Fac/Perm/Co ID #	Date	Doc ID#
56-03	12/11/12	17916

RJN
Environmental, Inc.

34888 Garfield
Fraser, Michigan 48026
Phone: 586-872-2416
Fax: 586-879-0176

December 10, 2012

Mr. Allen Gaither
North Carolina Department of Environment and Natural Resources
Asheville Regional Office
Division of Waste Management - Solid Waste Section
2090 U.S. Highway 70
Swannanoa, NC 28778

Re: Submission of Closure and Post Closure Plan and the
Soil Erosion and Sedimentation Control Plan, attached as Appendix A
Old Fort Landfill - 1240 Parker Padgett Road, Old Fort, North Carolina
Permit 56-03
RJN Project 010057.01

Dear Mr. Gaither:

On behalf of IAC Group North America, RJN Environmental, Inc. (RJN) is pleased to present this copy of the Closure and Post Closure Plan for the Old Fort Landfill, at 1240 Parker Padgett Road, in the City of Old Fort, McDowell County, North Carolina. The Soil Erosion and Sedimentation Control Plan is included as Appendix A.

If you have any questions or comments regarding this document, please contact Robert Nowakowski at 248-219-9228, at your earliest convenience.
Sincerely,

RJN Environmental, Inc.

Robert J. Nowakowski, CPG
Principal Geologist

Attachments

cc: Patrick Kresnak, IAC
Ms. Kristen Hicklin, NCDNR

CLOSURE
AND
POST-CLOSURE PLAN

OLD FORT LANDFILL
PERMIT #56-03
1240 PARKER-PADGETT ROAD
OLD FORT,
MCDOWELL COUNTY,
NORTH CAROLINA

Prepared for:

IAC Group North America
28333 Telegraph
Southfield, MI 48034

Attn: Mr. Patrick Kresnak

Prepared by:

Robert J. Nowakowski, CPG
RJN Environmental, Inc.
34888 Garfield Road
Fraser, Michigan 48026

December 10, 2012

TABLE OF CONTENTS

1.0 INTRODUCTION

This plan has been prepared and submitted by RJN Environmental, Inc. (RJN) in compliance with an order issued by the North Carolina Division of Waste Management for the closure of the Old Fort Landfill (Permit #56-03), known as the Collins & Aikman (C & A) Carpet Scrap Landfill and identified in this report as the Subject Site. The Subject Site is located on State Road 1240 just outside of Old Fort, North Carolina. The site was permitted for C & A for the disposal of scrap carpet and backing generated from the C&A Automotive Plant at 1506 E Main Street, Old Fort, North Carolina.

The Subject Site was operated exclusively by Collins & Aikman. Upon transfer of the landfill ownership from C & A to International Automotive Components (IAC), the landfill use was discontinued. The landfill use was initiated by C&A in 1982 and terminated in 2005. The landfill was operated in three phases as indicated on Figure 2 - Site Plan. The original landfilling operations (Phase I) were along the central west portion of the Subject Site. Phase I was operated from early 1982 to late 1982. Phase 2 was operated from late 1982 to 1985, south of the drainage feature along the central eastern portion of the Subject Site. From 1985 through 2005, the remaining operations, known as Phase 3, were located over the drainage feature north of Phase 2. There has been no landfilling since 2005. The entire site has an area of approximately 86 acres while the landfill proper is approximately 12 acres in size.

1.1 Purpose

The purpose of this document is to present a Closure Plan for the C&A Landfill for IAC and the NCDENR. Upon sale of the Subject Site from C&A to IAC, the landfill use was discontinued. Due to this, IAC is taking the steps necessary to close the landfill. The closure plan contained herein complies with 15A NCAC 13B.1627 - Rules .0505(3)(c), .0505(4), .0505(5)(c), .0505(6)(a), .0601, and .0602.

1.2 Contact Information

The following is the contact for the closure and post closure activities.

Robert Nowakowski, CPG
Principal Geologist (Project Manager for Closure-Post Closure)
RJN Environmental, Inc.
34888 Garfield Road
Fraser, MI 48026 USA

Email: rjn@rjnenv.com
Phone 586-872-2416
Mobile 248-219-9228
Fax 586-879-0176

2.0 CLOSURE DESIGN

2.1 Development Concept

The closure plan for the Old Fort Landfill was developed primarily to minimize erosional degradation of the proposed cap. As was demonstrated in earlier studies, due to the inert nature of the contents of the landfill, leachate is not present nor expected to be produced in the long term future. The cap is proposed to be completed through placement of a cover engineered from materials available on-site, which will reduce the potential impact to surface water and groundwater. These materials are stockpiled in the northeast corner of the landfill and were derived from the stripping of the site to create the original depression for the landfill.

Note that the oldest area of the landfill is Phase 1, which is currently completely vegetated with local species of trees and grasses. Many of the trees have grown to a diameter of 4 to 6-inches. It is the opinion of RJN that it is unnecessary to clear the vegetation from Phase 1 only to place another cap over the top. As a result, RJN is proposing to cap only Phase 2 and Phase 3.

The closure design was developed from site-specific conditions, availability of materials at the Subject Site, understanding of the past operating procedures of the site, and the type of waste in the landfill. Closure of the site will include the following activities.

- Placement of a soil cap in accordance with Subsection 2.3 of this document and as shown on the attached figures, Figure 2 and Figure 4.

and

- The seeding and fertilizing of the site in accordance with the seeding specifications described in the Soil Erosion and Sedimentation Control (SESC) Plan included as A.

The principal goals for the closure plan are as follows:

- To minimize infiltration and to provide a cover system suitable for development of a grass crop that will prevent erosion and infiltration.

2.2 Site Preparation and Regrade

Grading of the landfill material will be performed prior to cap placement to ensure proper drainage as required. Specifically, Phase 2 is 20-feet topographically higher than Phase 3. Due to this, separate caps will be constructed over Phase 2 and Phase 3, respectively. There will be a drainage swale constructed between the caps for Phase 2 and Phase 3. This will result in a reduction of the stormwater stress to the southern end of the Subject Site.

2.3 Cap Placement

The final cover will be, at a minimum of two feet thick as required by Rule 15A NCAC 13B.1627.0505(3)(c). The final cover system from bottom to top will consist of at least 18 inches of compacted soil overlain by 6 inches of vegetative soil capable of sustaining plant growth. Capping material will be obtained from locally available soil. Grading of the material will be performed to achieve a minimum 5 percent and a maximum 33 percent grade along the landfill sideslopes. Prior to placement of the 6-inch layer of vegetative soil, a surveyor will check the elevations to assure that the proper grades exist, and that there are no low areas or depressions within the cap that would collect surface water.

The 6-inch layer of vegetative soil will be consistent with local topsoil material and free of frozen material, debris, trash, stumps, rocks, and roots. Application of seed, lime, fertilizer, and mulch will be in accordance with the engineering specifications included in the SESC Plan, Appendix A.

Dust control measures including spraying with water mist will be instituted as necessary to minimize airborne dust emissions on the site.

2.4 Site Seeding

All areas disturbed during placement of the final cover system will be seeded as required by Rule 15A NCAC 13B.1627.0505(6)(a). Seeding will normally occur between March 1 and October 15. All site grading and surface water runoff control structures such as drainage ditches and culverts will be constructed prior to seeding. The top layer of soil will be loosened by raking, discing, or other acceptable means before seeding. Lime and fertilizer will be applied to areas prior to seeding. Application rates for lime and fertilizer will follow the engineering specifications in the SESCP, or, as needed based on testing. The seed will be applied uniformly with a cyclone seeder, drilled, cultipack seeder, or hydroseeder. The seeds shall not be planted if there is a danger of frost shortly after seed germination. Maximum seeding depth is 1- inch when using methods other than hydroseeding. Wood fiber, cellulose mulch, or hay mulch will be spread uniformly upon completion of the seedbed preparation, liming, fertilization, and seeding. The mulch may be anchored in-place by uniformly applying an acceptable mulch binder such as Curasol or Terr-Tac. If germination is unsuccessful (less than 75 percent catch) within 30 days of seeding, or there is unsatisfactory catch in the next year, the appropriate areas of the site will be re-seeded in accordance with the seeding specifications contained herein.

2.5 Quality Assurance / Quality Control Program

The capping of the landfill will begin in the late fall to early winter of 2012 (contingent upon regulatory approval and weather conditions). IAC will utilize qualified personnel familiar with the various aspects of landfill design and closure, to serve as their on-site representative during closure of the site. The on-site representative will provide observation of the proposed closure activities and will be responsible for quality control enforcement and construction documentation

at the site. Services of a general contractor will be procured through a competitive bid process. Bid packages for the solicitation of construction services will require the contractor to be responsible for supplying the required labor, material, equipment and insurance for the installation of the final closure system and to demonstrate familiarity and experience with the various aspects of landfill construction.

2.5.1 Soil QA / QC

The soil materials to be used for the landfill are stockpiled on-site, northeast of the landfilled area. These materials were derived from the original construction of the landfill by stripping the overburden down to bedrock. This material was designated at the time of construction for the future cap. This material was pre-determined to compact well, and to support vegetation. As a result, QA/QC testing of this material is not deemed necessary.

2.5.2 Weekly Inspection Reports

Weekly inspection reports will be prepared by the owners representative during the closure of the landfill. The reports will include material test results, summary of contractor submittals, summary of weekly progress and progress made to date, and anticipated work items for the following week. Copies of the reports will be provided in the construction certification report.

2.5.3 Photographic Documentation.

To provide documentation of the landfill closure, photographs will be taken periodically of the closure construction. Copies of the photographs will be provided in the construction certification report.

2.5.4 Record Drawings

Upon completion of the landfill closure, a set of as built drawings will be prepared for the facility. The drawings will be submitted to the NCDENR within 30 days of closure completion.

2.5.5 Final Construction Certification and Report.

A final construction report will be submitted to the NCDENR within 30 days following the completion of closure construction at the landfill. The report will include written certification signed by the site representative, that the site has been closed in accordance with the requirements listed in 15A NCAC 13B Rule .0510.

2.6 Leachate and Gas Management

Leachate is primarily generated at the landfill site through precipitation falling onto and infiltrating into the landfill. However, it has been demonstrated in the June 7, 2011 Final Investigation Report, that there is no leachate being generated at the Subject Site. This is consistent with the nature of the materials landfilled, that is, carpet pieces, fibers and plastic

backing. As a result, there will be no leachate collection system incorporated into the final cover system.

The generation of gas and associated odors is not a concern at the site therefore; no gas management/venting system will be incorporated into the final cover system.

2.7 Storm Water Management/Erosion Control

Erosion and sediment control measures will be implemented as required by Rule 15A NCAC 13B.1627 .0505(4). To design the necessary surface water control structures, storm water runoff calculations for the site were performed utilizing the methodology outlined by the USDA Soil Conservation Service's (SCS) Technical Release No. 55 (TR-55, Urban Hydrology for Small Watersheds, June 1986 Revision). A 10-year/24-hour Type II storm with average Antecedent Runoff Conditions was used to calculate the runoff characteristics of the appropriate drainage areas. Refer to the attached SESC Plan.

Erosion control measures, including the use of hay bales, bark mulch sediment barriers, and sediment traps will be implemented. In addition, the following erosion control procedures will be followed during closure construction operations and after site closure has been completed.

- Removal of trees, brush, and other vegetation, as well as disturbance of existing soil cover, will be kept to a minimum during site closure. There may be some tree removal along the southern edge of the landfill to obtain proper cap grading.

- Acceptable existing topsoil will be stripped and stockpiled for reuse as final cover. Topsoil suitable for reuse will be stockpiled on-site in a manner that natural drainage is not obstructed and no off-site sediment damage will result.

- During grading operations, the site will be brought to approximate finish grades and stabilized without extended delays. This includes the application of mulch to all surfaces designated to be revegetated.

- Erosion and sediment control measures such as hay bales will be installed as shown and/or adjusted to suit construction immediately after a cut or fill slope has been created.

- Hay bales will be inspected after prolonged rainfall events and repairs made as necessary. Sediment deposits will be periodically removed from the upstream side of the silt areas. This sediment will be spread and stabilized in areas of the site not subject to erosion. Hay bales will be replaced as necessary to provide proper filtration action.

- Immediately following the final grading of the landfill cap all graded or disturbed areas will receive 6 inches of topsoil and will be seeded to provide a permanent vegetative cover.

2.8 Design Plans and Technical Specifications

Design plans showing the landfill's existing site topography, proposed grading plans (elevations and sideslopes), design details, and landfill cross-sections are contained within the SESC as Appendix A.

3.0 LONG TERM (POST CLOSURE) MAINTENANCE

The subsections that follow describe the various activities that must be done to insure the long-term integrity of the landfill subsequent to final closure.

The following is the contact for the post closure activities.

Robert Nowakowski, CPG
Principal Geologist (Project Manager for Closure-Post Closure)
RJN Environmental, Inc.
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fax - 586-879-0176

3.1 Mowing

Normally in a landfill closure, to prevent deep-rooted tree growth, the closed portions of the landfill and drainage ditches would be mowed twice annually at a minimum. However, in this case, mowing will not occur to allow for the growth of trees. The trees will significantly stabilize the landfill cap. In this case, the inert materials present in the landfill allow for such an unique approach.

3.2 Site Inspections

Closed areas will be inspected quarterly to insure the cover system integrity is maintained against erosion and other problems. The inspection will include an examination of the following items:

- surface drainage ways
- surface grading
- grass growth

Each inspection will include notation of any problems and recommended remedial actions; please refer to Table 1 for maintenance inspection checklist. Following the receipt of a closure letter from NCDENR, an inspection frequency of twice per year will be instituted unless major problems develop, whereupon inspections that are more frequent will be made.

3.3 Ground and Surface Water Monitoring

3.3.1 Introduction

The site will be monitored in a manner that protects human health and the environment by monitoring the quality of upgradient and downgradient groundwater. The monitoring plan also provides the mechanism for assessment.

3.3.2 Relevant Points of Compliance

For ground water the compliance boundary, as defined by 2L .0107 (b), shall be established no more than 250 feet from the waste boundary, and shall be 50 feet within the property (facility) boundary, whichever is closer to the source. The compliance monitoring points for the site are depicted on Figure 5 and are represented by the existing groundwater monitoring wells, MW-2, MW-3 and MW-4 (downgradient) and MW-1 and MW-1A (upgradient).

For surface water, the compliance monitoring points for the site is depicted on Figure 5 and is represented by the surface water sampling locations, SW-1 through SW-4.

The schedule for monitoring is annual samples obtained in October of each year. The monitoring wells were designed and constructed in accordance with the specifications in the North Carolina Well Construction Standards, Rule 15A NCAC 2C .0108.

3.3.3 Field Sampling

Only experienced field personnel will conduct site-sampling activities. A copy of the sampling plan will be provided to the sampling team and will be reviewed by the sampling team prior to each sampling event. Personnel will wear sterile, disposable latex or nitrile gloves during all groundwater sampling activities. At a minimum, the gloves will be replaced at each sample location. New, disposable Teflon sampling bailers will be used wherever possible.

Groundwater sampling involves three general tasks:

- The measuring of the static water level and well depth to calculate the volume of water in the well
- Properly purging the appropriate well volume to ensure a sample representative of the aquifer is obtained; and
- Collecting, preserving and handling the groundwater samples prior to receipt by the laboratory in a way that maintains sample integrity.

There is no demonstrated impact to the aquifer as a result of the operation of the landfill,

however, per industry standards, sampling order will still consist of initiating the upgradient wells followed by the downgradient wells, i.e, MW-1A, MW-1, MW-4, MW-3 and MW-2.

3.3.4 Well Sampling Procedures

The initial step is to measure the water level and the depth of the well before purging. This will be accomplished by lowering an electrical water level indicator into the well until is touches the water and measures a response. The water level measurements shall be taken to the nearest 0.01-foot. The water level indicator will be thoroughly decontaminated before and between each well. Each well will have a referenced point from which its water level measurement is taken. The reference point shall be established in relation to a permanent benchmark, as mean sea level (MSL), and the survey shall note the well location. Water level elevations will be measured within a 24-hour period of the day that the samples are collected.

The monitoring wells shall be purged before taking samples in order to clear the well of stagnant water, which is not representative of aquifer conditions. Depending on the stability of pH and conductivity readings, three or more borehole volumes of groundwater in casing shall be withdrawn prior to sample collection. The volume of water present in each well shall be computed using the length of water column and monitoring well inside diameter. Purging the wells will be achieved by using a bailer. The water collected by bailing will be emptied into a graduated 5-gallon bucket to compute total purge volume. The sampler will monitor field parameters (pH, specific conductance, and temperature) periodically during purging process. When purge volume is equal to three casing volumes, and when field parameters are within plus or minus five percent (±5%) over successive readings, the well is ready for sampling.

3.3.5 Sample Collection and Parameters

Following well purging, the wells will be allowed to recharge prior to obtaining samples. Historical results indicate recharge generally occurs within 15 minutes. The parameters for analysis will consist total metals including mercury, arsenic, barium cadmium, lead, selenium, and silver (Table 2). In addition, collected field parameters will include pH, conductivity, temperature, and turbidity.

Non-filtered samples will be used for analysis reported to the Division of Waste Management. The samples will be collected on an annual basis for five years. After the five-year period the need for continued groundwater sampling and analysis will be reevaluated by the Division of Waste Management.

3.3.6 Chain of Custody Procedures

By the use of chain-of-custody procedures, the handling of samples will be traceable from the time of collection to the time of final sample disposition. In general, the field sampling personnel will be responsible for collecting the samples and for logging the samples into assigned field notebooks and the field-sampling log. The field sampling personnel will

complete and verify the Chain-of-Custody forms. The laboratory sample custodian and analysts will be responsible for custody of samples at the laboratory.

Prior to collecting samples in the field, the sampling personnel will obtain the sample bottles necessary for sampling. Field samplers will label each sample collected, filling in the appropriate information in waterproof ink. Field personnel will record the sample number, date and time of sample collection, personnel involved, type of sample, type of analysis to be performed, type of containers filled, volume of sample collected, and preservative used. Chain-of-Custody forms will accompany sample containers to document the transfer of the containers and samples from the originating laboratory, through the field collection, and to the laboratory receiving the samples for analyses. A sample container is under custody in the field if any one of the following conditions exists:

- It is in the field investigator's actual possession;
- It is in the field investigator's view, after being in his/her physical possession;
- It was in the field investigator's physical possession and then she/he secured it to prevent tampering; and
- It is in a secure area restricted to authorized personnel only.

A self-adhesive sample label will be affixed to each sample bottle before sample collection. At a minimum, the sample label will contain the following:

- Client - Job Name/Project Number
  Sample Identification
  Date and Time Collected (except for duplicate samples)
  Sampler's Signature (or initials)
  Preservatives Added

The field sampling personnel will complete and verify the Chain-of-Custody forms. A copy of the Chain-of-Custody will be placed in the project files and the original will accompany the shipped samples. The field technician will retain a copy of the overnight shipping label, which will be placed into the project files. Overnight carrier shipping label numbers will be included on the Chain-of-Custody form at the bottom along with the company name of the carrier. The identity of field duplicate samples will not be disclosed to the analytical laboratory.

For shipment to the laboratory, shipping containers will be sealed and accompanied by the Chain-of-Custody record, with appropriate signatures. The transfer of custody is the responsibility of the field sampling personnel and the laboratory. Upon receipt by the laboratory, a sample custodian will inspect the condition of the samples, reconcile the sample(s) received against the Chain-of-Custody record, log in the sample(s) in the laboratory log book, and store the sample(s) in a secured sample storage room or cabinet until assigned

to an analyst for analysis.

3.3.7 Analytical Methods

The laboratory performing the analyses shall use the methods specified in Table 2. The record of groundwater analyses shall include the methods used (by number), the extraction date, and the date of actual analysis. Any deviation from an EPA approved method shall be adequately tested to ensure that the quality of the results meets the performance specifications (e.g., detection limit, sensitivity, precision, accuracy) of the reference method. A planned deviation shall be justified and submitted for approval by North Carolina Division of Waste Management.

3.3.8 Sample Handing and Analysis

Sample containers, preservation methods and holding times that meet US EPA, standards will be used. New containers will be used. Sample bottles for metal analyses will be treated with nitric acid prior to sample collection. Samples for metals analysis will be checked for pH when collected and when they arrive in the laboratory. Additional preservatives will be added if the pH requirements for preservation are not met. If additional preservative is added at the laboratory, these procedures will be documented on the chain-of-custody form for the samples and the logbook.
For delivery of samples to the laboratory, the follow procedure will be implemented

Step Procedure

1 Collect, preserve and seal the samples as outlined in this plan.

2 Place sample containers in laboratory shipping container(s). Samples will be packed securely with packing material to protect sample containers from accidental breakage during shipment and so that the samples do not leak or spill. If necessary, the samples will be packed in vermiculite, inside garbage bags, to absorb the liquids if a jars) breaks.

3 Fill shipping container with enough ice and/or frozen ice-packs to last the trip. Place ice/ice packs around sample containers.

