)		
Metals Analysis-Mercury											
Batch 1429266											
QC1203192222 358711002 DUP											
Mercury		U	ND	U	ND	ug/L	N/A			MTM1	10/22/14 11:57
QC1203192221 LCS											
Mercury	2.00				1.96	ug/L		97.8	(80%-120%)		10/22/14 11:41
QC1203192220 MB											
Mercury				U	ND	ug/L					10/22/14 11:37
QC1203192226 358711002 MS											
Mercury	2.00	U	ND		1.94	ug/L		96.9	(75%-125%)		10/22/14 11:59
QC1203192227 358711002 SDILT											
Mercury		U	ND	U	ND	ug/L	N/A		(0%-10%)		10/22/14 12:01
Micro-biology											
Batch 1427461											

QC Summary

Workorder: 359004

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Micro-biology											
Batch 1427461											
QC1203187826 358984001 DUP											
BOD, 5 DAY		Ud	ND	Ud	ND	mg/L	N/A			SXC4	10/15/14 15:07
QC1203187824 LCS											
BOD, 5 DAY	198			J	198	mg/L		100	(85%-115%)		10/15/14 15:07
QC1203187823 MB											
BOD, 5 DAY				U	ND	mg/L					10/15/14 15:07
QC1203187825 SEED											
BOD, 5 DAY				U	ND	mg/L					10/15/14 15:07
Nutrient Analysis											
Batch 1426796											
QC1203186169 358841001 DUP											
Nitrogen, Nitrate/Nitrite		U	ND	U	ND	mg/L	N/A			KLP1	10/21/14 14:20
QC1203186168 LCS											
Nitrogen, Nitrate/Nitrite	1.00				1.02	mg/L		102	(90%-110%)		10/21/14 14:17
QC1203186167 MB											
Nitrogen, Nitrate/Nitrite				U	ND	mg/L					10/21/14 14:16
QC1203186170 358841001 PS											
Nitrogen, Nitrate/Nitrite	1.00	U	ND		0.891	mg/L		89.1 *	(90%-110%)		10/21/14 14:21
Solids Analysis											
Batch 1427600											
QC1203188178 359029002 DUP											
Total Suspended Solids			149		147	mg/L	1.35		(0%-20%)	MXB3	10/17/14 11:16
QC1203188172 LCS											
Total Suspended Solids	500				505	mg/L		101	(95%-105%)		10/17/14 11:16
QC1203188171 MB											
Total Suspended Solids				U	ND	mg/L					10/17/14 11:16
Batch 1427683											
QC1203188391 359041002 DUP											
Total Dissolved Solids			883		850	mg/L	4.12		(0%-10%)	MXB3	10/16/14 10:11
QC1203188390 LCS											
Total Dissolved Solids	300				291	mg/L		97.1	(95%-105%)		10/16/14 10:11
QC1203188389 MB											
Total Dissolved Solids				U	ND	mg/L					10/16/14 10:11

QC Summary

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Spectrometric Analysis										
Batch 1427833										
QC1203188769 359093004 DUP										
COD		45.6		45.6	mg/L	0.00 ^		(+/-20.0)	SXC5	10/16/14 16:59
QC1203188762 LCS										
COD	500			525	mg/L		105	(90%-110%)		10/16/14 16:54
QC1203188761 MB										
COD			U	ND	mg/L					10/16/14 16:54
QC1203188770 359093004 MS										
COD	500	45.6		507	mg/L		92.3	(90%-110%)		10/16/14 16:59
Volatile-GC/MS										
Batch 1429804										
QC1203193549 LCS										
1,1-Dichloroethylene	50.0			42.8	ug/L		85.6	(70%-127%)	ACJ	10/22/14 10:50
Benzene	50.0			44.8	ug/L		89.5	(75%-120%)		
Chlorobenzene	50.0			45.1	ug/L		90.2	(77%-120%)		
Toluene	50.0			44.9	ug/L		89.7	(75%-120%)		
Trichloroethylene	50.0			45.4	ug/L		90.7	(77%-123%)		
**1,2-Dichloroethane-d4	50.0			48.3	ug/L		96.7	(77%-123%)		
**Bromofluorobenzene	50.0			48.0	ug/L		96	(80%-120%)		
**Toluene-d8	50.0			49.9	ug/L		99.8	(80%-120%)		
QC1203194325 LCS										
1,1-Dichloroethylene	50.0			53.5	ug/L		107	(70%-127%)		10/23/14 10:25
Benzene	50.0			52.7	ug/L		105	(75%-120%)		
Chlorobenzene	50.0			52.4	ug/L		105	(77%-120%)		
Toluene	50.0			52.7	ug/L		105	(75%-120%)		
Trichloroethylene	50.0			53.3	ug/L		107	(77%-123%)		
**1,2-Dichloroethane-d4	50.0			49.8	ug/L		99.6	(77%-123%)		
**Bromofluorobenzene	50.0			49.1	ug/L		98.2	(80%-120%)		