4 Complete the chain-of-custody forms.

5 Tape chain-of-custody form to the inside of the shipping container lid

6 Seal shipping container.

7 Deliver or ship to the laboratory. Fastest available shipping methods will be used whenever required by short holding times or project scheduled.

3.3.9 Field Analytical Techniques

With any field analytical measurement, the equipment used must be suitable for the analytical method to be made and properly calibrated. In addition, field analysis must be conducted on a sample that is considered representative of the source from which it was collected.

3.3.10 Quality Assurance / Quality Control Plan

To assess and verify the performance of the field sampling and laboratory techniques, blank samples, and duplicate samples will be collected and submitted for laboratory analyses

Blanks will consist of a trip blank, field blank, and/or an equipment blank as circumstances require during each sampling round. Equipment blanks will only be necessary if certified disposable equipment is not used to sample the groundwater and surface water.

3.3.11 Groundwater/Surface Water Sampling - Maintenance Monitoring Report

As indicated earlier, initially, Site Inspections will be conducted quarterly, while groundwater monitoring will be conducted yearly (in October of each year). The Quarterly Inspections and Yearly Groundwater / Surface Water Monitoring will be documented in a yearly "Groundwater/Surface Water Sampling and Maintenance Monitoring Report". This report will be submitted to the NCDENR the first week of December of each year. This report will include the following:

For the groundwater and surface sampling, the report will include:

- Description of the scope-of-work of the groundwater / surface water sampling. Includes a description of sampling techniques and chain-of-custody procedures;
- Figure indicating the sampling locations and calculated groundwater flow direction;
- Tables including the field sampling parameters and historical analytical data;
- Analytical data sheets.

For the quarterly landfill inspections, the report will include:

- A description of procedures utilized to inspect the landfill;
- A description of the results of the inspection by quarter;
- A description of repairs made to the landfill;

- Photo-documentation of the inspection and repairs;
- Tables utilized for the quarterly inspection.

4.0 FINANCIAL ASSURANCE

The section describes the approximate costs associated with the Closure and the Post-Closure of the Old Fort Landfill per Rule .1628 of 15A NCAC 13B.1629. The estimated costs are based on preliminary bids obtained by RJN in November 2011.

4.1 Cost Estimate for Closure of Old Fort Landfill

In order to approximate costs associated with the Closure of the Old Fort Landfill, RJN obtained bids from four private contractors, all capable of completing the workload required of this closure. Based on these bids, RJN is estimating that the construction of proper drainage and the capping of the landfill can be completed for an estimated $785,000. The breakdown of this estimate is illustrated below:

Labor	
Access road improvement	$ 46,700
Construction of Silt Control Measures	$ 14,700
Modify existing ditch along access road	$ 6,600
Install perimeter trench	$ 23,750
Capping of landfill	$ 100,800
Fill in existing sediment basin	$ 7,750
Install drainage features	$ 50,000
Materials	
Rip rap	$ 96,250
Landscaping fabric	$ 0
Pea stone	$ 99,000
Topsoil and seed	$ 49,000
Miscellaneous materials including piping	$ 100,000
Supervision	
Geological Supervision and QA/QC	$ 50,000
Administration, reporting	$ 30,000
Unplanned contingencies	
25 % contingency	$ 150,000
TOTAL	**$ 784,550**

Upon completion and approval of the Closure Plan, the selected contractor will submit a final bid for the approved Closure Plan.

4.2 Cost Estimate for Post Closure of Old Fort Landfill

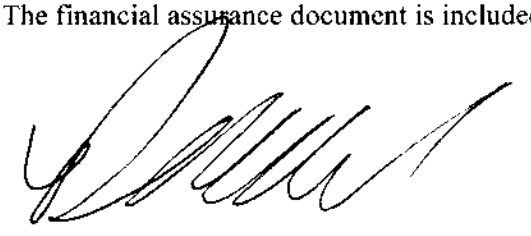
As indicated earlier in this document, RJN has proposed quarterly inspections of the landfill

and yearly groundwater / surface water monitoring. The costs for these tasks are outlined below and are indicated at approximately $10,000 per year.

1.	Inspections / record keeping	$ 1,000 per year
2.	Yearly GW/ Surface water monitoring	$ 4,000 per year
3.	Maintenance	
	– preventative and corrective for cover and drainage	$ 5,000 per year

4.3 Financial Assurance

The financial assurance document is included in the SESC Plan, Appendix A.



Robert Nowakowski, CPG
RJN Environmental Inc.

FIGURES

FIGURE 1 – SITE LOCATION MAP
OLD FORT LANDFILL
1240 PARKER-PADGETT ROAD,
OLD FORT, NORTH CAROLINA

PROPOSE NORTH CHANNEL DETENTION BASIN APPROXIMATE DIMENSION: 120'Lx60'WX4'D 12" OULET RISER, 6" ORIFICE, 8' WEIR LENGTH

NOTE: PROPOSED CONTOURS IN EXISTING BORROW AREA ARE APPROXIMATE.

EXISTING 18" C.M.P.

EXISTING SEDIMENTATION BASIN

PROPOSED PHASE 3 DETENTION BASIN APPROXIMATE DIMENSION: 120'Lx65'Wx4'D 12" OUTLET RISER, 6" ORIFICE, 8' WEIR LENGTH

EXISTING 18" C.M.P.

EXISTING SEDIMENTATION BASIN

EXISTING 36" C.M.P.

EXISTING SEDIMENTATION BASIN

EXISTING FLOW PATH

EXISTING 24" C.M.P.

EXISTING BORROW STOCKPILE AREA DISTURBED AREA: 4.74AC

EXISTING PHASE 3 DISTURBED AREA: 3.19 APPROX. FILL DEPTH: 2'

EXISTING BORROW LIMITS

PROPOSED PHASE 3 GRASS LINED CHANNEL DIMENSION: TRAPEZOIDAL SHAPED BOTTOM WIDTH 8' TOP WIDTH 12' DEPTH 1'

EXISTING PHASE 3 LIMITS

PROPOSED PERIMETER DRAIN

PROPOSED PHASE 2 DETENTION BASIN APPROXIMATE DIMENSION: 63'Lx20'Wx2.8'D 12" OULET RISER, 4" ORIFICE, 2' WEIR LENGTH

PROPOSED PHASE 2 GRASS LINED CHANNEL DIMENSION: TRAPEZOIDAL SHAPED BOTTOM WIDTH 3' TOP WIDTH 5' DEPTH 0.5'

EXISTING PHASE 2 DISTURBED AREA: 2.6AC APPROX. FILL DEPTH: 2'

EXISTING PHASE 2 LIMITS

N

SCALE: 1" = 60'

MAINTENANCE REQUIREMENTS FOR EACH MEASURE ARE OUTLINED IN THE SOIL EROSION AND SEDIMENTATION CONTROL PLAN (MAY 2012)

MAINTENANCE CONTACT
STEPHEN DAVIS
PLANT ENGINEER
IAC GROUP NORTH AMERICA
1506 E MAIN STREET
OLD FORT, NC 28762
P: (828) 668-3342
F: (828) 668-3254
E: sdavis@iacna.com

- 6.02 LAND GRADING
- 6.03 SURFACE ROUGHENING
- 6.04 TOPSOILING
- 6.06 TEMP. GRAVEL CONTS. ENTER/EXIT
- 6.11 PERMANENT SEEDING
- 6.14 MULCHING
- 6.15 RIPRAP
- 6.21 PERMANENT DIVERSIONS
- 6.30 GRASS-LINED CHANNELS
- 6.31 RIPRAP-LINED CHANNELS
- 6.41 OUTLET STABILIZATION STRUCTURE
- 6.55 ROCK PIPE INLET PROTECTION
- 6.61 SEDIMENT BASIN
- 6.62 SEDIMENT FENCE
- 6.63 ROCK DAM
- 6.83 CHECK DAM
- 6.84 DUST CONTROL
- PROPOSED CONTOURS
- EXISTING CONTOURS

SITE CHARACTERISTICS
OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA
LOCATED IN CATAWBA RIVER BASIN
TOTAL AREA OF SITE: 85.25 AC (COUNTY GIS)
TOTAL AREA OF DISTURBANCE: 10.53 AC (COUNTY GIS)
SITE DRAINAGE OUTLET: BREVARD CREEK
MAJOR RECEIVING WATERS: CATAWBA RIVER, LAKE TAHOMA

SOILS FOUND ONSITE
EVARD-COWEE COMPLEX, HAYESVILLE CLAY LOAM
(DETAILS IN SESC REPORT, MAY 2012)

BY	MARK	REVISIONS	DATE

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OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

SOIL MAP

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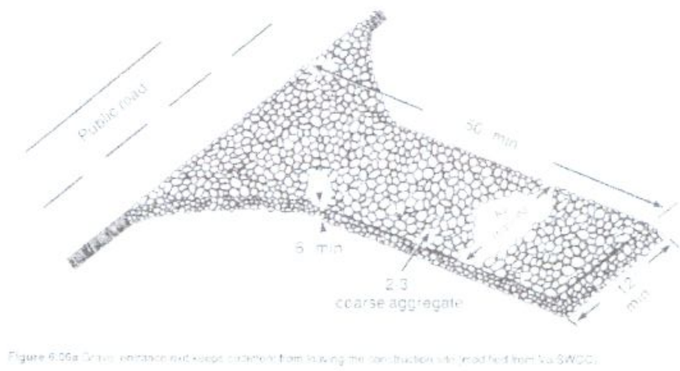
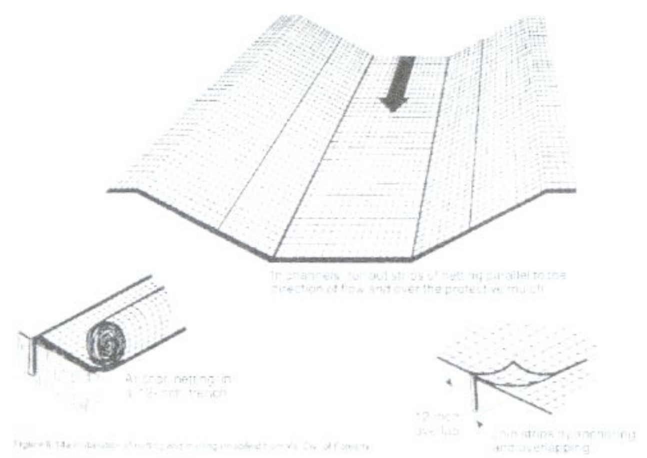
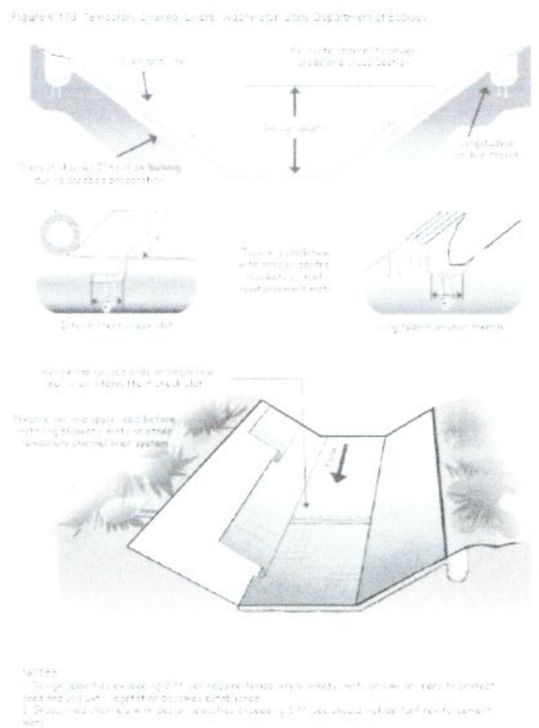
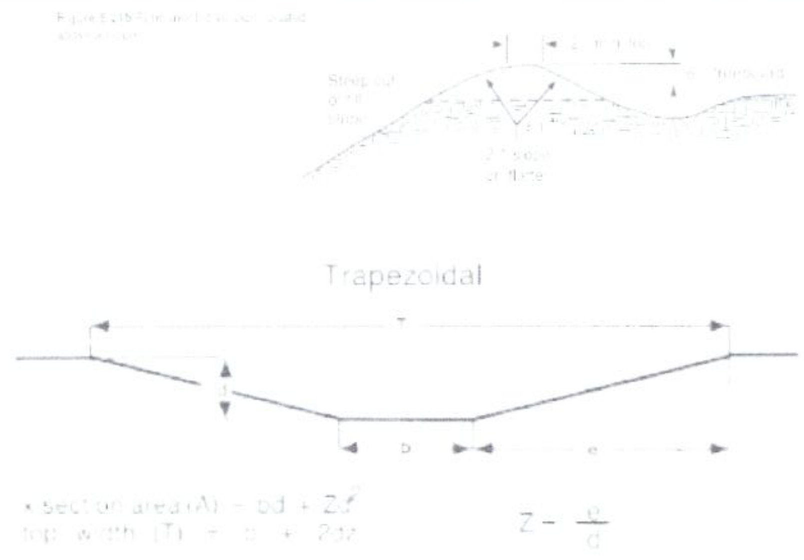
DR. BY: JEB	APP. BY:	119793SG2012
STDS.	SHEET 2 OF 4	
DATE: MAY, 2012	FILE NO.	
SCALE: AS SHOWN	JDR-2264-02	

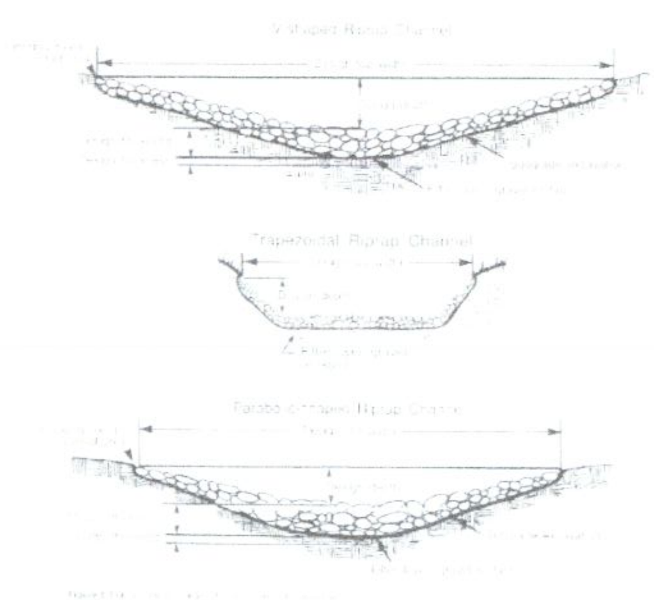
FIGURE 3A – CONSTRUCTION DETAILS

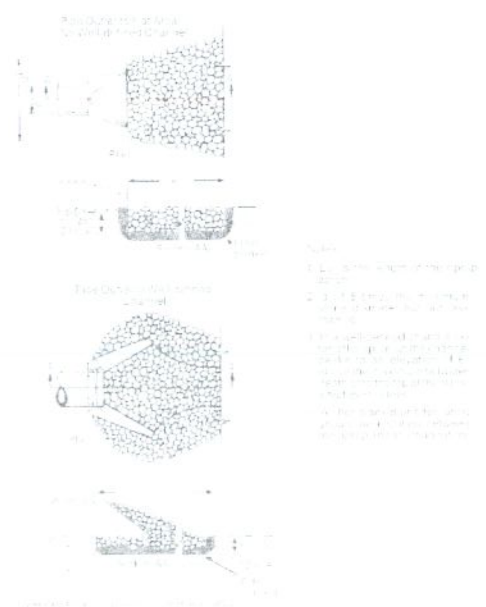


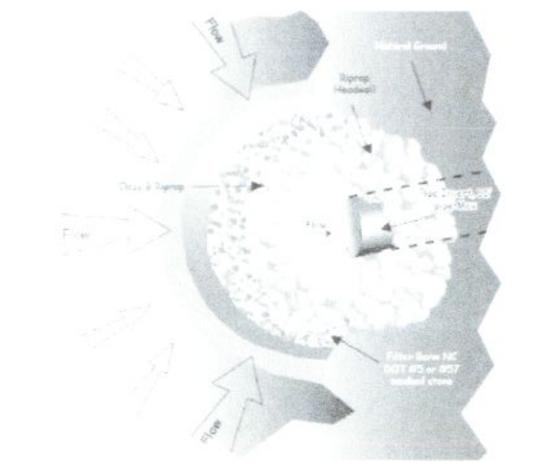


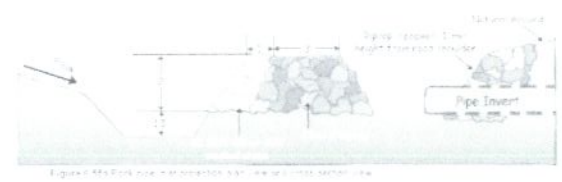












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OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

DETAILS

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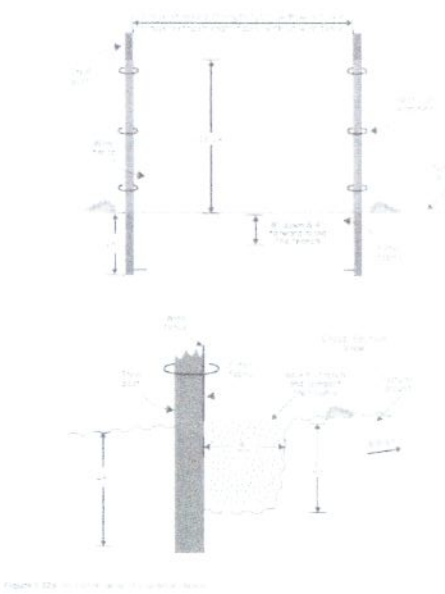
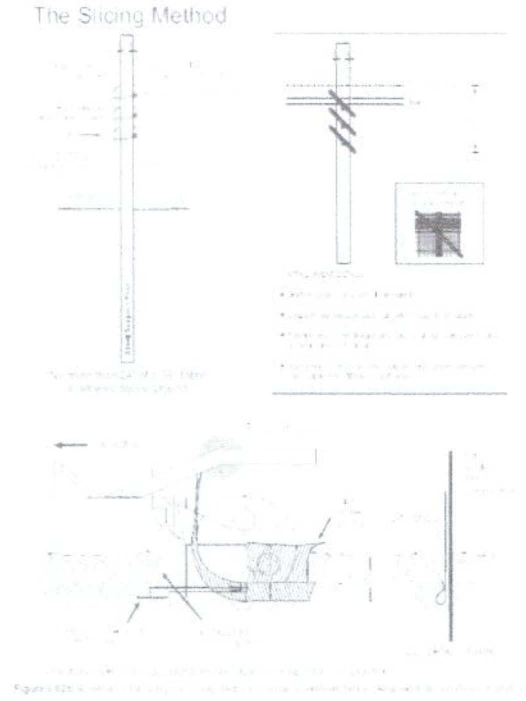
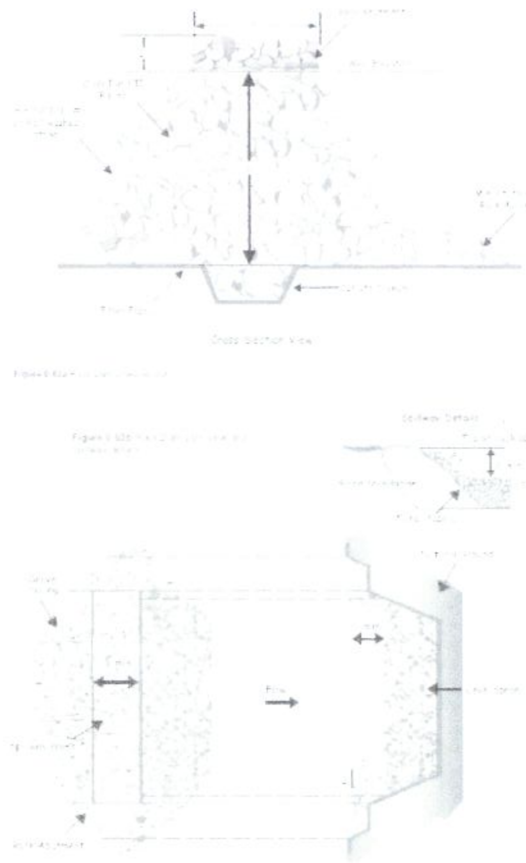
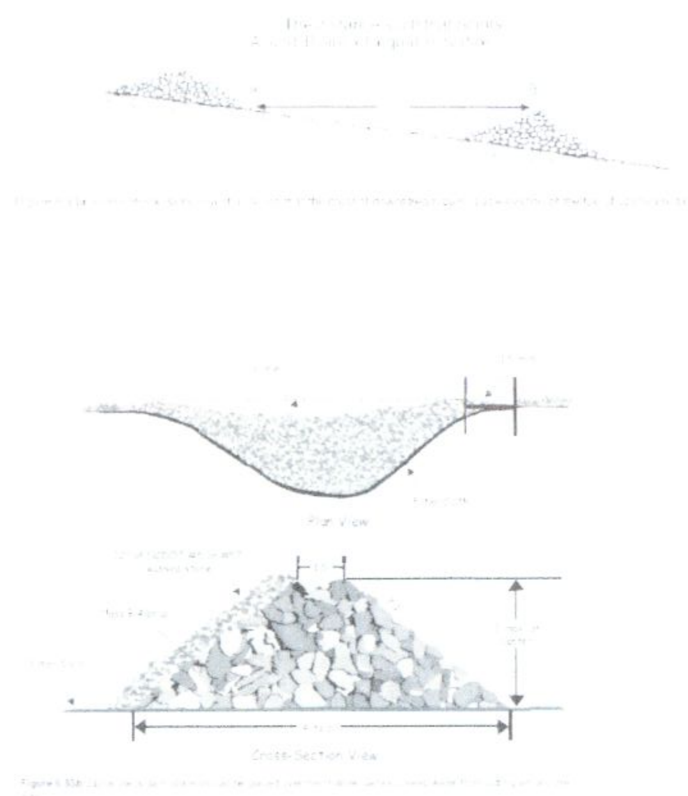
DATE MAY, 2012 SCALE AS SHOWN		FILE NO. JDR-2264-03

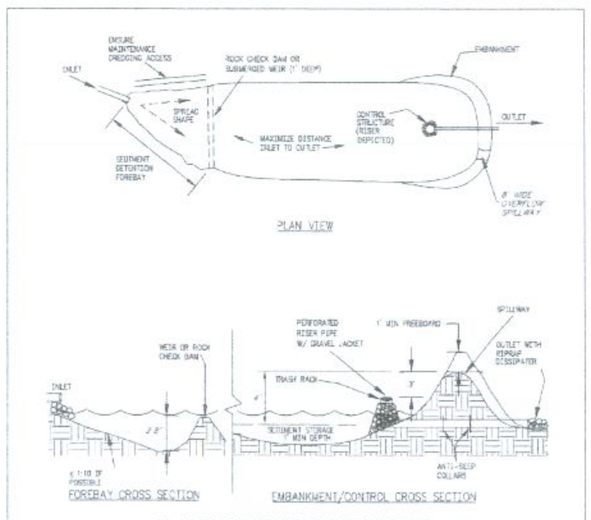
FIGURE 3B – CONSTRUCTION DETAILS











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OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

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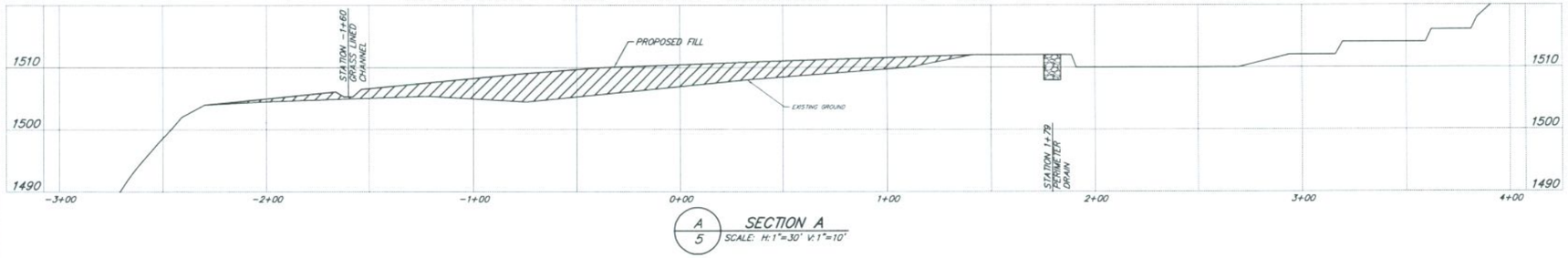
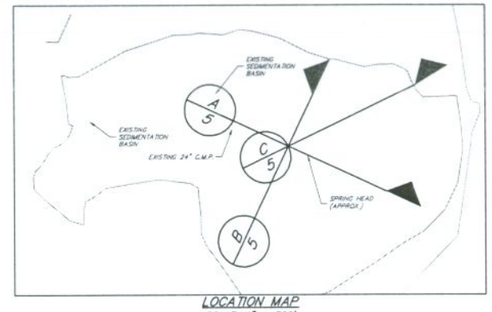
STDS.
SHEET 4 OF 4
DATE MAY, 2012
SCALE AS SHOWN
FILE NO. JDR-2264-04

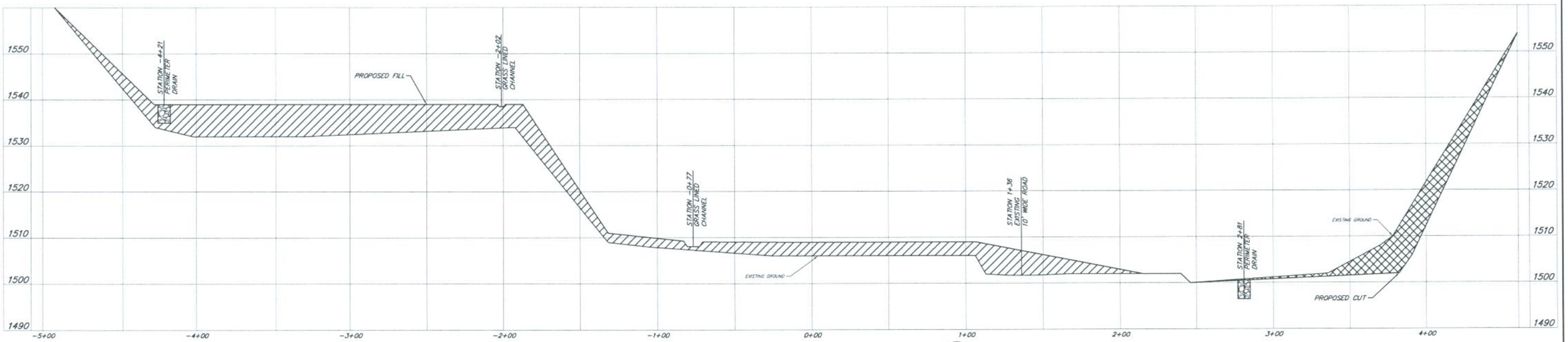
FIGURE 4 – CROSS-SECTIONS OF CAP



A/5 SECTION A
SCALE: H:1"=30' V:1"=10'



LOCATION MAP
SCALE: 1" = 300'



B/5 SECTION B
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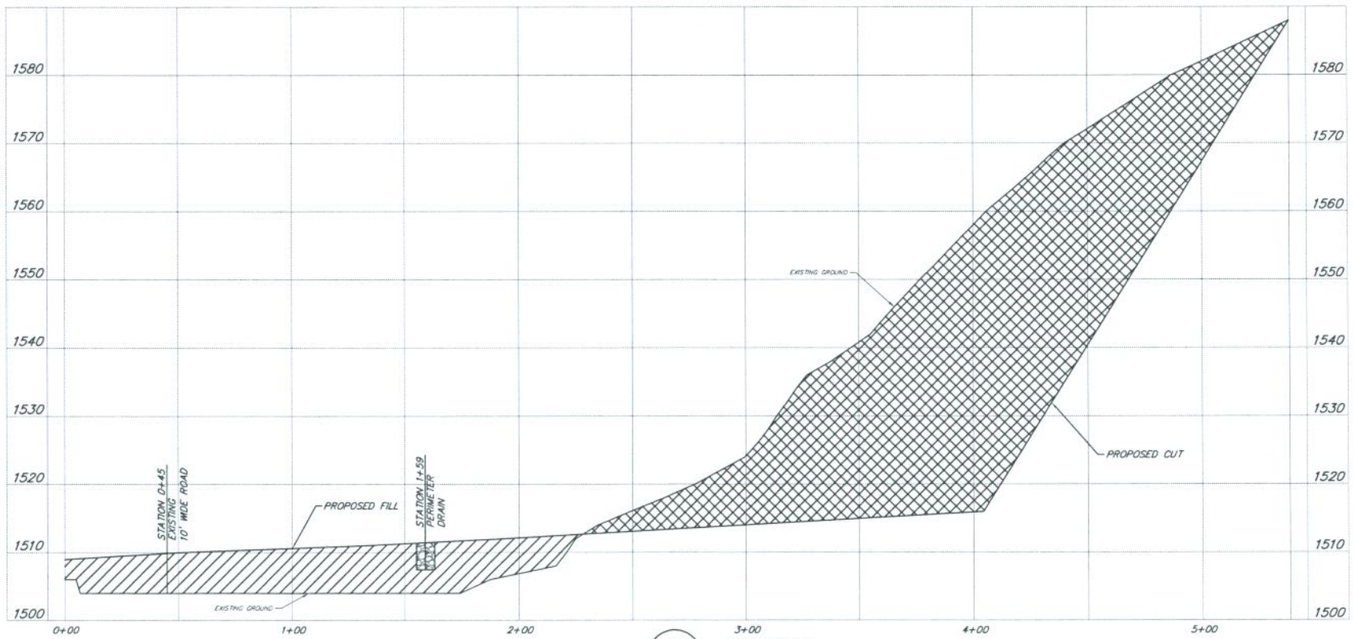

C/5 SECTION C
SCALE: H:1"=30' V:1"=10'

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OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

CROSS SECTIONS

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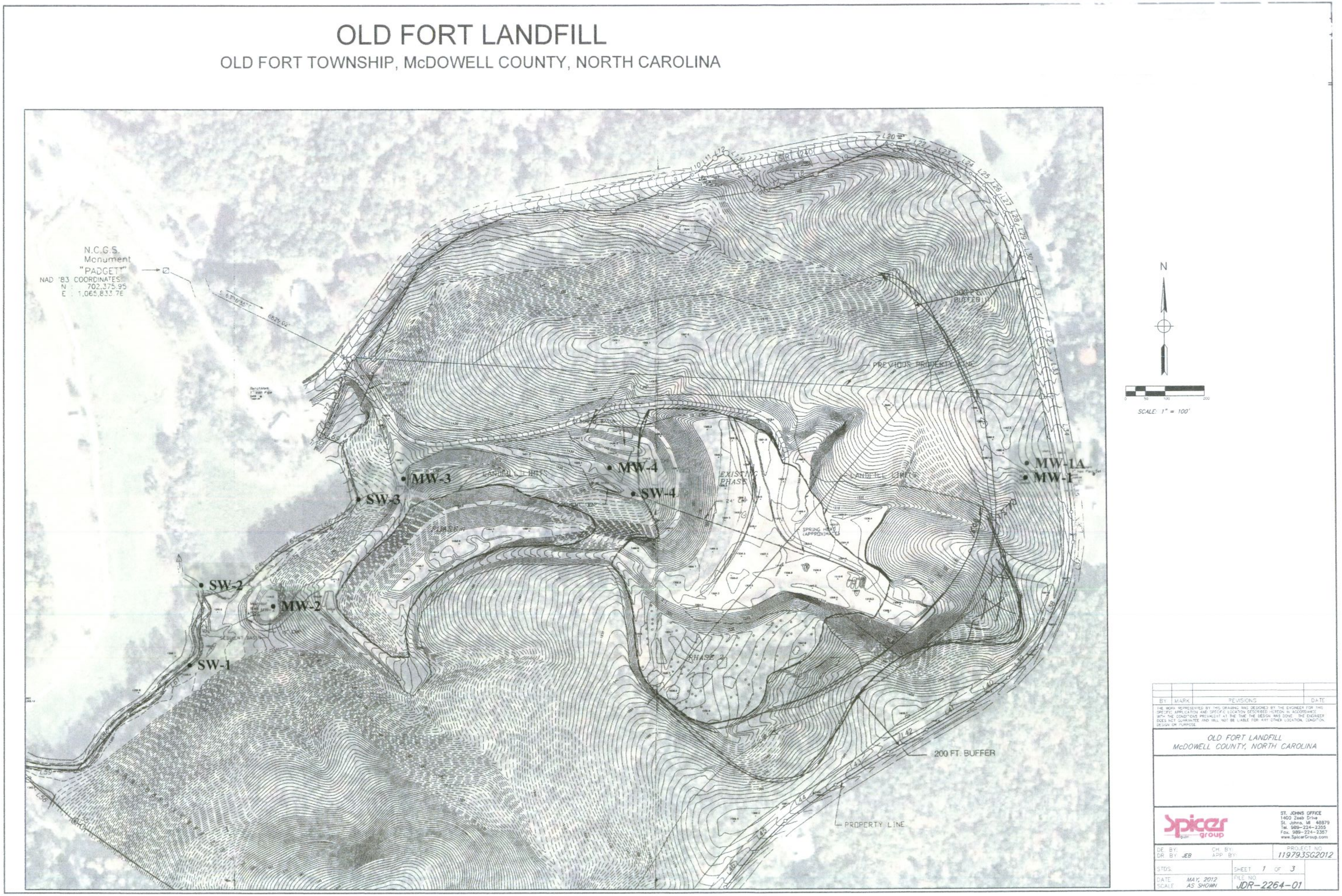
DR. BY: JEB/TAM	APP. BY: LJP		
STDS.		SHEET 5 OF 5	
DATE: MAY, 2012		FILE NO.	JDR-2264-05
SCALE H:1"=30'V:1"=10'			

P:\proj\2011\119793SG2012_CMF-ort_Landfill\Closure\dwg\JDR-2264-01.dwg, 7/31/2012 3:18:20 PM, mccormacida

FIGURE 5 – MONITORING LOCATIONS



PROJECT LOCATION

TABLES

TABLE 1

LANDFILL INSPECTION RECORD
Old Fort Landfill - 1240 Parker-Padgett Road, Old Fort, North Carolina

Date: (MM/DD/YY) _____ **Day: (Circle) S M T W T F S**

Inspected By: (print name) _____ Signature: _____

Reason for Inspection: _____

_____

_____

_____

ACCESS ROAD

	Pass	Corrective Action Required (describe below)
Gates	_____	_____
Road Surface	_____	_____
Ditches	_____	_____

Corrective Action: _____

_____

_____

_____

_____

Comments: _____

_____

_____ **Page 1 of 3**

TABLE 1 (continued)

LANDFILL INSPECTION RECORD
Old Fort Landfill - 1240 Parker-Padgett Road, Old Fort, North Carolina

VEGETATED AREAS

	Pass	Corrective Action Required (describe below)
Slope Stability	_____	_____
Vegetation	_____	_____
Erosion	_____	_____
Ditches	_____	_____

Corrective Action: _____

_____

_____

_____

_____

Comments: _____

_____

_____

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES

Existing Conditions: _____

_____

_____

_____

Comments: _____

_____

TABLE 1 (continued)

LANDFILL INSPECTION RECORD
Old Fort Landfill - 1240 Parker-Padgett Road, Old Fort, North Carolina

CLOSURE AREAS

	Pass	Corrective Action Required (describe below)
Rip Rap	_____	_____
Diversions / Dams	_____	_____
Inlets / Outlets	_____	_____
Sediment Traps, Basins	_____	_____

Corrective Action: _____

_____

_____

_____

_____

Comments: _____

_____

_____

FOLLOW-UP INSPECTIONS OF PREVIOUSLY REPORTED DEFICIENCIES

Existing Conditions: _____

_____

_____

_____

Comments: _____

_____

_____

TABLE 2

SAMPLE CONTAINERS, HOLDING TIMES, and ANALYTICAL METHODS FOR METALS

Old Fort Landfill - 1240 Parker-Padgett Road, Old Fort, North Carolina

Parameter	Maximum Holding Time	Container Type/Sample Volume	Preservation Technique	Method Description
temperature (field)	15 minutes	Plastic/glass 100ml	None	Meter
pH (field)	15 minutes	Plastic/glass 100ml	None	Meter
specific conductance (field)	28 days	Plastic/glass 100ml	cool, 4eC	Meter
total dissolved solids (field)	28 days	Plastic/glass 100ml	cool, 4eC	Meter
Arsenic	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Barium	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Cadmium	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Chromium (total)	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Iron	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Lead	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Manganese	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Mercury	6 months	Plastic/glass 100ml	HNO3 to ph<2	Digestion AA Furnace
Selenium	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B
Silver	6 months	Plastic/glass 100ml	HNO3 to ph<2	EPA 6010B

APPENDIX A

SOIL EROSION AND SEDIMENTATION CONTROL PLAN

SOIL EROSION
AND
SEDIMENTATION CONTROL PLAN

OLD FORT LANDFILL
PERMIT #56-03
1240 PARKER-PADGETT ROAD
OLD FORT,
MCDOWELL COUNTY,
NORTH CAROLINA

Prepared for:

IAC Group North America
28333 Telegraph
Southfield, MI 48034

Attn: Mr. Patrick Kresnak

Prepared by:

Robert J. Nowakowski, CPG
RJN Environmental, Inc.
34888 Garfield Road
Fraser, Michigan 48026

December 10, 2012

TABLE OF CONTENTS

Appendices:

NARRATIVE

Project Description and History

The purpose of this report is to provide soil erosion and sedimentation control recommendations for a proposed enclosure of the Old Fort Landfill in McDowell County, North Carolina. Approximately 10 acres will be disturbed during this project. The enclosed landfill will be established with vegetation and returned to a pre-existing or natural state. The Old Fort Landfill is owned by International Automotive Components and was used to dispose of scrap carpet and backing generated from the Collins & Aikman Automotive Plant in Old Fort. The landfill was constructed with three phases: Phase 1 (operated early 1982 to late 1982) is already enclosed and not a part of this project; Phase 2 (operated 1982 to 1985) currently vegetated and proposed to be enclosed as a part of this project; and, Phase 3 (operated 1985 to 2005) currently un-vegetated and proposed to be a part of this project. A portion of the disturbed area on this project includes soil stockpiles generated from the landfill excavation and will be used to cap the landfill.

Site Description

The Old Fort Landfill is located in McDowell County, 4 miles east of the city of Old Fort and 11 miles southwest of Marion. It is located south of Interstate 40 and has a contributing watershed of approximately 35 acres. The watershed is bordered on the north and east by Parker-Padgett Road and on the west by Brevard Creek. Brevard Creek serves as the principle drainage outlet for the site. Sediment control best management practices will be implemented to prevent adverse effects from drainage to Brevard Creek. Parker-Padgett Road diverts offsite runoff from adjacent sites.

The site has a rolling topography generally falling from east to west with slopes of 25 to 60%. Slopes lessen to 6 to 15% around the eastern portion of the site near Parker-Padgett Road. Nearly 90% of the site is heavy, woody vegetation, primarily deciduous trees. A 10 Acre site (including Phase 3) is currently un-vegetated and has areas of heavy erosion. The access drive along the north side of the landfill also experiences rill and gull erosion. Runoff that is conveyed from the north portion of the watershed is conveyed through an existing channel along the north side of the access road and outlets through an 18-inch CMP culvert into an existing sedimentation basin.

The soils on the majority of the site are NRCS hydrologic soil group type B and mapped as Evard-Cowee complex with slopes ranging from 25 to 60% (Appendices A and G). Evard-Cowee soils are considered well drained with permeability rates being 0.6 to 2.0 inches/hour. The subsurface is sandy loam 5 inches thick. The subsoil consists of clay loam to 38 inches. Below 32 inches is weathered bedrock. Some areas have a layer of sandy loam to 80 inches. The northern and eastern portion of the site are mapped as Hayesville Clay Loam, Eroded, with slopes ranging from 6 to 15%. Hayesville soils are considered well drained with permeability rates being 0.6 to 2.0 inches/hour. The subsurface is clay loam 6 inches thick. The subsoil consists of clay loam to 33 inches, loam to 45 inches and fine sandy loam to 80 inches.

PLANNED EROSION AND SEDIMENTATION CONTROL PRACTICES

Land Grading
Heavy land grading will be expected on both phases. Significant clearing is proposed for Phase 2. Both Phase 2 and Phase 3 will be receiving a 2 foot fill of native material that will be graded at a 5 percent slope. The sleep slope at the separation of Phase 2 and Phase 3 will also be graded.

Surface Roughening
Surface roughening will be required at the steep slope that divides Phase 2 and Phase 3.

Topsoiling/Permanent Seeding/Mulching
Topsoiling, Seeding and Mulching will be performed in all areas of disturbance.

Temporary Gravel Construction Entrance/Exit
A temporary gravel construction entrance will be installed at the location where the existing site entrance drive enters the existing landfill. During wet weather it may be necessary to wash vehicle tires at this location.

Permanent Diversion
A permanent diversion will be constructed along the northern boundary of Phase 2 and along the western boundary of Phase 3. Each diversion will aide in the prevention of runoff eroding the steep slopes directly adjacent to each diversion.

Grass-lined Channel
Grass-lined channels will be utilized to convey runoff from the landfill cap for Phase 2 and Phase 3. The grass-lined channel in Phase 2 will be constructed at the base of the permanent diversion. Phase 3 will have a grass-lined channel along its southern and western boundaries. Each grass-lined channel will convey water toward a detention basin with sediment trap. Dimensioning for the grass-lined channel can be found on the proposed plan sheet.

Riprap-lined Channel
A riprap-lined channel will be constructed from the outlet of each detention area/sediment basin leading downstream. Dimensioning for the riprap-lined channel can be found on the proposed plan sheet.

Outlet Stabilization Structure
Outlet stabilization structures will be used at the outlet of the existing culverts as they terminate into existing sediment basins. These will prevent scour at the outlet.