QC Summary

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1429804										
**Toluene-d8	50.0			49.3	ug/L		98.5	(80%-120%)		
QC1203193548 MB										
1,1,1-Trichloroethane			U	ND	ug/L				ACJ	10/22/14 13:12
1,1,2,2-Tetrachloroethane			U	ND	ug/L					
1,1,2-Trichloroethane			U	ND	ug/L					
1,1-Dichloroethane			U	ND	ug/L					
1,1-Dichloroethylene			U	ND	ug/L					
1,2-Dichlorobenzene			U	ND	ug/L					
1,2-Dichloroethane			U	ND	ug/L					
1,2-Dichloropropane			U	ND	ug/L					
1,3-Dichlorobenzene			U	ND	ug/L					
1,4-Dichlorobenzene			U	ND	ug/L					
2-Chloroethylvinyl ether			U	ND	ug/L					
Acrolein			U	ND	ug/L					
Acrylonitrile			U	ND	ug/L					
Benzene			U	ND	ug/L					
Bromodichloromethane			U	ND	ug/L					
Bromoform			U	ND	ug/L					
Bromomethane			U	ND	ug/L					
Carbon tetrachloride			U	ND	ug/L					
Chlorobenzene			U	ND	ug/L					
Chloroethane			U	ND	ug/L					
Chloroform			U	ND	ug/L					

QC Summary

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS										
Batch 1429804										
Chloromethane			U	ND	ug/L				ACJ	10/22/14 13:12
Dibromochloromethane			U	ND	ug/L					
Dichlorodifluoromethane			U	ND	ug/L					
Ethylbenzene			U	ND	ug/L					
Methylene chloride			U	ND	ug/L					
Tetrachloroethylene			U	ND	ug/L					
Toluene			U	ND	ug/L					
Trichloroethylene			U	ND	ug/L					
Trichlorofluoromethane			U	ND	ug/L					
Vinyl chloride			U	ND	ug/L					
cis-1,3-Dichloropropylene			U	ND	ug/L					
trans-1,2-Dichloroethylene			U	ND	ug/L					
trans-1,3-Dichloropropylene			U	ND	ug/L					
**1,2-Dichloroethane-d4	50.0			52.2	ug/L		104	(77%-123%)		
**Bromofluorobenzene	50.0			53.0	ug/L		106	(80%-120%)		
**Toluene-d8	50.0			51.2	ug/L		102	(80%-120%)		
QC1203194324 MB										
1,1,1-Trichloroethane			U	ND	ug/L					10/23/14 11:50
1,1,2,2-Tetrachloroethane			U	ND	ug/L					
1,1,2-Trichloroethane			U	ND	ug/L					
1,1-Dichloroethane			U	ND	ug/L					
1,1-Dichloroethylene			U	ND	ug/L					

QC Summary

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS											
Batch 1429804											
1,2-Dichlorobenzene			U	ND	ug/L				ACJ	10/23/14	11:50
1,2-Dichloroethane			U	ND	ug/L						
1,2-Dichloropropane			U	ND	ug/L						
1,3-Dichlorobenzene			U	ND	ug/L						
1,4-Dichlorobenzene			U	ND	ug/L						
2-Chloroethylvinyl ether			U	ND	ug/L						
Acrolein			U	ND	ug/L						
Acrylonitrile			U	ND	ug/L						
Benzene			U	ND	ug/L						
Bromodichloromethane			U	ND	ug/L						
Bromoform			U	ND	ug/L						
Bromomethane			U	ND	ug/L						
Carbon tetrachloride			U	ND	ug/L						
Chlorobenzene			U	ND	ug/L						
Chloroethane			U	ND	ug/L						
Chloroform			U	ND	ug/L						
Chloromethane			U	ND	ug/L						
Dibromochloromethane			U	ND	ug/L						
Dichlorodifluoromethane			U	ND	ug/L						
Ethylbenzene			U	ND	ug/L						
Methylene chloride			U	ND	ug/L						