PLANNED EROSION AND SEDIMENTATION CONTROL PRACTICES CONTINUED

Rock Pipe Inlet Protection
At the inlets of existing culverts that connect existing sedimentation basins, rock pile inlet protection will be constructed.

Sediment Basin
A sediment basin will be constructed at the northwest corner of Phase 3 in the proposed detention area. Similarly, Phase 2 will have a sediment basin constructed in the northwest corner in the proposed detention area. Both basins will have an outlet structure that will drain to riprap-lined channels. Dimensioning for the sediment basins and detention areas can be found on the proposed plan sheet.

Sediment Fence
Sediment fence will be constructed along the western borders of Phase 2 and Phase 3 to prevent sediment from washing down the steep grade into a highly vegetated area.

Rock Dam
Rock dams will be constructed in the natural channels downstream from Phase 2 and Phase 3.

Check Dam
Check dams will be constructed in the proposed grass-lined channels in Phase 2 and Phase 3.

Dust Control
Dust control will be used wherever soil is disturbed.

CONSTRUCTION SCHEDULE

The proposed construction will have an estimated duration of 6 weeks.

Once construction is permitted to begin:

1. Install silt fence, flocculants and sediment basins as first construction activity.
2. Install temporary gravel construction entrance/exit.
3. Install riprap-lined channel, rock dams and inlet protection.
4. Clear Phase 2 and construct 2 foot earth cap.
5. Construct diversion, grass-lined channel and detention area for Phase 2.
6. Make repairs to sediment basin as needed, for grade change.
7. Seed and mulch Phase 2.
8. Roughen surface of slope and seed and mulch.
9. Clear Phase 3 and construct 2 foot earth cap.
10. Construct diversion, grass-lined channel and detention area for Phase 3.
11. Make repairs to sediment basin as needed, for grade change.
12. Seed and mulch Phase 3.
13. Grade stock pile areas then seed and mulch.
14. Inspect erosion control measures weekly and after each rain event. Repair as needed.
15. After site is stabilized, remove silt fence.

MAINTENANCE PLAN

Land Grading Maintenance - Periodically, check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls. Promptly remove all sediment from diversions and other water-disposal practices. If washouts or breaks occur, repair them immediately. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

Surface Roughening Maintenance - Periodically check the seeded slopes for rills and washes. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.

Temporary Gravel Construction Entrance/Exit Maintenance - Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

Permanent Seeding Maintenance - The Contractor shall maintain all seeded areas in a condition approved by the Project Manager until final acceptance of the Contract. Maintenance shall include, but not be limited to, mowing, raking clippings and leaves, repair of seeded areas, irrigation, and weed control. Protection shall be provided for all seeded areas against trespassing and damage. Slopes shall be protected from damage due to erosion, settlement, and other causes and shall be repaired promptly.

Mowing shall be scheduled so as to maintain a minimum stand height of 4 inches. Stand height shall be allowed to reach 7-9 inches prior to mowing.

All seeded areas shall be inspected on a regular basis and any necessary repairs or reseeding made within the planting season, if possible.

Mulching Maintenance - Contractor shall inspect all mulches periodically, and after rainstorms to check for rill erosion, dislocation or failure. Where erosion is observed, apply additional mulch. If washout occurs, repair the slope grade, reseed and reinstall mulch. Continue inspections until vegetation is firmly established.

Riprap Maintenance - In general, once a riprap installation has been properly designed and installed it requires very little maintenance. Riprap should be inspected periodically for scour or dislodged stones. Control of weed and brush growth may be needed in some locations.

MAINTENANCE PLAN CONTINUED

Permanent Diversion Maintenance - Inspect temporary diversions once a week and after every rainfall. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlets and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it.

Grass-Lined Channel Maintenance - During the establishment period, check grass-lined channels after every rainfall. After grass is established, periodically check the channel; check it after every heavy rainfall event. Immediately make repairs. It is particularly important to check the channel outlet and all road crossings for bank stability and evidence of piping or scour holes. Remove all significant sediment accumulations to maintain the designed carrying capacity. Keep the grass in a healthy, vigorous condition at all times, since it is the primary erosion protection for the channel

Riprap-Lined Channel Maintenance - Inspect channels at regular intervals as well as after major rains, and make repairs promptly. Give special attention to the outlet and inlet sections and other points where concentrated flow enters. Carefully check stability at road crossings, and look for indications of piping, scour holes, or bank failures. Make repairs immediately. Maintain all vegetation adjacent to the channel in a healthy, vigorous condition to protect the area from erosion and scour during out-of-bank flow.

Outlet Stabilization Structure Maintenance - Inspect riprap outlet structures weekly and after significant (1/2 inch or greater) rainfall events to see if any erosion around or below the riprap has taken place, or if stones have been dislodged. Immediately make all needed repairs to prevent further damage.

Rock Pipe Inlet Protection Maintenance - Inspect rock pipe inlet protection at least weekly and after each significant (½ inch or greater) rainfall event and repair immediately. Remove sediment and restore the sediment storage area to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in the designated disposal area and replace the contaminated part of the gravel facing.

Check the structure for damage. Any riprap displaced from the stone horseshoe must be replaced immediately.

After all the sediment-producing areas have been permanently stabilized, remove the structure and all the unstable sediment. Smooth the area to blend with the adjoining areas and provide permanent ground cover.

MAINTENANCE PLAN CONTINUED

Temporary Sediment Trap Maintenance - Inspect temporary sediment traps at least weekly and after each significant (½ inch or greater) rainfall event and repair immediately. Remove sediment, and restore the trap to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. Place the sediment that is removed in the designate disposal area, and replace the part of the gravel facing that is impaired by sediment.
Check the structure for damage from erosion or piping. Periodically check the depth of the spillway to ensure it is a minimum of 1.5 feet below the low point of the embankment. Immediately fill any settlement of the embankment to slightly above design grade. Any riprap displaced from the spillway must be replaced immediately. After all sediment-producing areas have been permanently stabilized, remove the structure and all unstable sediment. Smooth the area to blend with the adjoining areas, and stabilize properly.

Sediment Basin Maintenance - Inspect temporary sediment basins at least weekly and after each significant (½ inch or greater) rainfall event and repair immediately. Remove sediment and restore the basin to its original dimensions when it accumulates to one-half the design depth. Place removed sediment in an area with sediment controls.

Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement. Make all necessary repairs immediately. Remove all trash and other debris from the riser and pool area.

Sediment Fence Maintenance - Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment fence collapse, tear, decompose or become ineffective, replace it promptly.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

Rock Dam Maintenance - Check sediment basins after each rainfall. Remove sediment and restore original volume when sediment accumulates to about one-half the design volume. Sediment should be placed above the basin and adequately stabilized.

Check the structure for erosion, piping, and rock displacement weekly and after each significant (1/2 inch or greater) rainstorm and repair immediately.

MAINTENANCE PLAN CONTINUED

Remove the structure and any unstable sediment immediately after the construction site has been permanently stabilized. Smooth the basin site to blend with the surrounding area and stabilize. All water and sediment should be removed from the basin prior to dam removal. Sediment should be placed in designated disposal areas and not allowed to flow into streams or drainage ways during structure removal.

Check Dam Maintenance - Inspect check dams and channels at least weekly and after each significant (1/2 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel.

Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed to maintain design height and cross section.

Dust Control Maintenance - Maintain dust control measures through dry weather periods until all disturbed areas have been stabilized.

VEGETATIVE PLAN

Permanent Seeding

- Make certain that soil is loosened and free of stones, sticks, roots, and other extraneous materials.

- Uniformly apply seed and lightly rake into surface. Lightly roll the surface and water with a fine spray.

- For seeding dates (February 1 to May 1), apply 120 pounds per acre of Rye (grain) and 50 pounds per acre of Korean lespedeza. For seeding dates (May 15 to August 15), apply 40 pounds per acre of German millet. For seeding dates (August 15 to December 15), apply 120 pounds per acre of Rye (grain).

- Apply 2,00 pounds per acre grain straw or equivalent cover of another suitable mulching material. Anchor mulch by tool, netting or mat.

- Keep all seeded areas in good condition.

- Refertilize in the second year unless growth is fully adequate. Reseeding shall be done to damaged areas immediately, until a good, healthy, uniform growth is established over the entire area seeded.

- On slopes provide against washouts by an approved method. Any washout which occurs shall be regarded and reseeded.

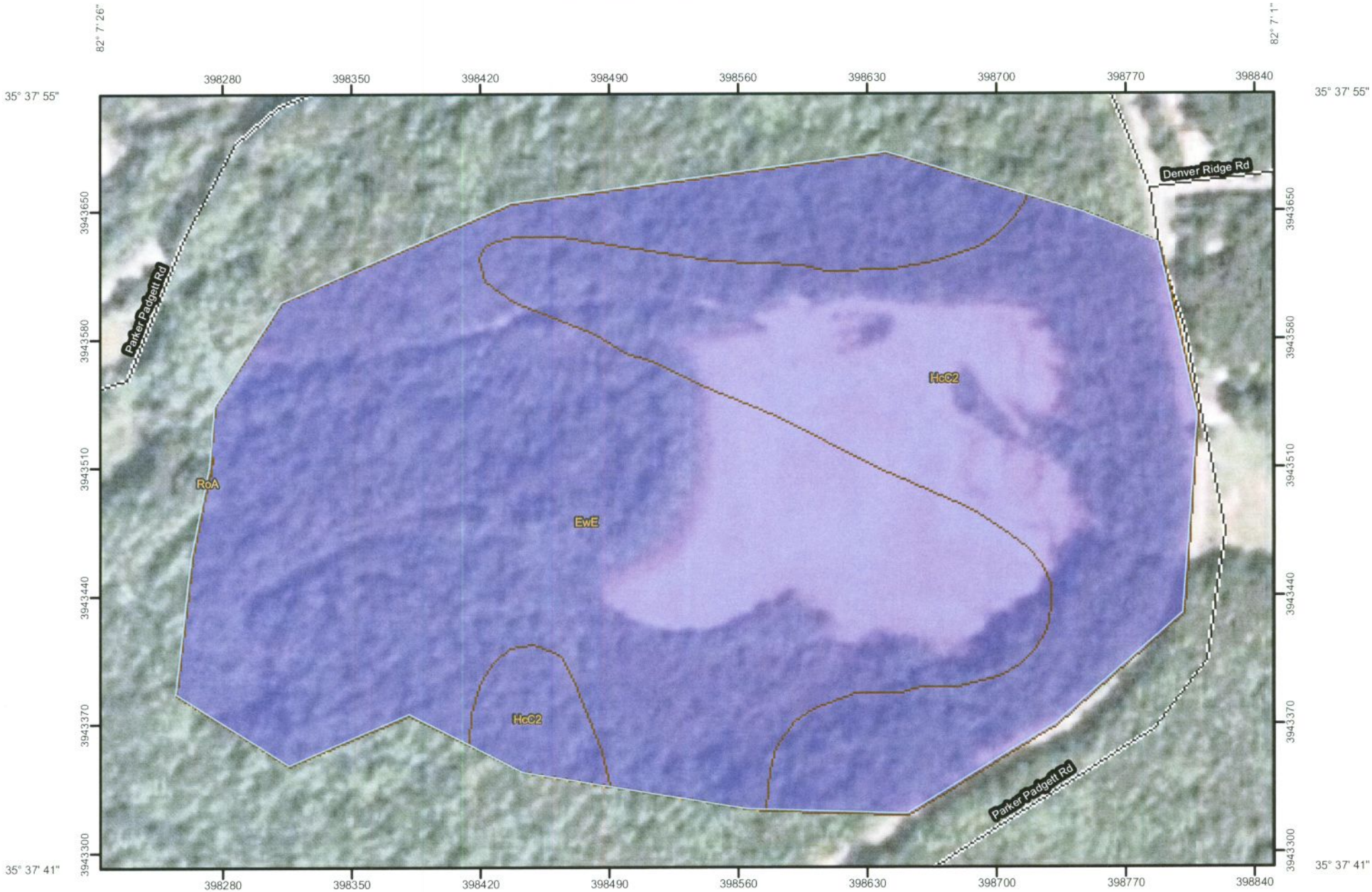
APPENDIX A

CALCULATIONS

Appendix A: Calculations Index

1. Hydrologic Soil Group information
2. Old Fort, North Carolina precipitation values
3. Sub-District Map
4. TR-55 output results for 2012 Existing conditions
5. TR-55 output results for fully forested conditions (post-construction)
6. Sample sedimentation basin calculation
7. Detention basin volume calculation method
8. Detention basin requirement summary
9. Existing sedimentation basin detention requirement calculation
10. Proposed Phase 2 detention requirement calculation
11. Proposed Phase 3 detention requirement calculation
12. Proposed North detention basin requirement calculation
13. Proposed South detention basin requirement calculation
14. Diversion Channel Sizing

Hydrologic Soil Group—McDowell County, North Carolina
(Old Fort Landfill, Mcdowell North Carolina)



Map Scale: 1:3,020 if printed on A size (8.5" x 11") sheet.

N

Meters
0 40 80 160 240

Feet
0 150 300 600 900

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:3,020 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: McDowell County, North Carolina
Survey Area Data: Version 11, Jul 21, 2009

Date(s) aerial images were photographed: 7/1/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — McDowell County, North Carolina (NC111)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
EwE	Evard-Cowee complex, 25 to 60 percent slopes	B	24.8	63.3%
HcC2	Hayesville clay loam, 6 to 15 percent slopes, eroded	B	14.3	36.6%
RoA	Rosman loam, 0 to 3 percent slopes, occasionally flooded	A	0.0	0.0%
Totals for Area of Interest			39.1	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Precipitation Data for Old Fort, North Carolina. Found here: http://hdsc.nws.noaa.gov/hdsc/pfds/

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.369** (0.336-0.406)	**0.439** (0.400-0.484)	**0.525** (0.476-0.578)	**0.591** (0.535-0.649)	**0.677** (0.609-0.744)	**0.742** (0.663-0.816)	**0.808** (0.718-0.890)	**0.874** (0.771-0.966)	**0.96** (0.837-1.07)	**1.03** (0.888-1.15)
10-min	**0.59** (0.536-0.649)	**0.702** (0.640-0.773)	**0.84** (0.763-0.925)	**0.944** (0.856-1.04)	**1.08** (0.971-1.19)	**1.18** (1.06-1.30)	**1.28** (1.14-1.42)	**1.39** (1.22-1.53)	**1.52** (1.32-1.69)	**1.62** (1.40-1.81)
15-min	**0.737** (0.670-0.811)	**0.883** (0.804-0.972)	**1.06** (0.965-1.17)	**1.2** (1.08-1.31)	**1.37** (1.23-1.50)	**1.5** (1.34-1.65)	**1.62** (1.44-1.79)	**1.75** (1.54-1.93)	**1.91** (1.67-2.13)	**2.03** (1.75-2.28)
30-min	**1.01** (0.919-1.11)	**1.22** (1.11-1.34)	**1.51** (1.37-1.66)	**1.73** (1.57-1.90)	**2.02** (1.82-2.23)	**2.25** (2.02-2.48)	**2.48** (2.21-2.74)	**2.72** (2.40-3.01)	**3.04** (2.65-3.38)	**3.29** (2.84-3.69)
60-min	**1.26** (1.15-1.39)	**1.53** (1.39-1.69)	**1.94** (1.76-2.13)	**2.25** (2.04-2.48)	**2.7** (2.43-2.97)	**3.05** (2.73-3.36)	**3.42** (3.04-3.77)	**3.82** (3.37-4.22)	**4.36** (3.81-4.85)	**4.81** (4.15-5.38)
2-hr	**1.48** (1.34-1.63)	**1.8** (1.64-1.99)	**2.29** (2.08-2.52)	**2.69** (2.43-2.95)	**3.24** (2.91-3.56)	**3.7** (3.30-4.07)	**4.18** (3.70-4.61)	**4.69** (4.12-5.19)	**5.43** (4.71-6.04)	**6.04** (5.18-6.76)
3-hr	**1.58** (1.43-1.75)	**1.91** (1.73-2.11)	**2.41** (2.19-2.67)	**2.83** (2.55-3.13)	**3.44** (3.08-3.80)	**3.94** (3.51-4.37)	**4.49** (3.96-4.98)	**5.09** (4.44-5.66)	**5.96** (5.12-6.67)	**6.7** (5.67-7.53)
6-hr	**1.95** (1.78-2.14)	**2.33** (2.13-2.56)	**2.9** (2.64-3.19)	**3.38** (3.07-3.71)	**4.09** (3.68-4.49)	**4.69** (4.20-5.16)	**5.35** (4.73-5.89)	**6.07** (5.31-6.71)	**7.13** (6.12-7.92)	**8.02** (6.79-8.96)
12-hr	**2.4** (2.20-2.62)	**2.87** (2.63-3.14)	**3.55** (3.25-3.88)	**4.1** (3.74-4.49)	**4.87** (4.43-5.33)	**5.51** (4.98-6.04)	**6.17** (5.54-6.77)	**6.86** (6.11-7.57)	**7.84** (6.90-8.70)	**8.62** (7.52-9.63)
24-hr	**2.79** (2.57-3.05)	**3.38** (3.12-3.69)	**4.29** (3.94-4.67)	**5** (4.58-5.44)	**5.98** (5.46-6.51)	**6.77** (6.16-7.37)	**7.58** (6.87-8.26)	**8.41** (7.59-9.17)	**9.54** (8.57-10.4)	**10.4** (9.33-11.4)
2-day	**3.34** (3.08-3.61)	**4.02** (3.72-4.37)	**5.04** (4.66-5.47)	**5.84** (5.38-6.33)	**6.93** (6.36-7.51)	**7.79** (7.13-8.46)	**8.67** (7.89-9.42)	**9.56** (8.67-10.4)	**10.8** (9.71-11.7)	**11.7** (10.5-12.8)
3-day	**3.55** (3.28-3.84)	**4.27** (3.95-4.62)	**5.31** (4.92-5.76)	**6.13** (5.66-6.64)	**7.25** (6.66-7.84)	**8.12** (7.44-8.80)	**9.02** (8.22-9.77)	**9.92** (9.02-10.8)	**11.1** (10.1-12.1)	**12.1** (10.9-13.2)
4-day	**3.75** (3.48-4.06)	**4.51** (4.18-4.88)	**5.58** (5.17-6.04)	**6.42** (5.93-6.94)	**7.56** (6.96-8.17)	**8.46** (7.76-9.15)	**9.36** (8.56-10.1)	**10.3** (9.36-11.1)	**11.5** (10.4-12.5)	**12.5** (11.3-13.6)
7-day	**4.39** (4.09-4.74)	**5.25** (4.89-5.67)	**6.39** (5.95-6.89)	**7.26** (6.75-7.84)	**8.43** (7.82-9.10)	**9.34** (8.63-10.1)	**10.2** (9.44-11.1)	**11.2** (10.2-12.1)	**12.4** (11.3-13.4)	**13.2** (12.1-14.4)
10-day	**5** (4.67-5.38)	**5.96** (5.57-6.41)	**7.15** (6.68-7.68)	**8.06** (7.51-8.65)	**9.25** (8.60-9.93)	**10.2** (9.43-10.9)	**11.1** (10.2-11.9)	**12** (11.0-12.9)	**13.1** (12.1-14.1)	**14** (12.8-15.1)
20-day	**6.64** (6.24-7.11)	**7.87** (7.38-8.40)	**9.29** (8.70-9.91)	**10.4** (9.71-11.1)	**11.8** (11.0-12.7)	**13** (12.1-13.9)	**14.1** (13.1-15.1)	**15.2** (14.0-16.3)	**16.6** (15.3-17.9)	**17.7** (16.2-19.1)
30-day	**8.23** (7.76-8.75)	**9.67** (9.12-10.3)	**11.1** (10.5-11.8)	**12.2** (11.5-13.0)	**13.6** (12.8-14.5)	**14.6** (13.7-15.6)	**15.6** (14.6-16.6)	**16.6** (15.5-17.7)	**17.8** (16.6-19.0)	**18.7** (17.3-20.0)
45-day	**10.4** (9.88-11.0)	**12.2** (11.5-12.9)	**13.8** (13.0-14.6)	**15** (14.2-15.8)	**16.4** (15.5-17.4)	**17.5** (16.5-18.5)	**18.6** (17.5-19.6)	**19.5** (18.4-20.7)	**20.7** (19.5-22.0)	**21.6** (20.3-22.9)
60-day	**12.5** (11.8-13.1)	**14.5** (13.8-15.3)	**16.3** (15.5-17.1)	**17.6** (16.7-18.5)	**19.3** (18.3-20.3)	**20.5** (19.4-21.6)	**21.6** (20.5-22.8)	**22.7** (21.5-24.0)	**24.1** (22.7-25.4)	**25** (23.6-26.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

BY	MARK	REVISIONS	DATE

THE WORK REPRESENTED BY THIS DRAWING WAS DESIGNED BY THE ENGINEER FOR THIS SPECIFIC APPLICATION AND SPECIFIC LOCATION DESCRIBED HEREON IN ACCORDANCE WITH THE CONDITIONS PREVALENT AT THE TIME THE DESIGN WAS DONE. THE ENGINEER DOES NOT GUARANTEE AND WILL NOT BE LIABLE FOR ANY OTHER LOCATION, CONDITION, DESIGN OR PURPOSE.

OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

SUB-DISTRICT MAP

Spicer group
ST. JOHNS OFFICE
1400 Zeeb Drive
St. Johns, MI 48879
Tel. 989-224-2355
Fax. 989-224-2357
www.SpicerGroup.com

DE. BY: DR. BY: JEB	CH. BY: APP. BY:	PROJECT NO. 119793SG2012
STDS:	SHEET 2 OF 3	
DATE: MAY, 2012 SCALE: AS SHOWN	FILE NO. JDR-2264-02	

WinTR-55 Current Data Description

--- Identification Data ---

User: JGM
Project:
SubTitle:
State: North Carolina
County: Mcdowell Central
Filename: C:\Users\morganjg\Dropbox\North Carolina_Design\TR55\Landfill.w55

Date: 5/15/2012
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
SChannel1		Outlet	1.7	60	0.1
SChannel2		SouthChann	4.36	60	.242
SChannel3		SouthChann	2.42	60	.155
NChannel1		Outlet	4.31	60	.285
NChannel3		NorthChann	3.7	65	.176
NChannel5		NorthChann	4.56	69	.198
NChannel6		NorthChann	1.56	80	.154
Phase1		Outlet	2.88	60	0.1
Phase2		CenterChan	2.1	60	.262
Phase3		CenterChan	5.87	82	0.174

Total area: 33.46 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

1-Yr (in)	2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)
2.79	3.38	4.29	5.0	5.98	6.77	7.58

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

JGM

Mcdowell Central County, North Carolina

Storm Data

Rainfall Depth by Rainfall Return Period

1-Yr (in)	2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)
2.79	3.38	4.29	5.0	5.98	6.77	7.58

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

JGM

Mcdowell Central County, North Carolina

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 1-Yr (cfs)	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)
SUBAREAS							
SChannel1	0.45	1.02	2.10	3.14	4.80	6.26	7.83
SChannel2	0.76	1.93	4.36	6.62	10.08	13.11	16.36
SChannel3	0.54	1.30	2.81	4.19	6.32	8.18	10.20
NChannel1	0.67	1.74	3.99	6.08	9.31	12.13	15.14
NChannel3	1.66	3.13	5.82	8.20	11.77	14.80	18.03
NChannel5	3.00	5.05	8.70	11.80	16.39	20.25	24.32
NChannel6	2.38	3.39	5.03	6.36	8.23	9.75	11.31
Phase1	0.76	1.72	3.55	5.31	8.12	10.59	13.24
Phase2	0.35	0.89	2.02	3.08	4.71	6.13	7.65
Phase3	9.78	13.58	19.73	24.64	31.53	37.12	42.86
REACHES							
SouthChann	1.23	3.12	7.02	10.62	16.12	20.91	26.09
Down	1.22	3.11	6.99	10.58	16.09	20.87	26.06
NorthChann	6.91	11.41	19.32	26.10	36.04	44.41	53.25
Down	6.90	11.40	19.32	26.09	36.04	44.40	53.23
CenterChan	9.94	14.18	21.32	27.18	35.54	42.39	49.51
Down	9.94	14.17	21.31	27.17	35.53	42.37	49.49
OUTLET	18.67	30.82	53.93	74.49	104.74	130.50	157.89

JGM

Mcdowell Central County, North Carolina

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 1-Yr (cfs) (hr)	2-Yr (cfs) (hr)	5-Yr (cfs) (hr)	10-Yr (cfs) (hr)	25-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)
SUBAREAS							
SChannel1	0.45	1.02	2.10	3.14	4.80	6.26	7.83
	12.03	12.02	12.01	11.95	11.94	11.94	11.94
SChannel2	0.76	1.93	4.36	6.62	10.08	13.11	16.36
	12.11	12.09	12.07	12.06	12.06	12.06	12.05
SChannel3	0.54	1.30	2.81	4.19	6.32	8.18	10.20
	12.05	12.04	12.03	12.02	12.01	12.00	11.99
NChannel1	0.67	1.74	3.99	6.08	9.31	12.13	15.14
	12.14	12.11	12.09	12.09	12.08	12.07	12.06
NChannel3	1.66	3.13	5.82	8.20	11.77	14.80	18.03
	12.05	12.04	12.02	12.01	12.01	12.01	12.00
NChannel5	3.00	5.05	8.70	11.80	16.39	20.25	24.32
	12.04	12.03	12.03	12.02	12.02	12.02	12.01
NChannel6	2.38	3.39	5.03	6.36	8.23	9.75	11.31
	12.00	11.99	11.98	11.97	11.97	11.96	11.96
Phase1	0.76	1.72	3.55	5.31	8.12	10.59	13.24
	12.03	12.02	12.01	11.95	11.94	11.94	11.94
Phase2	0.35	0.89	2.02	3.08	4.71	6.13	7.65
	12.12	12.10	12.07	12.07	12.06	12.06	12.05
Phase3	9.78	13.58	19.73	24.64	31.53	37.12	42.86
	12.01	11.99	11.99	11.98	11.99	11.98	11.98
REACHES							
SouthChann	1.23	3.12	7.02	10.62	16.12	20.91	26.09
	12.08	12.06	12.05	12.04	12.04	12.03	12.03
Down	1.22	3.11	6.99	10.58	16.09	20.87	26.06
	12.19	12.16	12.14	12.13	12.11	12.10	12.09
NorthChann	6.91	11.41	19.32	26.10	36.04	44.41	53.25
	12.04	12.02	12.01	12.01	12.01	12.00	12.00
Down	6.90	11.40	19.32	26.09	36.04	44.40	53.23
	12.05	12.03	12.02	12.02	12.01	12.01	12.01
CenterChan	9.94	14.18	21.32	27.18	35.54	42.39	49.51
	12.01	12.00	12.00	12.00	12.00	11.99	11.99
Down	9.94	14.17	21.31	27.17	35.53	42.37	49.49
	12.03	12.03	12.02	12.02	12.01	12.01	12.01
OUTLET	18.67	30.82	53.93	74.49	104.74	130.50	157.89

JGM

Mcdowell Central County, North Carolina

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
SChannel1	1.70	0.100	60	Outlet	
SChannel2	4.36	0.242	60	SouthChann	
SChannel3	2.42	0.155	60	SouthChann	
NChannel1	4.31	0.285	60	Outlet	
NChannel3	3.70	0.176	65	NorthChann	
NChannel5	4.56	0.198	69	NorthChann	
NChannel6	1.56	0.154	80	NorthChann	
Phase1	2.88	0.100	60	Outlet	
Phase2	2.10	0.262	60	CenterChan	
Phase3	5.87	0.174	82	CenterChan	

Total Area: 33.46 (ac)

JGM

Mcdowell Central County, North Carolina

Reach Summary Table

Reach Identifier	Receiving Reach Identifier	Reach Length (ft)	Routing Method
SouthChann	Outlet	2298	CHANNEL
NorthChann	Outlet	481	CHANNEL
CenterChan	Outlet	647	CHANNEL

JGM

Mcdowell Central County, North Carolina

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
SChannel1							
CHANNEL	1252	0.1038	0.040	7.20	13.30	7.904	0.044
					Time of Concentration		0.1
SChannel2							
SHEET	100	0.1176	0.400				0.171
SHALLOW	376	0.1176	0.050				0.019
CHANNEL	863	0.0347	0.040	7.20	13.30	4.610	0.052
					Time of Concentration		.242
SChannel3							
SHEET	100	0.2090	0.400				0.136
SHALLOW	308	0.2090	0.050				0.012
CHANNEL	185	0.0970	0.040	7.20	13.30	7.341	0.007
					Time of Concentration		.155
NChannel1							
SHEET	100	0.0476	0.400				0.246
SHALLOW	320	0.0476	0.050				0.025
SHALLOW	394	0.2410	0.050				0.014
					Time of Concentration		.285
NChannel3							
SHEET	100	0.1730	0.400				0.147
SHALLOW	241	0.1730	0.050				0.010
CHANNEL	576	0.1206	0.040	7.20	13.30	8.421	0.019
					Time of Concentration		.176
NChannel5							
SHEET	100	0.1270	0.400				0.166
SHALLOW	181	0.1270	0.050				0.009
SHALLOW	443	0.1280	0.050				0.021
CHANNEL	62	0.1000	0.040	7.20	13.30	8.611	0.002
					Time of Concentration		.198
NChannel6							
SHEET	100	0.1988	0.400				0.139
SHALLOW	312	0.1988	0.050				0.012
CHANNEL	87	0.1000	0.040	7.20	13.30	8.056	0.003
					Time of Concentration		.154
Phase1							
SHALLOW	600	0.1266	0.050				0.029
					Time of Concentration		0.1

Phase2							
SHEET	100	0.0590	0.400				0.226
SHALLOW	510	0.0590	0.050				0.036

Mcdowell Central County, North Carolina

Sub-Area Time of Concentration Details (continued)

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
					Time of Concentration		.262
Phase3							
SHALLOW	512	0.0078	0.050				0.100
CHANNEL	4423	0.1808	0.024	3.14	6.28	16.603	0.074
					Time of Concentration		0.174

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Mcdowell Central County, North Carolina

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
SChannel1	Woods	(fair)	B	1.7	60
	Total Area / Weighted Curve Number			1.7	60
SChannel2	Woods	(fair)	B	4.36	60
	Total Area / Weighted Curve Number			4.36	60
SChannel3	Woods	(fair)	B	2.42	60
	Total Area / Weighted Curve Number			2.42	60
NChannel1	Woods	(fair)	B	4.31	60
	Total Area / Weighted Curve Number			4.31	60
NChannel3	Newly graded area (pervious only)		B	.74	86
	Woods	(fair)	B	2.957	60
	Total Area / Weighted Curve Number			3.7	65
NChannel5	Newly graded area (pervious only)		B	1.52	86
	Woods	(fair)	B	3.04	60
	Total Area / Weighted Curve Number			4.56	69
NChannel6	Newly graded area (pervious only)		B	1.17	86
	Woods	(fair)	B	.39	60
	Total Area / Weighted Curve Number			1.56	80
Phase1	Woods	(fair)	B	2.88	60
	Total Area / Weighted Curve Number			2.88	60
Phase2	Woods	(fair)	B	2.1	60
	Total Area / Weighted Curve Number			2.1	60
Phase3	Newly graded area (pervious only)		B	5	86
	Woods	(fair)	B	.87	60
	Total Area / Weighted Curve Number			5.87	82

Mcdowell Central County, North Carolina

Reach Channel Rating Details

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
SouthChann	2298	0.04	0.0522	2	1 :1
NorthChann	481	0.04	0.1206	2	1 :1
CenterChan	647	0.04	0.0711	2	1 :1

Reach Identifier	Stage (ft)	Flow (cfs)	End Area (sq ft)	Top Width (ft)	Friction Slope (ft/ft)
SouthChann	0.0	0.000	0	2	0.0522
	0.5	5.430	1.3	3	
	1.0	18.541	3	4	
	2.0	69.916	8	6	
	5.0	497.661	35	12	
	10.0	2550.457	120	22	
	20.0	14325.361	440	42	
NorthChann	0.0	0.000	0	2	0.1206
	0.5	8.253	1.3	3	
	1.0	28.182	3	4	
	2.0	106.271	8	6	
	5.0	756.435	35	12	
	10.0	3876.649	120	22	
	20.0	21774.289	440	42	
CenterChan	0.0	0.000	0	2	0.0711
	0.5	6.337	1.3	3	
	1.0	21.638	3	4	
	2.0	81.597	8	6	
	5.0	580.809	35	12	
	10.0	2976.580	120	22	
	20.0	16718.801	440	42	

WinTR-55 Current Data Description

--- Identification Data ---

User: JGM
Project:
SubTitle:
State: North Carolina
County: Mcdowell Central
Filename: C:\Users\morganjg\Dropbox\North Carolina_Design\TR55\Landfill Existing.w55

Date: 5/15/2012
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
SChannel1		Outlet	1.7	60	0.1
SChannel2		SouthChann	4.36	60	.242
SChannel3		SouthChann	2.42	60	.155
NChannel1		Outlet	4.31	60	.285
NChannel3		NorthChann	3.7	65	.176
NChannel5		NorthChann	4.56	60	.198
NChannel6		NorthChann	1.56	60	0.154
Phase1		Outlet	2.88	60	0.1
Phase2		CenterChan	2.1	60	.262
Phase3		CenterChan	5.87	60	0.174

Total area: 33.46 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

1-Yr (in)	2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)
2.79	3.38	4.29	5.0	5.98	6.77	7.58

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

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Mcdowell Central County, North Carolina

Storm Data

Rainfall Depth by Rainfall Return Period

1-Yr (in)	2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)
2.79	3.38	4.29	5.0	5.98	6.77	7.58

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

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Mcdowell Central County, North Carolina

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 1-Yr (cfs)	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)
SUBAREAS							
SChannel1	0.45	1.02	2.10	3.14	4.80	6.26	7.83
SChannel2	0.76	1.93	4.36	6.62	10.08	13.11	16.36
SChannel3	0.54	1.30	2.81	4.19	6.32	8.18	10.20
NChannel1	0.67	1.74	3.99	6.08	9.31	12.13	15.14
NChannel3	1.66	3.13	5.82	8.20	11.77	14.80	18.03
NChannel5	0.89	2.23	4.94	7.44	11.28	14.64	18.25
NChannel6	0.35	0.84	1.81	2.71	4.08	5.29	6.59
Phase1	0.76	1.72	3.55	5.31	8.12	10.59	13.24
Phase2	0.35	0.89	2.02	3.08	4.71	6.13	7.65
Phase3	1.23	3.02	6.62	9.92	14.99	19.42	24.22
REACHES							
SouthChann	1.23	3.12	7.02	10.62	16.12	20.91	26.09
Down	1.22	3.11	6.99	10.58	16.09	20.87	26.06
NorthChann	2.85	6.14	12.51	18.28	27.04	34.61	42.72
Down	2.85	6.13	12.50	18.27	27.02	34.61	42.71
CenterChan	1.53	3.83	8.51	12.83	19.45	25.20	31.45
Down	1.52	3.82	8.50	12.82	19.44	25.19	31.44
OUTLET	6.26	15.29	34.46	52.51	80.00	104.00	129.82

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Mcdowell Central County, North Carolina

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 1-Yr (cfs) (hr)	2-Yr (cfs) (hr)	5-Yr (cfs) (hr)	10-Yr (cfs) (hr)	25-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)
SUBAREAS							
SChannel1	0.45	1.02	2.10	3.14	4.80	6.26	7.83
	12.03	12.02	12.01	11.95	11.94	11.94	11.94
SChannel2	0.76	1.93	4.36	6.62	10.08	13.11	16.36
	12.11	12.09	12.07	12.06	12.06	12.06	12.05
SChannel3	0.54	1.30	2.81	4.19	6.32	8.18	10.20
	12.05	12.04	12.03	12.02	12.01	12.00	11.99
NChannel1	0.67	1.74	3.99	6.08	9.31	12.13	15.14
	12.14	12.11	12.09	12.09	12.08	12.07	12.06
NChannel3	1.66	3.13	5.82	8.20	11.77	14.80	18.03
	12.05	12.04	12.02	12.01	12.01	12.01	12.00
NChannel5	0.89	2.23	4.94	7.44	11.28	14.64	18.25
	12.07	12.07	12.05	12.04	12.02	12.02	12.02
NChannel6	0.35	0.84	1.81	2.71	4.08	5.29	6.59
	12.06	12.03	12.03	12.02	12.01	12.00	11.99
Phase1	0.76	1.72	3.55	5.31	8.12	10.59	13.24
	12.03	12.02	12.01	11.95	11.94	11.94	11.94
Phase2	0.35	0.89	2.02	3.08	4.71	6.13	7.65
	12.12	12.10	12.07	12.07	12.06	12.06	12.05
Phase3	1.23	3.02	6.62	9.92	14.99	19.42	24.22
	12.07	12.05	12.04	12.02	12.02	12.01	12.01
REACHES							
SouthChann	1.23	3.12	7.02	10.62	16.12	20.91	26.09
	12.08	12.06	12.05	12.04	12.04	12.03	12.03
Down	1.22	3.11	6.99	10.58	16.09	20.87	26.06
	12.19	12.16	12.14	12.13	12.11	12.10	12.09
NorthChann	2.85	6.14	12.51	18.28	27.04	34.61	42.72
	12.06	12.04	12.04	12.03	12.02	12.01	12.01
Down	2.85	6.13	12.50	18.27	27.02	34.61	42.71
	12.07	12.06	12.05	12.04	12.03	12.02	12.02
CenterChan	1.53	3.83	8.51	12.83	19.45	25.20	31.45
	12.08	12.06	12.04	12.04	12.03	12.03	12.02
Down	1.52	3.82	8.50	12.82	19.44	25.19	31.44
	12.10	12.08	12.07	12.06	12.04	12.04	12.03
OUTLET	6.26	15.29	34.46	52.51	80.00	104.00	129.82

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Mcdowell Central County, North Carolina

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
SChannel1	1.70	0.100	60	Outlet	
SChannel2	4.36	0.242	60	SouthChann	
SChannel3	2.42	0.155	60	SouthChann	
NChannel1	4.31	0.285	60	Outlet	
NChannel3	3.70	0.176	65	NorthChann	
NChannel5	4.56	0.198	60	NorthChann	
NChannel6	1.56	0.154	60	NorthChann	
Phase1	2.88	0.100	60	Outlet	
Phase2	2.10	0.262	60	CenterChan	
Phase3	5.87	0.174	60	CenterChan	

Total Area: 33.46 (ac)

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Mcdowell Central County, North Carolina

Reach Summary Table

Reach Identifier	Receiving Reach Identifier	Reach Length (ft)	Routing Method
SouthChann	Outlet	2298	CHANNEL
NorthChann	Outlet	481	CHANNEL
CenterChan	Outlet	647	CHANNEL

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Mcdowell Central County, North Carolina

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft.)	Wetted Perimeter (ft.)	Velocity (ft/sec)	Travel Time (hr)
SChannel1							
CHANNEL	1252	0.1038	0.040	7.20	13.30	7.904	0.044
					Time of Concentration		0.1
SChannel2							
SHEET	100	0.1176	0.400				0.171
SHALLOW	376	0.1176	0.050				0.019
CHANNEL	863	0.0347	0.040	7.20	13.30	4.610	0.052
					Time of Concentration		.242
SChannel3							
SHEET	100	0.2090	0.400				0.136
SHALLOW	308	0.2090	0.050				0.012
CHANNEL	185	0.0970	0.040	7.20	13.30	7.341	0.007
					Time of Concentration		.155
NChannel1							
SHEET	100	0.0476	0.400				0.246
SHALLOW	320	0.0476	0.050				0.025
SHALLOW	394	0.2410	0.050				0.014
					Time of Concentration		.285
NChannel3							
SHEET	100	0.1730	0.400				0.147
SHALLOW	241	0.1730	0.050				0.010
CHANNEL	576	0.1206	0.040	7.20	13.30	8.421	0.019
					Time of Concentration		.176
NChannel5							
SHEET	100	0.1270	0.400				0.166
SHALLOW	181	0.1270	0.050				0.009
SHALLOW	443	0.1280	0.050				0.021
CHANNEL	62	0.1000	0.040	7.20	13.30	8.611	0.002
					Time of Concentration		.198
NChannel6							
SHEET	100	0.1988	0.400				0.139
SHALLOW	312	0.1988	0.050				0.012
CHANNEL	87	0.1000	0.040	7.20	13.30	8.056	0.003
					Time of Concentration		0.154
Phase1							
SHALLOW	600	0.1266	0.050				0.029
					Time of Concentration		0.1

Phase2							
SHEET	100	0.0590	0.400				0.226
SHALLOW	510	0.0590	0.050				0.036

Mcdowell Central County, North Carolina

Sub-Area Time of Concentration Details (continued)

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
					Time of Concentration		.262
Phase3							
SHALLOW	512	0.0078	0.050				0.100
CHANNEL	4423	0.1808	0.024	3.14	6.28	16.603	0.074
					Time of Concentration		0.174

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Mcdowell Central County, North Carolina

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
SChannel1	Woods	(fair)	B	1.7	60
	Total Area / Weighted Curve Number			1.7	60
SChannel2	Woods	(fair)	B	4.36	60
	Total Area / Weighted Curve Number			4.36	60
SChannel3	Woods	(fair)	B	2.42	60
	Total Area / Weighted Curve Number			2.42	60
NChannel1	Woods	(fair)	B	4.31	60
	Total Area / Weighted Curve Number			4.31	60
NChannel3	Newly graded area (pervious only)		B	.74	86
	Woods	(fair)	B	2.957	60
	Total Area / Weighted Curve Number			3.7	65
NChannel5	Woods	(fair)	B	4.56	60
	Total Area / Weighted Curve Number			4.56	60
NChannel6	Woods	(fair)	B	1.56	60
	Total Area / Weighted Curve Number			1.56	60
Phase1	Woods	(fair)	B	2.88	60
	Total Area / Weighted Curve Number			2.88	60
Phase2	Woods	(fair)	B	2.1	60
	Total Area / Weighted Curve Number			2.1	60
Phase3	Woods	(fair)	B	5.87	60
	Total Area / Weighted Curve Number			5.87	60

Mcdowell Central County, North Carolina

Reach Channel Rating Details

Reach Identifier	Reach Length (ft)	Reach Manning's n	Friction Slope (ft/ft)	Bottom Width (ft)	Side Slope
SouthChann	2298	0.04	0.0522	2	1 :1
NorthChann	481	0.04	0.1206	2	1 :1
CenterChan	647	0.04	0.0711	2	1 :1

Reach Identifier	Stage (ft)	Flow (cfs)	End Area (sq ft)	Top Width (ft)	Friction Slope (ft/ft)
SouthChann	0.0	0.000	0	2	0.0522
	0.5	5.430	1.3	3	
	1.0	18.541	3	4	
	2.0	69.916	8	6	
	5.0	497.661	35	12	
	10.0	2550.457	120	22	
	20.0	14325.361	440	42	
NorthChann	0.0	0.000	0	2	0.1206
	0.5	8.253	1.3	3	
	1.0	28.182	3	4	
	2.0	106.271	8	6	
	5.0	756.435	35	12	
	10.0	3876.649	120	22	
	20.0	21774.289	440	42	
CenterChan	0.0	0.000	0	2	0.0711
	0.5	6.337	1.3	3	
	1.0	21.638	3	4	
	2.0	81.597	8	6	
	5.0	580.809	35	12	
	10.0	2976.580	120	22	
	20.0	16718.801	440	42	

Sedimentation Basin Calculation

The criteria and calculations for designing the rock dams is as follows:

- Maximum drainage area for trap is less than 50 acres.
- Volume required for sediment trap is 1,800 cubic feet per drainage acre, measured 1 foot below the spillway crest.
- Dam height is limited to 8 feet.
- To achieve the maximum trapping efficiency, a minimum of 0.01 acres per cfs based on the 10-year storm.
- See Section 6.63 of Erosion and Sediment Control Manual for construction and maintenance details.