QC Summary

Workorder: 359004

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
Volatile-GC/MS											
Batch 1429804											
Tetrachloroethylene				U	ND	ug/L					
Toluene				U	ND	ug/L				ACJ	10/23/14 11:50
Trichloroethylene				U	ND	ug/L					
Trichlorofluoromethane				U	ND	ug/L					
Vinyl chloride				U	ND	ug/L					
cis-1,3-Dichloropropylene				U	ND	ug/L					
trans-1,2-Dichloroethylene				U	ND	ug/L					
trans-1,3-Dichloropropylene				U	ND	ug/L					
**1,2-Dichloroethane-d4	50.0				50.5	ug/L		101	(77%-123%)		
**Bromofluorobenzene	50.0				51.9	ug/L		104	(80%-120%)		
**Toluene-d8	50.0				51.6	ug/L		103	(80%-120%)		
QC1203193550 359022001 PS											
1,1-Dichloroethylene	50.0	U	ND		42.7	ug/L		85.4	(65%-129%)		10/22/14 20:27
Benzene	50.0	U	ND		45.1	ug/L		90.3	(71%-118%)		
Chlorobenzene	50.0	U	ND		43.7	ug/L		87.4	(71%-119%)		
Toluene	50.0	U	ND		44.3	ug/L		88.5	(69%-119%)		
Trichloroethylene	50.0	U	ND		44.6	ug/L		89.2	(68%-130%)		
**1,2-Dichloroethane-d4	50.0		51.4		51.5	ug/L		103	(77%-123%)		
**Bromofluorobenzene	50.0		51.4		48.3	ug/L		96.7	(80%-120%)		
**Toluene-d8	50.0		51.3		49.8	ug/L		99.6	(80%-120%)		
QC1203193551 359022001 PSD											
1,1-Dichloroethylene	50.0	U	ND		43.5	ug/L	1.69	86.9	(0%-20%)		10/22/14 20:55
Benzene	50.0	U	ND		45.5	ug/L	0.838	91	(0%-20%)		
Chlorobenzene	50.0	U	ND		44.9	ug/L	2.64	89.7	(0%-20%)		

QC Summary

Workorder: 359004

Parmname	NOM		Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Volatile-GC/MS												
Batch 1429804												
Toluene	50.0	U	ND		45.2	ug/L	2.01	90.3	(0%-20%)	ACJ	10/22/14	20:55
Trichloroethylene	50.0	U	ND		45.4	ug/L	1.82	90.9	(0%-20%)			
**1,2-Dichloroethane-d4	50.0		51.4		50.8	ug/L		102	(77%-123%)			
**Bromofluorobenzene	50.0		51.4		48.9	ug/L		97.8	(80%-120%)			
**Toluene-d8	50.0		51.3		50.4	ug/L		101	(80%-120%)			

Notes:

The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B The target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- E Concentration of the target analyte exceeds the instrument calibration range
- E General Chemistry--Concentration of the target analyte exceeds the instrument calibration range
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded
- J Value is estimated
- JNX Non Calibrated Compound
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
- N/A RPD or %Recovery limits do not apply.
- N1 See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier

QC Summary

Workorder: 359004

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time

P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
R	Per section 9.3.4.1 of Method 1664 Revision B, due to matrix spike recovery issues, this result may not be reported or used for regulatory compliance purposes.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
UJ	Compound cannot be extracted
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	Other specific qualifiers were required to properly define the results. Consult case narrative.
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test--Particulates passed through the filter, however no free liquids were observed.
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.
d	5-day BOD--The 2:1 depletion requirement was not met for this sample
e	5-day BOD--Test replicates show more than 30% difference between high and low values. The data is qualified per the method and can be used for reporting purposes
h	Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
16-OCT-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
IC	EPA 300.0	Liquid	AGES
Batch ID:	**Sample Numbers:**		
1427777	See Below		

Potentially affected work order(s)(SDG): 359004

Application Issues:

Failed Recovery for MS/PS

Specification and Requirements Exception Description:	DER Disposition:
1. Failed Recovery for MS/PS: QC 1203188652(MW-6)PS	1. The PS failed required acceptance limits for Chloride and Sulfate due to matrix interference. Of the remaining anions in the PS, several met required acceptance limits. This failure is attributed to the matrix of the sample because the successful recovery of the other compounds indicate that the laboratory process was in control. This variance is judged to have no negative impact on the data. The deviation is noted in the Case Narrative and DER, and the data has been reported.