See "Detention Basin Summary" for final required sedimentation basin volumes.

Example: Proposed Phase 2 detention basin.
Total Acres Disturbed = 2.1 Ac
1,800 cfs/ac * 2.1 Ac = 3780 cft

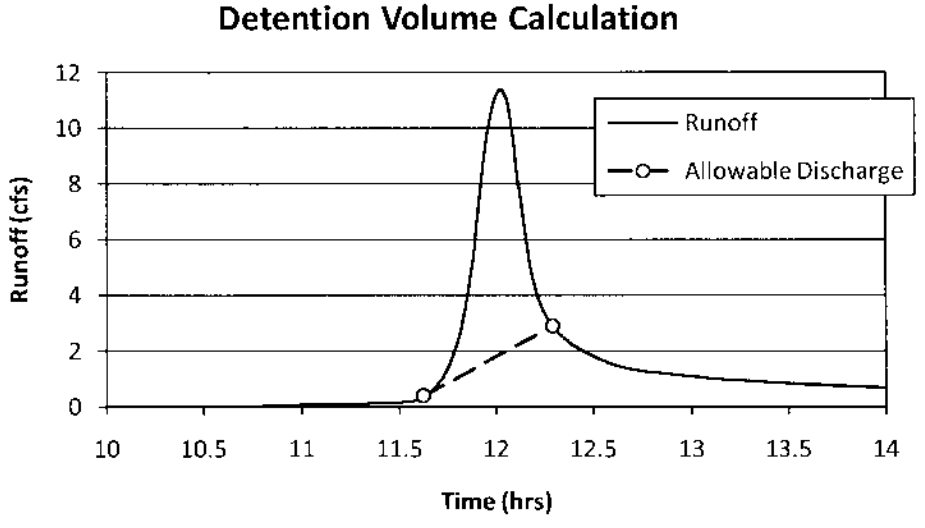
Q_{10} = 3.08 cfs (from TR-55 analysis)
Required surface area at design flow = (0.01)(3.08 cfs) =
= .031 ac = 1350.4 sq. ft.

Dimensions of trap: Depth = 2.8 ft
Length = 50 ft
Width = 27 ft

Required Weir length to pass peak discharge (Q_{10} = 3.08 cfs) – use 8 ft from Table 6.60a of Erosion and Sediment Control Manual.

Detention Basin Calculation Method

1. Runoff hydrographs for the 2 and 10 year, 24 hour storms were determined using NRCS's WIN Tr-55. This is a computer model that uses the SCS method of determining runoff.
2. An outlet discharge rate of 0.3 cfs/ drainage acre was assumed.
3. The volume of detention storage is equal to the difference between the runoff hydrograph and the assumed discharge. See figure below:



4. Detention volumes and peak discharges were determined for both the 2 and 10 year storms per Erosion and Sediment Control Manual Section
5. Outlet sizing was done using the orifice and weir equations. All orifice equations assumed 4 ft of differential head between the headwater (ponding within the detention basin) and tailwater.

Orifice Equation:

$Q = C * A * (2*g*h)^{1/2}$ where Q is flow (cfs), C is the orifice coefficient (assumed 0.6), A is the orifice area (ft^2), g is the gravity constant (32.2 ft/sec^2), and h is the differential head (ft).

Example: Outlet flow = 2.95 cfs. Solve for orifice Area.

$A = Q / (C * (2*g*h)^{1/2}) = 2.95 / (0.6 * (2 * 32.2 * 4)^{1/2}) = .31$ sq ft.

$A = 0.25 * pi * diameter^2$ Solve for diameter

A 0.31 sq ft circle has a diameter of .63 ft. Use 6 inches.

Weir Equation

$Q = C * L * H^{1.5}$ where Q is flow (cfs), C is the weir coefficient (assumed 3 for broad-crested weir), L is the weir length (ft) and H is the head on the weir (ft).

Solve for L.

$L = Q/ (C * H^{1/2})$ Assume H = 1 ft of flow and Q = 26.1 cfs (safely passing 10 yr storm).

$L = 26.1 / (3 * 1^{1/2})$. L = 8.7 ft. Use L = 8 ft for trapezoidal bottom width.

Detention and Sedimentation Requirements

North Existing Sedimentation Basin

2 Yr Peak Flow	11.41	cfs
10 Yr Peak Flow	26.1	cfs
Outflow (0.3 cfs/acre)	2.95	cfs
2-Yr Req. Detention	0.2	Ac-ft
2-Yr Outlet Pipe Size	6	in. orifice
10-Yr Req. Detention	0.66	Ac-ft
10-Yr Weir Length	8	ft
Req. Footprint	7200	sq ft
Assumed Depth:	4	ft

Proposed Phase 2 Detention Basin

2 Yr Peak Flow	0.89	cfs
10 Yr Peak Flow	3.08	cfs
Outflow (0.3 cfs/acre)	0.63	cfs
Required Detention	0.09	Ac-ft
2-Yr Outlet Pipe Size	4	in. orifice
10-Yr Req. Detention	0.07	Ac-ft
10-Yr Weir Length	2	ft
Req. Footprint	1350	sq ft
Assumed Depth:	2.8	ft

Proposed Phase 3 Detention Basin

2 Yr Peak Flow	14.38	
10 Yr Peak Flow	26.56	
Outflow (0.3 cfs/acre)	1.76	
Req. Sedimentation	0.24	Ac-ft
Sed. Basin Footprint	5800	sq ft
10-Yr Req. Detention	0.71	Ac-ft
10-Yr Weir Length	8	ft
Req. Footprint	7700	sq ft
Assumed Depth:	4	

DETENTION BASIN REQUIREMENTS

Analysis of existing sedimentation basin. North Channel outlets into basin via 18-inch CMP

Contributing Area 9.82 Ac Allowable Discharge 0.3 cfs Ac = 2.946 cfs

N. Channel hydrograph - 2 year volume

Time (hrs)	Flows (cfs)	Vol (cft)	Dish. Time	Det Vol	Total Volume
10.809	0.05	1.8			8865.73 cft
10.819	0.05	1.8			0.20 Ac-ft
10.829	0.05	1.8			
10.839	0.05	1.8			Max (cfs)
10.849	0.05	1.8			11.41
10.859	0.05	1.8			
10.869	0.05	1.584			
10.877	0.06	2.16			
10.887	0.06	2.16			
10.897	0.06	2.16			
10.907	0.06	2.16			
10.917	0.06	2.16			
10.927	0.06	2.16			
10.937	0.06	1.728			
10.945	0.06	2.16			
10.955	0.06	2.16			
10.965	0.06	2.16			
10.975	0.06	2.16			
10.985	0.06	2.34			
10.995	0.07	2.52			
11.005	0.07	2.016			
11.013	0.07	2.52			
11.023	0.07	2.52			
11.033	0.07	2.52			
11.043	0.07	2.52			
11.053	0.07	2.52			
11.063	0.07	2.52			
11.073	0.07	2.016			
11.081	0.07	2.52			
11.091	0.07	2.7			
11.101	0.08	2.88			
11.111	0.08	2.88			
11.121	0.08	2.88			
11.131	0.08	2.88			
11.141	0.08	2.304			
11.149	0.08	2.88			
11.159	0.08	3.06			
11.169	0.09	3.24			
11.179	0.09	3.24			
11.189	0.09	3.24			
11.199	0.09	3.24			
11.209	0.09	2.592			
11.217	0.09	3.24			
11.227	0.09	3.42			
11.237	0.1	3.6			
11.247	0.1	3.6			
11.257	0.1	3.6			
11.267	0.1	3.6			
11.277	0.1	3.402			
11.286	0.11	3.96			
11.296	0.11	3.96			
11.306	0.11	3.96			
11.316	0.11	3.96			
11.326	0.11	3.96			
11.336	0.11	4.14			
11.346	0.12	3.456			
11.354	0.12	4.32			
11.364	0.12	4.32			
11.374	0.12	4.5			
11.384	0.13	4.68			
11.394	0.13	4.68			
11.404	0.13	4.68			
11.414	0.13	3.744			
11.422	0.13	4.86			
11.432	0.14	5.04			
11.442	0.14	5.04			
11.452	0.14	5.04			
11.462	0.14	5.04			
11.472	0.14	5.22			
11.482	0.15	4.32			
11.49	0.15	5.4			
11.5	0.15	5.4			
11.51	0.15	5.58			
11.52	0.16	5.76			
11.53	0.16	5.94			
11.54	0.17	6.3			
11.55	0.18	5.328			
11.558	0.19	7.02			
11.568	0.2	7.56			
11.578	0.22	8.1			
11.588	0.23	8.64			

N. Channel hydrograph - 10 year volume

Time (hrs)	Flows (cfs)	Vol (cft)	Dish. Time	Det Vol	Total Volume
9.481	0.05	1.8	0		28779.59 cft
9.491	0.05	1.8	0		0.66 Ac-ft
9.501	0.05	1.8	0		
9.511	0.05	1.8	0		Max (cfs)
9.521	0.05	1.8	0		26.1
9.531	0.05	1.8	0		
9.541	0.05	1.44	0		
9.549	0.05	1.8	0		
9.559	0.05	1.8	0		
9.569	0.05	1.8	0		
9.579	0.05	1.8	0		
9.589	0.05	1.8	0		
9.599	0.05	1.8	0		
9.609	0.05	1.44	0		
9.617	0.05	1.8	0		
9.627	0.05	1.8	0		
9.637	0.05	1.98	0		
9.647	0.06	2.16	0		
9.657	0.06	2.16	0		
9.667	0.06	2.16	0		
9.677	0.06	1.944	0		
9.686	0.06	2.16	0		
9.696	0.06	2.16	0		
9.706	0.06	2.16	0		
9.716	0.06	2.16	0		
9.726	0.06	2.16	0		
9.736	0.06	2.16	0		
9.746	0.06	1.728	0		
9.754	0.06	2.16	0		
9.764	0.06	2.16	0		
9.774	0.06	2.16	0		
9.784	0.06	2.16	0		
9.794	0.06	2.16	0		
9.804	0.06	2.16	0		
9.814	0.06	1.728	0		
9.822	0.06	2.16	0		
9.832	0.06	2.16	0		
9.842	0.06	2.34	0		
9.852	0.07	2.52	0		
9.862	0.07	2.52	0		
9.872	0.07	2.52	0		
9.882	0.07	2.016	0		
9.89	0.07	2.52	0		
9.9	0.07	2.52	0		
9.91	0.07	2.52	0		
9.92	0.07	2.52	0		
9.93	0.07	2.52	0		
9.94	0.07	2.52	0		
9.95	0.07	2.016	0		
9.958	0.07	2.52	0		
9.968	0.07	2.52	0		
9.978	0.07	2.52	0		
9.988	0.07	2.52	0		
9.998	0.07	2.52	0		
10.008	0.07	2.7	0		
10.018	0.08	2.304	0		
10.026	0.08	2.88	0		
10.036	0.08	2.88	0		
10.046	0.08	2.88	0		
10.056	0.08	2.88	0		
10.066	0.08	2.88	0		
10.076	0.08	2.88	0		
10.086	0.08	2.304	0		
10.094	0.08	2.88	0		
10.104	0.08	2.88	0		
10.114	0.08	2.88	0		
10.124	0.08	2.88	0		
10.134	0.08	2.88	0		
10.144	0.08	2.88	0		
10.154	0.08	2.448	0		
10.162	0.09	3.24	0		
10.172	0.09	3.24	0		
10.182	0.09	3.24	0		
10.192	0.09	3.24	0		
10.202	0.09	3.24	0		
10.212	0.09	3.24	0		
10.222	0.09	2.592	0		
10.23	0.09	3.24	0		
10.24	0.09	3.24	0		
10.25	0.09	3.24	0		
10.26	0.09	3.24	0		

11.598	0.25	9.72		
11.608	0.29	11.52		
11.618	0.35	10.656		
11.626	0.39	14.58		
11.636	0.42	15.84		
11.646	0.46	17.46	0.465716	0.01276
11.656	0.51	19.44	0.503575	0.629864
11.666	0.57	21.6	0.541433	1.426968
11.676	0.63	23.94	0.579291	2.404072
11.686	0.7	21.168	0.617149	2.957973
11.694	0.77	29.16	0.647436	5.17086
11.704	0.85	32.04	0.685294	6.687964
11.714	0.93	34.92	0.723152	8.205068
11.724	1.01	38.88	0.761011	10.80217
11.734	1.15	43.74	0.798869	11.29928
11.744	1.28	48.6	0.836727	17.79638
11.754	1.42	43.056	0.874585	17.43182
11.762	1.57	59.76	0.904872	26.50317
11.772	1.75	66.42	0.94273	31.80027
11.782	1.94	73.44	0.980588	37.45738
11.792	2.14	81	1.018446	43.65448
11.802	2.36	89.1	1.056305	50.39158
11.812	2.59	97.92	1.094163	57.84869
11.822	2.85	86.112	1.132021	53.07367
11.83	3.13	118.62	1.162308	76.09548
11.84	3.46	131.04	1.200166	87.15258
11.85	3.82	145.26	1.238024	100.0097
11.86	4.25	161.46	1.275882	114.8468
11.87	4.72	179.64	1.313741	131.6639
11.88	5.26	199.8	1.351599	150.461
11.89	5.84	176.832	1.389457	136.3795
11.898	6.44	243	1.419744	191.2078
11.908	7.06	265.32	1.457602	212.1649
11.918	7.68	287.46	1.49546	232.942
11.928	8.29	308.88	1.533318	252.9991
11.938	8.87	328.86	1.571176	271.6162
11.948	9.4	346.68	1.609035	288.0733
11.958	9.86	289.584	1.646893	241.7174
11.966	10.25	374.94	1.677179	313.8801
11.976	10.58	385.74	1.715038	323.3172
11.986	10.85	394.56	1.752896	330.7743
11.996	11.07	401.58	1.790754	336.4313
12.006	11.24	406.8	1.828612	340.2885
12.016	11.36	409.86	1.866471	341.9856
12.026	11.41	328.176	1.904329	272.8952
12.034	11.38	407.7	1.934615	337.3724
12.044	11.27	402.12	1.972474	330.4295
12.054	11.07	392.94	2.010332	319.8866
12.064	10.76	379.98	2.04819	305.5637
12.074	10.35	364.14	2.086048	288.3608
12.084	9.88	345.96	2.123906	268.8179
12.094	9.34	293.544	2.161765	222.9509
12.103	8.78	305.82	2.195837	226.0884
12.113	8.21	285.3	2.233695	204.2055
12.123	7.64	265.11	2.271554	182.6826
12.133	7.09	245.7	2.309412	161.8797
12.143	6.56	227.34	2.34727	142.1568
12.153	6.07	210.6	2.385128	124.0539
12.163	5.63	156.384	2.422986	86.16586
12.171	5.23	181.8	2.453273	92.80072
12.181	4.87	169.92	2.491131	79.55783
12.191	4.57	159.66	2.528989	67.93493
12.201	4.3	150.48	2.566848	57.39204
12.211	4.06	142.56	2.604706	48.10914
12.221	3.86	135.54	2.642564	39.72624
12.231	3.67	103.392	2.680422	25.75971
12.239	3.51	123.66	2.710709	25.39303
12.249	3.36	118.62	2.748567	18.99014
12.259	3.23	114.12	2.786425	13.12724
12.269	3.11	109.98	2.824284	7.621344
12.279	3	106.2	2.862142	2.481448
12.289	2.9	102.96	2.9	50.76
12.299	2.82	80.064		
12.307	2.74	97.2		
12.317	2.66	94.5		
12.327	2.59	92.16		
12.337	2.53	90		
12.347	2.47	88.02		
12.357	2.42	86.22		
12.367	2.37	67.536		
12.375	2.32	82.62		
12.385	2.27	80.82		
12.395	2.22	79.2		
12.405	2.18	77.76		
12.415	2.13	76.32		
12.425	2.1	74.88		
12.435	2.06	58.752		

10.27	0.09	3.42	0
10.28	0.1	3.6	0
10.29	0.1	2.88	0
10.298	0.1	3.6	0
10.308	0.1	3.6	0
10.318	0.1	3.6	0
10.328	0.1	3.6	0
10.338	0.1	3.6	0
10.348	0.1	3.6	0
10.358	0.1	2.88	0
10.366	0.1	3.6	0
10.376	0.1	3.78	0
10.386	0.11	3.96	0
10.396	0.11	3.96	0
10.406	0.11	3.96	0
10.416	0.11	3.96	0
10.426	0.11	3.564	0
10.435	0.11	3.96	0
10.445	0.11	3.96	0
10.455	0.11	3.96	0
10.465	0.11	3.96	0
10.475	0.11	3.96	0
10.485	0.11	4.14	0
10.495	0.12	3.456	0
10.503	0.12	4.32	0
10.513	0.12	4.32	0
10.523	0.12	4.32	0
10.533	0.12	4.32	0
10.543	0.12	4.32	0
10.553	0.12	4.32	0
10.563	0.12	3.6	0
10.571	0.13	5.58	0
10.581	0.18	6.48	0
10.591	0.18	6.48	0
10.601	0.18	6.48	0
10.611	0.18	6.66	0
10.621	0.19	6.84	0
10.631	0.19	5.472	0
10.639	0.19	7.02	0
10.649	0.2	7.2	0
10.659	0.2	7.2	0
10.669	0.2	7.38	0
10.679	0.21	7.56	0
10.689	0.22	7.56	0
10.699	0.21	6.192	0
10.707	0.22	7.92	0
10.717	0.22	7.92	0
10.727	0.22	8.1	0
10.737	0.23	8.28	0
10.747	0.23	8.28	0
10.757	0.23	8.46	0
10.767	0.24	6.912	0
10.775	0.24	8.64	0
10.785	0.24	8.82	0
10.795	0.25	9	0
10.805	0.25	9	0
10.815	0.25	9.18	0
10.825	0.26	9.36	0
10.835	0.26	7.632	0
10.843	0.27	9.72	0
10.853	0.27	9.72	0
10.863	0.27	9.9	0
10.873	0.28	10.08	0
10.883	0.28	10.26	0
10.893	0.29	10.44	0
10.903	0.29	8.352	0
10.911	0.29	10.62	0
10.921	0.3	10.8	0
10.931	0.3	10.98	0
10.941	0.31	11.16	0
10.951	0.31	11.16	0
10.961	0.31	11.34	0
10.971	0.32	9.216	0
10.979	0.32	11.7	0
10.989	0.33	11.88	0
10.999	0.33	12.06	0
11.009	0.34	12.24	0
11.019	0.34	12.42	0
11.029	0.35	12.6	0
11.039	0.35	10.224	0
11.047	0.36	12.96	0
11.057	0.36	13.14	0
11.067	0.37	13.32	0
11.077	0.37	13.5	0
11.083	0.38	13.86	0
11.097	0.39	14.04	0
11.107	0.39	11.376	0