Originator's Name:

Rachael Bell 16-OCT-14

Data Validator/Group Leader:

Thomas Lewis 29-OCT-14

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
17-OCT-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
ICP	SW846 3005/6010B	Liquid	AGES
Batch ID:	**Sample Numbers:**		
1427727	See Below		

Potentially affected work order(s)(SDG): 359004

Application Issues:

Failed RPD for DUP

Specification and Requirements Exception Description:	DER Disposition:
1. Failed RPD for DUP: QC 1203188498(MW-6)DUP	1. The sample and sample duplicate % RPD failed outside the control limits for zinc due to possible sample non-homogeneity and/or matrix interference.

Originator's Name:

Travis Tola 17-OCT-14

Data Validator/Group Leader:

Jerry Wigfall 29-OCT-14

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
21-OCT-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
LACHAT Flow Injection Analyzer	EPA 353.2 Low Level	Liquid	AGES, NCSW
Batch ID:	**Sample Numbers:**		
1426796	See Below		

Potentially affected work order(s)(SDG): 358841,359004,359258

Application Issues:

Failed Recovery for MS/PS

Specification and Requirements Exception Description:	DER Disposition:
1. Failed Recovery for MS/PS: QC 1203186170PS	1. The spike recovery falls outside of the established acceptance limits due to matrix interference.

Originator's Name:

Kristen Parson 21-OCT-14

Data Validator/Group Leader:

Aubrey Kingsbury 22-OCT-14

DATA EXCEPTION REPORT

Mo.Day Yr.	Division:	Quality Criteria:	Type:
22-OCT-14	Industrial	Specifications	Process
Instrument Type:	**Test / Method:**	**Matrix Type:**	**Client Code:**
MERCURY	SW846 7470A	Liquid	AGES, BRKL, CRPS, DMAX,
Batch ID:	**Sample Numbers:**		
1429266	See Below		

Potentially affected work order(s)(SDG): 358689,358711,358807(W5128),359004,359125(35261),359282,359302,359326,359344,359360(X410157),359376

Application Issues:

Failed Recovery for MS/PS

Failed Recovery for MSD/PSD

Specification and Requirements Exception Description:	DER Disposition:
1. Failed Recovery for MS/PS: QC 1203192223MS 2. Failed Recovery for MSD/PSD: QC 1203192225MSD	1/2. The matrix spike and matrix spike duplicate recovery failed outside of the control limits for mercury. The post spike passed the required control limits. This verifies the absence of a matrix interference.

Originator's Name:
Monifa Basdeo 22-OCT-14

Data Validator/Group Leader:
Jamie Johnson 23-OCT-14

Page: 1 of 1
Project #:
GEL Quote #:
COC Number (1):
PO Number:

GEL Chain of Custody and Analytical Request

GEL Work Order Number: 359004

GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Phone: (843) 556-8171
Fax: (843) 766-1178

Client Name: Atlantic GeoScience Ltd Phone #: 910 612 4853
Project/Site Name: Green Recycling Solutions Fax #:
Address: Hwy 17 Mayesville NC
Collected by: R. Smithwick Send Results To: Atlantic Geoscience

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample ID (* For composites - indicate start and stop date/time)	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (2)	Field Filtered (3)	Sample Matrix (4)	Radioactive	TSCA Regulated	Total number of containers	BOD	TSS	TDS	Mg/Ca	COD	NO_2+NO_3	TOC	VOA	Anions	F, Cl, S	Comments Note: extra sample is required for sample specific QC
									<-- Preservative Type (6)										
MW-6	10-14-14	1250	N	N	W				X	X	X	X	X	X	X	X	X	X	

TAT Requested: Normal: X Rush: Specify: (Subject to Surcharge) Fax Results: Yes / No Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4

Remarks: Are there any known hazards applicable to these samples? If so, please list the hazards

Sample Collection Time Zone: Eastern Pacific Central Other _____ Mountain

Chain of Custody Signatures

Relinquished By (Signed)	Date	Time	Received by (signed)	Date	Time
1 Rudy Smithwick	10-14-14	2:10 PM	[illegible]	10/14/14	14:10
2			[illegible]	10-15-14	0920
3					