12.443	2.02	72.18	11.115	0.4	14.4	0	
12.453	1.99	70.92	11.125	0.4	14.58	0	
12.463	1.95	69.48	11.135	0.41	15.48	0	
12.473	1.91	68.22	11.145	0.45	16.74	0	
12.483	1.88	66.96	11.155	0.48	17.46	0	
12.493	1.84	65.7	11.165	0.49	17.82	0	
12.503	1.81	51.552	11.175	0.5	14.544	0	
12.511	1.77	63.18	11.183	0.51	18.54	0	
12.521	1.74	62.1	11.193	0.52	18.9	0	
12.531	1.71	61.02	11.203	0.53	19.26	0	
12.541	1.68	59.94	11.213	0.54	19.62	0	
12.551	1.65	59.04	11.223	0.55	19.98	0	
12.561	1.63	58.14	11.233	0.56	20.52	0	
12.571	1.6	45.648	11.243	0.58	18.954	0	
12.579	1.57	56.16	11.252	0.59	21.42	0	
12.589	1.55	55.26	11.262	0.6	21.78	0	
12.599	1.52	54.36	11.272	0.61	22.32	0	
12.609	1.5	53.64	11.282	0.63	22.86	0	
12.619	1.48	52.92	11.292	0.64	23.22	0	
12.629	1.46	52.2	11.302	0.65	23.76	0	
12.639	1.44	41.184	11.312	0.67	19.44	0	
12.647	1.42	50.76	11.32	0.68	24.66	0	
12.657	1.4	50.22	11.33	0.69	25.2	0	
12.667	1.39	49.68	11.34	0.71	25.74	0	
12.677	1.37	49.14	11.35	0.72	26.1	0	
12.687	1.36	48.6	11.36	0.73	26.64	0	
12.697	1.34	48.06	11.37	0.75	27.18	0	
12.707	1.33	38.16	11.38	0.76	22.176	0	
12.715	1.32	47.34	11.388	0.78	28.26	0	
12.725	1.31	46.98	11.398	0.79	28.8	0	
12.735	1.3	46.62	11.408	0.81	29.52	0	
12.745	1.29	46.26	11.418	0.83	30.06	0	
12.755	1.28	45.9	11.428	0.84	30.6	0	
12.765	1.27	45.54	11.438	0.86	31.14	0	
12.775	1.26	36.288	11.448	0.87	25.344	0	
12.783	1.26	45.18	11.456	0.89	32.4	0	
12.793	1.25	44.82	11.466	0.91	32.94	0	
12.803	1.24	44.46	11.476	0.92	33.48	0	
12.813	1.23	44.1	11.486	0.94	34.2	0	
12.823	1.22	43.92	11.496	0.96	34.92	0	
12.833	1.22	43.74	11.506	0.98	35.64	0	
12.843	1.21	34.704	11.516	1	29.232	2	0.224073
12.851	1.2	43.02	11.524	1.03	37.62	1.014439	0.775296
12.861	1.19	42.84	11.534	1.06	38.88	1.032489	1.385524
12.871	1.19	42.66	11.544	1.1	40.68	1.050538	2.535752
12.881	1.18	42.3	11.554	1.16	43.02	1.068587	4.22598
12.891	1.17	41.94	11.564	1.23	45.72	1.086636	6.276208
12.901	1.16	41.76	11.574	1.31	48.78	1.104686	8.686436
12.911	1.16	37.422	11.584	1.4	41.76	1.122735	9.217313
12.92	1.15	41.22	11.592	1.5	55.8	1.137174	14.53685
12.93	1.14	41.04	11.602	1.6	59.76	1.155223	17.84707
12.94	1.14	40.86	11.612	1.72	64.08	1.173273	21.5173
12.95	1.13	40.5	11.622	1.84	68.76	1.191322	25.54753
12.96	1.12	40.14	11.632	1.98	74.16	1.209371	30.29776
12.97	1.11	39.96	11.642	2.11	80.28	1.22742	35.76799
12.98	1.11	31.824	11.652	2.32	69.696	1.245469	33.61855
12.988	1.1	39.42	11.66	2.52	94.86	1.259909	49.1784
12.998	1.09	39.06	11.67	2.75	103.68	1.277958	57.34862
13.008	1.08	38.88	11.68	3.01	113.22	1.296007	66.23885
13.018	1.08	38.7	11.69	3.28	123.12	1.314057	75.48908
13.028	1.07	38.34	11.7	3.56	133.56	1.332106	85.27931
13.038	1.06	38.16	11.71	3.86	144.54	1.350155	95.60954
13.048	1.06	30.384	11.72	4.17	124.848	1.368204	85.23579
13.056	1.05	37.62	11.728	4.5	168.3	1.382644	118.1999
13.066	1.04	37.44	11.738	4.85	181.62	1.400693	130.8702
13.076	1.04	37.26	11.748	5.24	196.2	1.418742	144.8004
13.086	1.03	36.9	11.758	5.66	212.04	1.436791	159.9906
13.096	1.02	36.72	11.768	6.12	229.14	1.45484	176.4409
13.106	1.02	36.54	11.778	6.61	247.32	1.47289	193.9711
13.116	1.01	29.088	11.788	7.13	213.12	1.490939	169.973
13.124	1.01	36.18	11.796	7.63	286.2	1.505378	234.6825
13.134	1	36	11.806	8.23	307.08	1.523428	251.9117
13.144	1	35.82	11.816	8.83	329.4	1.541477	273.582
13.154	0.99	35.46	11.826	9.47	353.88	1.559526	297.4122
13.164	0.98	35.28	11.836	10.19	381.24	1.577575	324.1224
13.174	0.98	35.1	11.846	10.99	412.02	1.595624	354.2526
13.184	0.97	27.936	11.856	11.9	357.264	1.613674	340.5823
13.192	0.97	34.92	11.864	12.91	484.92	1.628113	425.983
13.202	0.97	34.74	11.874	14.03	526.86	1.646162	467.2733
13.212	0.96	34.56	11.884	15.23	571.68	1.664211	511.4435
13.222	0.96	34.38	11.894	16.52	618.48	1.682261	557.5937
13.232	0.95	34.2	11.904	17.84	665.64	1.70031	604.104
13.242	0.95	31.02	11.914	19.14	711.9	1.718359	649.7142
13.252	0.94	27.072	11.924	20.41	688.8	1.736408	554.5835
13.26	0.94	33.84	11.932	21.59	796.68	1.750848	733.3246
13.27	0.94	33.66	11.942	22.67	833.22	1.768897	769.2148
13.28	0.93	33.48	11.952	23.62	864.36	1.786946	799.7051

13.29	0.93	33.3		
13.3	0.92	33.12		
13.31	0.92	32.94		
13.32	0.91	26.208		
13.328	0.92	32.76		
13.338	0.91	32.58		
13.348	0.9	32.4		
13.358	0.9	32.4		
13.368	0.9	32.22		
13.378	0.89	32.04		
13.388	0.89	25.488		
13.396	0.88	31.68		
13.406	0.88	31.5		
13.416	0.87	31.32		
13.426	0.87	31.32		
13.436	0.87	31.14		
13.446	0.86	30.96		
13.456	0.86	24.768		
13.464	0.86	30.78		
13.474	0.85	30.6		
13.484	0.85	30.42		
13.494	0.84	30.24		
13.504	0.84	30.06		
13.514	0.83	29.88		
13.524	0.83	23.904		
13.532	0.83	29.7		
13.542	0.82	29.52		
13.552	0.82	29.52		
13.562	0.82	29.34		
13.572	0.81	29.16		
13.582	0.81	28.98		
13.592	0.8	23.04		
13.6	0.8	28.8		
13.61	0.8	28.62		
13.62	0.79	28.44		
13.63	0.79	28.44		
13.64	0.79	28.26		
13.65	0.78	28.08		
13.66	0.78	22.464		
13.668	0.78	27.9		
13.678	0.77	27.72		
13.688	0.77	27.72		
13.698	0.77	27.54		
13.708	0.76	27.36		
13.718	0.76	27.36		
13.728	0.76	24.462		
13.737	0.75	27		
13.747	0.75	27		
13.757	0.75	26.82		
13.767	0.74	26.64		
13.777	0.74	26.64		
13.787	0.74	26.64		
13.797	0.74	21.168		
13.805	0.73	26.28		
13.815	0.73	26.28		
13.825	0.73	26.1		
13.835	0.72	25.92		
13.845	0.72	25.92		
13.855	0.72	25.74		
13.865	0.71	20.448		
13.873	0.71	25.56		
13.883	0.71	25.56		
13.893	0.71	25.38		
13.903	0.7	25.2		
13.913	0.7	25.2		
13.923	0.7	25.02		
13.933	0.69	19.872		
13.941	0.69	24.84		
13.951	0.69	24.84		
13.961	0.69	24.66		
13.971	0.68	24.48		
11.962	24.4	889.56	1.804995	824.2553
11.972	25.02	909	1.823045	843.0455
11.982	25.48	923.22	1.841094	856.6157
11.992	25.81	746.208	1.859143	692.4568
12	26.01	937.08	1.877582	870.2061
12.01	26.1	938.88	1.891632	870.4564
12.02	26.06	935.1	1.909682	866.0266
12.03	25.89	926.1	1.92773	856.3768
12.04	25.56	911.16	1.945779	840.7871
12.05	25.06	889.74	1.963829	818.7173
12.06	24.37	774.684	1.981878	710.208
12.069	23.45	824.76	1.998122	752.5027
12.079	22.37	783.72	2.016171	710.8129
12.089	21.17	739.26	2.034221	665.7032
12.099	19.9	693	2.05227	618.7934
12.109	18.6	646.2	2.070319	571.3436
12.119	17.3	600.12	2.088368	524.6139
12.129	16.04	444.384	2.106418	383.5112
12.137	14.82	513.28	2.120857	436.5043
12.147	13.69	474.22	2.138906	396.7945
12.157	12.65	438.48	2.156955	360.5047
12.167	11.71	406.26	2.175005	327.6349
12.177	10.86	377.64	2.193054	298.3652
12.187	10.12	352.44	2.211103	272.5154
12.197	9.46	264.384	2.229152	199.9765
12.205	8.9	311.1	2.243592	230.3028
12.215	8.4	294.66	2.261641	212.916
12.225	7.97	279.9	2.27969	197.5063
12.235	7.58	266.58	2.297739	183.5365
12.245	7.23	254.7	2.315789	171.0067
12.255	6.92	244.08	2.333838	159.737
12.265	6.64	187.488	2.351887	119.5457
12.273	6.38	225.54	2.366326	140.0274
12.283	6.15	217.62	2.384376	131.4576
12.293	5.94	210.42	2.402425	123.6078
12.303	5.75	203.94	2.420474	116.478
12.313	5.58	198	2.438523	109.8883
12.323	5.42	192.6	2.456572	103.8385
12.333	5.28	150.048	2.474622	78.57097
12.341	5.14	182.88	2.489061	92.94892
12.351	5.02	178.56	2.50711	87.97914
12.361	4.9	174.42	2.525516	83.18937
12.371	4.79	170.46	2.543209	78.5796
12.381	4.68	166.68	2.561258	74.14983
12.391	4.58	163.08	2.579307	69.90005
12.401	4.48	127.328	2.597356	52.71621
12.409	4.39	156.42	2.611796	62.07046
12.419	4.3	153.36	2.629845	58.36069
12.429	4.22	150.48	2.647894	54.83092
12.439	4.14	147.6	2.665943	51.30115
12.449	4.06	144.72	2.683993	47.77138
12.459	3.98	141.84	2.702042	44.2416
12.469	3.9	121.168	2.720091	32.62145
12.477	3.82	136.26	2.734531	37.49201
12.487	3.75	133.74	2.75258	34.32224
12.497	3.68	131.22	2.770629	31.15247
12.507	3.61	128.7	2.788678	27.9827
12.517	3.54	126.18	2.806727	24.81293
12.527	3.47	123.84	2.824777	21.82315
12.537	3.41	93.343	2.842826	15.26269
12.545	3.35	119.52	2.857265	16.33356
12.555	3.29	117.36	2.875314	13.52379
12.565	3.23	115.38	2.893364	10.89402
12.575	3.18	113.4	2.911413	8.264248
12.585	3.12	111.42	2.929462	5.634476
12.595	3.07	109.62	2.947511	3.184704
12.605	3.02	86.4	2.965561	0.783927
12.613	2.98	106.38	2.98	52.74
12.623	2.93	104.76		
12.633	2.89	103.32		
12.643	2.85	102.06		

DETENTION BASIN REQUIREMENTS

Analysis of Proposed Phase 2 detention basin.

Contributing Area	2.1 Ac	Allowable Discharge	0.3	cfs/Ac	0.63 cfs
Sediment Storage Basin	1800 cfs distributed Acre		#DIV/0!		

N. Channel hydrograph - 2 year volume

Time (hrs)	Flows (cfs)	Vel (ft/s)	Dish Line	Det Vol	Total Volume
11.885	0.07	5.8.4	0.07	0.572171	800.12 cft
11.902	0.12	8.674	0.101302	1.716514	0.01 Ac ft
11.919	0.17	12.546	0.132603	3.472857	
11.936	0.24	17.436	0.163905	6.1472	
11.953	0.32	22.338	0.195206	9.433543	0.89
11.97	0.41	27.846	0.226508	13.02589	
11.987	0.5	27.468	0.25781	16.8048	
12.001	0.59	38.556	0.283587	20.24263	
12.018	0.67	43.452	0.314889	23.22297	
12.035	0.75	47.736	0.34619	25.59131	
12.052	0.81	51.102	0.377492	27.04166	
12.069	0.86	53.55	0.408794	27.574	
12.086	0.89	54.468	0.440095	26.57634	
12.103	0.89	53.634	0.471397	20.196	
12.117	0.88	52.938	0.497175	21.55309	
12.134	0.85	50.49	0.528476	17.18943	
12.151	0.8	47.736	0.559778	12.51977	
12.168	0.76	44.982	0.591079	7.860114	
12.185	0.71	41.616	0.622381	22.57114	
12.202	0.65	38.25			
12.219	0.6	27.144			
12.232	0.56	33.048			
12.249	0.52	30.6			
12.266	0.48	28.458			
12.283	0.45	26.928			
12.3	0.43	25.398			
12.317	0.4	23.868			
12.334	0.38	18.9			
12.348	0.37	22.032			
12.365	0.35	21.114			
12.382	0.34	20.196			
12.399	0.32	19.278			
12.416	0.31	18.666			
12.433	0.3	18.054			
12.45	0.29	14.364			
12.464	0.28	16.83			
12.481	0.27	16.218			
12.498	0.26	15.912			
12.515	0.26	15.606			
12.532	0.25	14.994			
12.549	0.24	14.382			
12.566	0.23	13.592			
12.58	0.23	13.77			
12.597	0.22	13.158			
12.614	0.21	12.852			
12.631	0.21	12.546			
12.648	0.2	12.24			
12.665	0.2	11.934			
12.682	0.19	9.576			
12.696	0.19	11.322			
12.713	0.18	11.016			
12.73	0.18	11.026			
12.747	0.18	10.71			
12.764	0.17	10.404			
12.781	0.17	10.404			
12.798	0.17	8.568	1.751079		
12.812	0.17	10.098			

N. Channel hydrograph - 10 year volume

Time (hrs)	Flows (cfs)	Vel (ft/s)	Dish Line	Det Vol	Total Volume
11.669	0.06	4.284	0.06	0.768016	1098.54 cft
11.686	0.08	5.508	0.071241	0.804649	0.07 Ac ft
11.703	0.1	7.038	0.082483	1.646081	
11.72	0.13	9.18	0.093724	3.100114	
11.737	0.17	11.628	0.104965	4.860146	0.68
11.754	0.21	14.382	0.116206	6.926179	
11.771	0.26	14.616	0.127448	7.959341	
11.785	0.32	21.726	0.136705	13.01565	
11.802	0.39	26.316	0.147947	16.91768	
11.819	0.47	31.824	0.159188	21.73771	
11.836	0.57	38.556	0.170429	27.78175	
11.853	0.69	46.512	0.181671	35.04978	
11.87	0.83	55.998	0.192912	43.84781	
11.887	1	51.48	0.204153	41.57448	
11.9	1.2	80.172	0.212749	66.80775	
11.917	1.42	94.248	0.223991	80.19578	
11.934	1.66	109.242	0.235232	94.50182	
11.951	1.91	124.542	0.246473	109.1138	
11.968	2.16	139.23	0.257715	123.1139	
11.985	2.39	152.694	0.268956	135.8899	
12.002	2.6	135.828	0.280197	121.4728	
12.016	2.79	178.812	0.289455	156.9734	
12.033	2.93	182.376	0.300696	163.6794	
12.05	3.03	190.966	0.311937	167.5315	
12.067	3.08	198.396	0.323179	168.8735	
12.084	3.08	196.554	0.33442	165.5435	
12.101	3.01	190.54	0.345661	159.0415	
12.118	2.89	141.876	0.356903	123.6548	
12.132	2.74	162.18	0.366616	139.427	
12.149	2.56	150.858	0.377401	127.4171	
12.166	2.37	139.23	0.388643	115.1011	
12.183	2.18	127.908	0.399884	103.0911	
12.2	2	113.198	0.411125	91.69315	
12.217	1.84	107.1	0.422367	80.90718	
12.234	1.67	80.088	0.433608	68.30087	
12.248	1.52	89.352	0.442865	65.90465	
12.265	1.4	82.62	0.454107	54.48468	
12.282	1.3	76.806	0.465348	47.96272	
12.299	1.22	71.93	0.476589	42.39875	
12.316	1.14	67.626	0.487831	37.42678	
12.333	1.07	63.648	0.499072	32.76081	
12.35	1.01	59.644	0.510313	28.69097	
12.364	0.96	57.252	0.519571	25.08029	
12.381	0.91	54.468	0.530812	21.63832	
12.398	0.87	52.02	0.542053	18.50235	
12.415	0.83	49.878	0.553295	15.67238	
12.432	0.8	47.736	0.564536	12.84242	
12.449	0.76	45.594	0.575777	10.01245	
12.466	0.73	36.288	0.587019	6.468974	
12.48	0.71	42.534	0.596276	5.697919	
12.497	0.68	41.004	0.607517	3.479951	
12.514	0.66	39.474	0.618759	1.261984	
12.531	0.63	37.944	0.63		
12.548	0.61	36.72			
12.565	0.59	35.496			
12.582	0.57	26.508			
12.595	0.55	33.354			

DETENTION BASIN REQUIREMENTS

Analysis of proposed Phase 3 detention basin

Contributing Area = 5.87 Ac Allowable Discharge 0.3 cfs/Ac = 1.761 cfs

Subtract Sump Basin = 1801 cfs/distributed Acre 0.242562

N. Channel hydrograph - 2 year volume

Time (hrs)	Flows (cfs)	Vol (cft)	Disch. Line Det Vol	Total Volume
9.971	0.05	1.08	0	14085.44 cft
9.977	0.05	1.08	0	0.32 Ac-ft
9.983	0.05	1.08	0	
9.989	0.05	1.08	0	
9.995	0.05	1.08	0	14.38
10.001	0.05	1.08	0	
10.007	0.05	1.44	0	
10.015	0.05	1.08	0	
10.021	0.05	1.08	0	
10.027	0.05	1.08	0	
10.033	0.05	1.08	0	
10.039	0.05	1.08	0	
10.045	0.05	1.08	0	
10.051	0.05	1.584	0	
10.059	0.06	1.296	0	
10.065	0.06	1.296	0	
10.071	0.06	1.296	0	
10.077	0.06	1.296	0	
10.083	0.06	1.296	0	
10.089	0.06	1.296	0	
10.095	0.06	1.944	0	
10.104	0.06	1.296	0	
10.11	0.06	1.296	0	
10.116	0.06	1.296	0	
10.122	0.06	1.296	0	
10.128	0.06	1.296	0	
10.134	0.06	1.296	0	
10.14	0.06	1.728	0	
10.148	0.06	1.296	0	
10.154	0.06	1.296	0	
10.16	0.06	1.296	0	
10.166	0.06	1.296	0	
10.172	0.06	1.296	0	
10.178	0.06	1.296	0	
10.184	0.06	1.872	0	
10.192	0.07	1.512	0	
10.198	0.07	1.512	0	
10.204	0.07	1.512	0	
10.21	0.07	1.512	0	
10.216	0.07	1.512	0	
10.222	0.07	1.512	0	
10.228	0.07	2.016	0	
10.236	0.07	1.512	0	
10.242	0.07	1.512	0	
10.248	0.07	1.512	0	
10.254	0.07	1.512	0	
10.26	0.07	1.512	0	
10.266	0.07	1.512	0	
10.272	0.07	2.016	0	
10.28	0.07	1.512	0	
10.286	0.07	1.512	0	
10.292	0.07	1.512	0	
10.298	0.07	1.512	0	
10.304	0.07	1.62	0	
10.31	0.08	1.728	0	
10.316	0.08	2.592	0	
10.325	0.08	1.728	0	
10.331	0.08	1.728	0	
10.337	0.08	1.728	0	
10.343	0.08	1.728	0	
10.349	0.08	1.728	0	
10.355	0.08	1.728	0	
10.361	0.08	2.304	0	
10.369	0.08	1.728	0	
10.375	0.08	1.728	0	
10.381	0.08	1.728	0	
10.387	0.08	1.728	0	
10.393	0.08	1.728	0	
10.399	0.08	1.728	0	
10.405	0.08	2.304	0	
10.413	0.08	1.728	0	
10.419	0.08	2.88	0	
10.425	0.09	1.944	0	
10.431	0.09	1.944	0	
10.437	0.09	1.944	0	
10.443	0.09	1.944	0	
10.449	0.09	2.592	0	
10.457	0.09	1.944	0	
10.463	0.09	1.944	0	
10.469	0.09	1.944	0	
10.475	0.09	1.944	0	
10.481	0.09	1.944	0	
10.487	0.09	1.944	0	
10.493	0.09	2.592	0	