Sample Shipping and Delivery Details

GEL PM:
Method of Shipment: Date Shipped:
Airbill #:
Airbill #:

For Lab Receiving Use Only
Custody Seal Intact? YES NO
Cooler Temp: 2 C

1.) Chain of Custody Number = Client Determined
2.) QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite
3.) Field Filtered: For liquid matrices, indicate with a - Y - for yes the sample was field filtered or - N - for sample was not field filtered.
4.) Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Fecal, N=Nasal
5.) Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).
6.) Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thiosulfate, If no preservative is added = leave field blank

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: AGES	SDG/AR/COC/Work Order: 359004
Received By: DH	Date Received: 10-15-14

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?		✓	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM
Classified Radioactive II or III by RSO?		✓	If yes, Were swipes taken of sample contatiners < action levels?
COC/Samples marked containing PCBs?		✓	
Package, COC, and/or Samples marked as beryllium or asbestos containing?		✓	If yes, samples are to be segregeated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?		✓	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?		✓	

	Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	✓			Preservation Method: Ice bags Blue ice Dry ice None Other (describe) *all temperatures are recorded in Celsius 2°C
2a	Daily check performed and passed on IR temperature gun?	✓			Temperature Device Serial #: 130462962 Secondary Temperature Device Serial # (If Applicable):
3	Chain of custody documents included with shipment?	✓			
4	Sample containers intact and sealed?	✓			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5	Samples requiring chemical preservation at proper pH?	✓			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6	VOA vials free of headspace (defined as < 6mm bubble)?	✓			Sample ID's and containers affected:
7	Are Encore containers present?			✓	(If yes, immediately deliver to Volatiles laboratory)
8	Samples received within holding time?	✓			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	✓			Sample ID's and containers affected:
10	Date & time on COC match date & time on bottles?	✓			Sample ID's affected:
11	Number of containers received match number indicated on COC?			✓	Sample ID's affected: 11 Containers Received
12	Are sample containers identifiable as GEL provided?	✓			
13	COC form is properly signed in relinquished/received sections?			✓	COC not Relinquished
14	Carrier and tracking number.	✓			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other 4158 9570 7690

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JR Date 10/15/14 Page 1 of 1

GL-CHL-SR-001

List of current GEL Certifications as of 29 October 2014

State	Certification
Alaska	UST–110
Arkansas	88–0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH–0169
Delaware	SC000122013–10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330–12–00283, P330–12–00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013–10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C–SC–01
Kansas NELAP	E–10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M–SC012
Michigan	9976
Mississippi	SC000122013–10
Nebraska	NE–OS–26–13
Nevada	SC000122014–1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68–00485
Plant Material Permit	PDEP–12–00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235–14–9
Utah NELAP	SC000122014–16
Vermont	VT87156
Virginia NELAP	460202
Washington	C780–12
Wisconsin	999887790

APPENDIX 3-
Environmental Monitoring Reporting Form

DENR USE ONLY: ☐ Paper Report ☐ Electronic Data - Email CD (data loaded: Yes / No) Doc/Event #:

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Atlantic Geoscience, Ltd.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Rudy Smithwick, P.G. Phone: 910-612-4853

E-mail: AtlanticGeoscience@hotmail.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Green Recycling Solutions-CDLF	11710 Hwy 17 North Mayesville, NC 28555	Phase I, Cell 1A	.0539	October 10th and 14th, 2014

Environmental Status: (Check all that apply)

☒ Initial/Background Monitoring ☐ Detection Monitoring ☐ Assessment Monitoring ☐ Corrective Action

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☐ Surface water monitoring data
☐ Methane gas monitoring data
☐ Corrective action data (specify) _____
☐ Other(specify) _____

Notification attached?

☒ No. No groundwater or surface water standards were exceeded.
☐ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Rudy A.Smithwick, P.G. President 910-612-4853

Facility Representative Name (Print) Title (Area Code) Telephone Number

Rudy A Smithwick 1-25-15

Signature Date

Affix NC Licensed/ Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 866 GEOLOGIST RUDY A. SMITHWICK 1-25-15

Facility Representative Address

Atlantic Geoscience, Ltd. 8633 Vintage Club Drive, Wilmington,NC 28411

NC PE Firm License Number (if applicable effective May 1, 2009)

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