N. Channel hydrograph - 10 year volume

Time (hrs)	Flows (cfs)	Vol (cft)	Disch. Line Det Vol	Total Volume
8.23	0.05	1.08	0	30722.24 cft
8.236	0.05	1.08	0	0.71 Ac-ft
8.242	0.05	1.08	0	
8.248	0.05	1.08	0	
8.254	0.05	1.08	0	26.56
8.26	0.05	1.08	0	
8.266	0.05	1.44	0	
8.274	0.05	1.08	0	
8.28	0.05	1.08	0	
8.286	0.05	1.08	0	
8.292	0.05	1.08	0	
8.298	0.05	1.08	0	
8.304	0.05	1.08	0	
8.31	0.05	1.44	0	
8.318	0.05	1.188	0	
8.324	0.06	1.296	0	
8.33	0.06	1.296	0	
8.336	0.06	1.296	0	
8.342	0.06	1.296	0	
8.348	0.06	1.296	0	
8.354	0.06	1.728	0	
8.362	0.06	1.296	0	
8.368	0.06	1.296	0	
8.374	0.06	1.296	0	
8.38	0.06	1.296	0	
8.386	0.06	1.296	0	
8.392	0.06	1.296	0	
8.398	0.06	1.944	0	
8.407	0.06	1.296	0	
8.413	0.06	1.296	0	
8.419	0.06	1.296	0	
8.425	0.06	1.296	0	
8.431	0.06	1.296	0	
8.437	0.06	1.296	0	
8.443	0.06	1.728	0	
8.451	0.06	1.296	0	
8.457	0.06	1.296	0	
8.463	0.06	1.296	0	
8.469	0.06	1.296	0	
8.475	0.06	1.296	0	
8.481	0.06	1.296	0	
8.487	0.06	1.872	0	
8.495	0.07	1.512	0	
8.501	0.07	1.512	0	
8.507	0.07	1.512	0	
8.513	0.07	1.512	0	
8.519	0.07	1.512	0	
8.525	0.07	1.512	0	
8.531	0.07	2.016	0	
8.539	0.07	1.512	0	
8.545	0.07	1.512	0	
8.551	0.07	1.512	0	
8.557	0.07	1.512	0	
8.563	0.07	1.512	0	
8.569	0.07	1.512	0	
8.575	0.07	2.268	0	
8.584	0.07	1.512	0	
8.59	0.07	1.512	0	
8.596	0.07	1.512	0	
8.602	0.07	1.512	0	
8.608	0.07	1.512	0	
8.614	0.07	1.512	0	
8.62	0.07	2.016	0	
8.628	0.07	1.512	0	
8.634	0.07	1.512	0	
8.64	0.07	1.512	0	
8.646	0.07	1.512	0	
8.652	0.07	1.62	0	
8.658	0.08	1.728	0	
8.664	0.08	2.304	0	
8.672	0.08	1.728	0	
8.678	0.08	1.728	0	
8.684	0.08	1.728	0	
8.69	0.08	1.728	0	
8.696	0.08	1.728	0	
8.702	0.08	1.728	0	
8.708	0.08	2.304	0	
8.716	0.08	1.728	0	
8.722	0.08	1.728	0	
8.728	0.08	1.728	0	
8.734	0.08	1.728	0	
8.74	0.08	1.728	0	
8.746	0.08	1.728	0	
8.752	0.08	2.304	0	

10.501	0.09	1.944	0
10.507	0.09	1.944	0
10.513	0.09	2.052	0
10.519	0.1	2.16	0
10.525	0.1	2.16	0
10.531	0.1	2.16	0
10.537	0.1	3.24	0
10.546	0.1	2.16	0
10.552	0.1	2.16	0
10.558	0.1	2.7	0
10.564	0.15	3.564	0
10.57	0.18	3.996	0
10.576	0.19	4.212	0
10.582	0.2	4.76	0
10.59	0.2	4.32	0
10.596	0.2	4.32	0
10.602	0.2	4.32	0
10.608	0.2	4.428	0
10.614	0.21	4.536	0
10.62	0.21	4.536	0
10.626	0.21	6.048	0
10.634	0.21	4.536	0
10.64	0.21	4.536	0
10.646	0.21	4.644	0
10.652	0.22	4.752	0
10.658	0.22	4.752	0
10.664	0.22	4.752	0
10.67	0.22	6.336	0
10.678	0.22	4.86	0
10.684	0.23	4.968	0
10.69	0.23	4.968	0
10.696	0.23	4.968	0
10.702	0.23	4.968	0
10.708	0.23	4.968	0
10.714	0.23	6.768	0
10.722	0.24	5.184	0
10.728	0.24	5.184	0
10.734	0.24	5.184	0
10.74	0.24	5.184	0
10.746	0.24	5.292	0
10.752	0.25	5.4	0
10.758	0.25	8.1	0
10.767	0.25	5.4	0
10.773	0.25	5.4	0
10.779	0.25	5.508	0
10.785	0.26	5.616	0
10.791	0.26	5.616	0
10.797	0.26	5.616	0
10.803	0.26	7.488	0
10.811	0.26	5.724	0
10.817	0.27	5.832	0
10.823	0.27	5.832	0
10.829	0.27	5.832	0
10.835	0.27	5.94	0
10.841	0.28	6.048	0
10.847	0.28	8.064	0
10.855	0.28	6.048	0
10.861	0.28	6.048	0
10.867	0.28	6.156	0
10.873	0.29	6.264	0
10.879	0.29	6.264	0
10.885	0.29	6.264	0
10.891	0.29	8.496	0
10.899	0.3	6.48	0
10.905	0.3	6.48	0
10.911	0.3	6.48	0
10.917	0.3	6.48	0
10.923	0.3	6.588	0
10.929	0.31	6.696	0
10.935	0.31	10.044	0
10.944	0.31	6.696	0
10.95	0.31	6.804	0
10.956	0.32	6.912	0
10.962	0.32	6.912	0
10.968	0.32	6.912	0
10.974	0.32	7.02	0
10.98	0.33	9.504	0
10.988	0.33	7.128	0
10.994	0.33	7.128	0
11	0.33	7.128	0
11.006	0.33	7.236	0
11.012	0.34	7.344	0
11.018	0.34	7.344	0
11.024	0.34	9.792	0
11.032	0.34	7.452	0
11.038	0.35	7.56	0
11.044	0.35	7.56	0
11.05	0.35	7.668	0
11.056	0.36	7.776	0
11.062	0.36	7.776	0
11.068	0.36	10.512	0

8.76	0.08	1.728	0
8.766	0.08	1.728	0
8.772	0.08	1.728	0
8.778	0.08	1.728	0
8.784	0.08	1.728	0
8.79	0.08	1.728	0
8.796	0.08	2.754	0
8.805	0.09	1.944	0
8.811	0.09	1.944	0
8.817	0.09	1.944	0
8.823	0.09	1.944	0
8.829	0.09	1.944	0
8.835	0.09	1.944	0
8.841	0.09	2.592	0
8.849	0.09	1.944	0
8.855	0.09	1.944	0
8.861	0.09	1.944	0
8.867	0.09	1.944	0
8.873	0.09	1.944	0
8.879	0.09	1.944	0
8.885	0.09	2.592	0
8.893	0.09	1.944	0
8.899	0.09	1.944	0
8.905	0.09	1.944	0
8.911	0.09	1.944	0
8.917	0.09	1.944	0
8.923	0.09	1.944	0
8.929	0.09	2.592	0
8.937	0.09	2.052	0
8.943	0.1	2.16	0
8.949	0.1	2.16	0
8.955	0.1	2.16	0
8.961	0.1	2.16	0
8.967	0.1	2.7	0
8.973	0.15	4.608	0
8.981	0.17	3.78	0
8.987	0.18	3.996	0
8.993	0.19	4.031	0
8.999	0.19	4.212	0
9.005	0.2	4.32	0
9.011	0.2	4.32	0
9.017	0.2	6.48	0
9.026	0.2	4.32	0
9.032	0.2	4.32	0
9.038	0.2	4.32	0
9.044	0.2	4.32	0
9.05	0.2	4.32	0
9.056	0.2	4.428	0
9.062	0.21	6.048	0
9.07	0.21	4.536	0
9.076	0.21	4.536	0
9.082	0.21	4.536	0
9.088	0.21	4.536	0
9.094	0.21	4.536	0
9.1	0.22	4.536	0
9.106	0.22	6.048	0
9.114	0.21	4.536	0
9.12	0.21	4.536	0
9.126	0.21	4.536	0
9.132	0.21	4.536	0
9.138	0.21	4.644	0
9.144	0.22	4.752	0
9.15	0.22	6.336	0
9.158	0.22	4.752	0
9.164	0.22	4.752	0
9.17	0.22	4.752	0
9.176	0.22	4.752	0
9.182	0.22	4.752	0
9.188	0.22	4.752	0
9.194	0.22	6.336	0
9.202	0.22	4.752	0
9.208	0.22	4.752	0
9.214	0.22	4.752	0
9.22	0.22	4.752	0
9.226	0.22	4.752	0
9.232	0.22	4.752	0
9.238	0.22	7.26	0
9.247	0.23	4.968	0
9.253	0.23	4.968	0
9.259	0.23	4.968	0
9.265	0.23	4.968	0
9.271	0.23	4.968	0
9.277	0.23	4.968	0
9.283	0.23	6.624	0
9.291	0.23	4.968	0
9.297	0.23	4.968	0
9.303	0.23	4.968	0
9.309	0.23	4.968	0
9.315	0.23	4.968	0
9.321	0.23	4.968	0
9.327	0.23	6.624	0

11.076	0.37	7.992	0	
11.082	0.37	7.992	0	
11.088	0.37	8.1	0	
11.094	0.38	8.208	0	
11.1	0.38	8.208	0	
11.106	0.38	8.316	0	
11.112	0.39	11.232	0	
11.12	0.39	8.424	0	
11.126	0.39	8.532	0	
11.132	0.4	8.64	0	
11.138	0.4	8.748	0	
11.144	0.41	8.856	0	
11.15	0.41	8.964	0	
11.156	0.42	13.608	0	
11.165	0.42	9.072	0	
11.171	0.42	9.18	0	
11.177	0.43	9.288	0	
11.183	0.43	9.396	0	
11.189	0.44	9.504	0	
11.195	0.44	9.612	0	
11.201	0.45	12.96	0	
11.209	0.45	9.828	0	
11.215	0.46	9.936	0	
11.221	0.46	10.044	0	
11.227	0.47	10.152	0	
11.233	0.47	10.26	0	
11.239	0.48	10.368	0	
11.245	0.48	13.968	0	
11.253	0.49	10.584	0	
11.259	0.49	10.692	0	
11.265	0.5	11.8	0	
11.271	0.5	10.908	0	
11.277	0.51	11.016	0	
11.283	0.51	11.124	0	
11.289	0.52	14.976	0	
11.297	0.52	11.34	0	
11.303	0.53	11.448	0	
11.309	0.53	11.556	0	
11.315	0.54	11.664	0	
11.321	0.54	11.772	0	
11.327	0.55	11.988	0	
11.333	0.56	16.128	0	
11.341	0.56	12.204	0	
11.347	0.57	12.312	0	
11.353	0.57	12.42	0	
11.359	0.58	12.636	0	
11.365	0.59	12.744	0	
11.371	0.59	12.852	0	
11.377	0.6	19.44	0	
11.386	0.6	13.068	0	
11.392	0.61	13.284	0	
11.398	0.62	13.392	0	
11.404	0.62	13.5	0	
11.41	0.63	13.608	0	
11.416	0.63	13.716	0	
11.422	0.64	18.432	0	
11.43	0.64	13.932	0	
11.436	0.65	14.148	0	
11.442	0.66	14.256	0	
11.448	0.66	14.364	0	
11.454	0.67	14.58	0	
11.46	0.68	14.688	0	
11.466	0.68	19.728	0	
11.474	0.69	15.012	0	
11.48	0.7	15.12	0	
11.486	0.7	15.228	0	
11.492	0.71	15.444	0	
11.498	0.72	15.552	0	
11.504	0.72	15.66	0	
11.51	0.73	21.168	0	
11.518	0.74	16.2	0.74	0.144616
11.524	0.76	16.632	0.74661	0.433848
11.53	0.78	17.172	0.753219	0.83108
11.536	0.81	17.82	0.759829	1.336312
11.542	0.84	18.468	0.766439	1.841544
11.548	0.87	19.224	0.773048	2.454776
11.554	0.91	26.928	0.779658	4.346952
11.562	0.96	21.168	0.788471	4.065651
11.568	1	22.14	0.79508	4.894883
11.574	1.05	23.22	0.80169	5.837126
11.58	1.1	24.3	0.808299	6.769348
11.586	1.15	25.38	0.814909	7.70658
11.592	1.2	26.352	0.821519	8.535812
11.598	1.24	40.086	0.828128	13.99403
11.607	1.29	28.512	0.838043	10.33889
11.613	1.35	29.808	0.844652	11.49212
11.619	1.41	31.104	0.851262	12.64536
11.625	1.47	32.616	0.857872	14.01459
11.631	1.55	33.852	0.864481	15.70782
11.637	1.64	36.504	0.871091	17.61705
11.643	1.74	51.552	0.877701	26.14732

9.335	0.23	4.968	0
9.341	0.23	4.968	0
9.347	0.23	5.076	0
9.353	0.24	5.184	0
9.359	0.24	5.184	0
9.365	0.24	5.184	0
9.371	0.24	6.912	0
9.379	0.24	5.184	0
9.385	0.24	5.184	0
9.391	0.24	5.184	0
9.397	0.24	5.184	0
9.403	0.24	5.184	0
9.409	0.24	5.184	0
9.415	0.24	7.776	0
9.424	0.24	5.184	0
9.43	0.24	5.184	0
9.436	0.24	5.184	0
9.442	0.24	5.184	0
9.448	0.24	5.184	0
9.454	0.24	5.184	0
9.46	0.24	7.056	0
9.468	0.25	5.4	0
9.474	0.25	5.4	0
9.48	0.25	5.4	0
9.486	0.25	5.4	0
9.492	0.25	5.4	0
9.498	0.25	5.4	0
9.504	0.25	7.2	0
9.512	0.25	5.4	0
9.518	0.25	5.4	0
9.524	0.25	5.4	0
9.53	0.25	5.4	0
9.536	0.25	5.4	0
9.542	0.25	5.4	0
9.548	0.25	7.2	0
9.556	0.25	5.508	0
9.562	0.26	5.616	0
9.568	0.26	5.616	0
9.574	0.26	5.616	0
9.58	0.26	5.616	0
9.586	0.26	5.616	0
9.592	0.26	7.488	0
9.6	0.26	5.616	0
9.606	0.26	5.616	0
9.612	0.26	5.616	0
9.618	0.26	5.616	0
9.624	0.26	5.724	0
9.63	0.27	5.832	0
9.636	0.27	8.748	0
9.645	0.27	5.832	0
9.651	0.27	5.832	0
9.657	0.27	5.832	0
9.663	0.27	5.832	0
9.669	0.27	5.832	0
9.675	0.27	5.94	0
9.681	0.28	6.064	0
9.689	0.28	6.048	0
9.695	0.28	6.048	0
9.701	0.28	6.048	0
9.707	0.28	6.048	0
9.713	0.28	6.048	0
9.719	0.28	6.156	0
9.725	0.29	8.352	0
9.733	0.29	6.264	0
9.739	0.29	6.264	0
9.745	0.29	6.264	0
9.751	0.29	6.264	0
9.757	0.29	6.264	0
9.763	0.29	6.372	0
9.769	0.3	8.64	0
9.777	0.3	6.48	0
9.783	0.3	6.48	0
9.789	0.3	6.48	0
9.795	0.3	6.48	0
9.801	0.3	6.48	0
9.807	0.3	6.588	0
9.813	0.31	8.928	0
9.821	0.31	6.696	0
9.827	0.31	6.696	0
9.833	0.31	6.696	0
9.839	0.31	6.696	0
9.845	0.31	6.696	0
9.851	0.31	6.804	0
9.857	0.32	10.368	0
9.866	0.32	6.912	0
9.872	0.32	6.912	0
9.878	0.32	6.912	0
9.884	0.32	6.912	0
9.89	0.32	7.02	0
9.896	0.33	7.128	0
9.902	0.33	9.504	0

11.651	1.84	401.932	0.886513	21.71193	9.91	0.33	7.128	0
11.657	1.95	433.416	0.893123	24.05316	9.916	0.33	7.128	0
11.663	2.07	466.008	0.899733	26.50239	9.922	0.33	7.128	0
11.669	2.19	498.6	0.906342	28.95162	9.928	0.33	7.236	0
11.675	2.31	531.192	0.912952	31.40086	9.934	0.34	7.344	0
11.681	2.43	563.784	0.919561	33.85009	9.94	0.34	7.344	0
11.687	2.55	596.368	0.926171	36.29737	9.946	0.34	9.792	0
11.695	2.67	628.968	0.934984	38.70096	9.954	0.34	7.344	0
11.701	2.79	661.56	0.941594	41.15019	9.96	0.34	7.344	0
11.707	2.91	694.26	0.948203	43.70743	9.966	0.34	7.452	0
11.713	3.04	727.176	0.954813	46.48066	9.972	0.35	7.56	0
11.719	3.18	760.2	0.961422	49.36189	9.978	0.35	7.56	0
11.725	3.32	793.44	0.968032	52.45912	9.984	0.35	7.56	0
11.731	3.48	832.672	0.974642	54.47541	9.99	0.35	10.038	0
11.739	3.65	870.384	0.983455	59.47	9.998	0.35	7.56	0
11.745	3.83	84.78	0.990064	63.32323	10.004	0.35	7.56	0
11.751	4.02	858.992	0.996674	67.39246	10.01	0.35	7.668	0
11.757	4.22	933.312	1.003283	71.56969	10.016	0.36	7.776	0
11.763	4.42	97.74	1.009893	75.85493	10.022	0.36	7.776	0
11.769	4.63	1002.168	1.016503	80.14016	10.028	0.36	7.776	0
11.775	4.83	159.864	1.023112	126.5845	10.034	0.36	10.368	0
11.784	5.04	1111.152	1.033077	88.74774	10.042	0.36	7.884	0
11.79	5.25	115.56	1.039686	93.03247	10.048	0.37	7.992	0
11.796	5.45	119.88	1.046246	97.2097	10.054	0.37	7.992	0
11.802	5.65	124.308	1.052856	102.4949	10.06	0.37	7.992	0
11.808	5.86	129.06	1.059465	106.1047	10.066	0.37	7.992	0
11.814	6.09	134.244	1.066075	111.1454	10.072	0.37	8.1	0
11.82	6.34	186.48	1.072684	155.4598	10.078	0.38	12.312	0
11.828	6.61	146.232	1.081497	122.8003	10.087	0.38	8.208	0
11.834	6.93	153.576	1.088107	130.9015	10.093	0.38	8.208	0
11.84	7.29	161.676	1.094717	137.9587	10.099	0.38	8.208	0
11.846	7.68	170.424	1.101326	146.564	10.105	0.38	8.208	0
11.852	8.1	179.712	1.107936	155.7092	10.111	0.38	8.316	0
11.858	8.54	189.624	1.114545	165.1784	10.117	0.39	8.424	0
11.864	8.99	265.536	1.121155	233.1198	10.123	0.39	11.232	0
11.872	9.45	209.196	1.129968	184.7173	10.131	0.39	8.424	0
11.878	9.92	219.456	1.136578	194.8345	10.137	0.39	8.424	0
11.884	10.4	229.824	1.143187	205.0598	10.143	0.39	8.532	0
11.89	10.88	240.192	1.149797	215.285	10.149	0.4	8.64	0
11.896	11.36	250.452	1.156406	225.4022	10.155	0.4	8.64	0
11.902	11.83	260.28	1.163016	235.0875	10.161	0.4	8.64	0
11.908	12.27	359.424	1.169626	325.6129	10.167	0.4	11.664	0
11.916	12.69	278.316	1.178439	252.7903	10.175	0.41	8.856	0
11.922	13.08	286.308	1.185048	260.6396	10.181	0.41	8.856	0
11.928	13.43	293.22	1.191658	267.4088	10.187	0.41	8.856	0
11.934	13.72	298.836	1.198267	272.882	10.193	0.41	8.964	0
11.94	13.95	303.156	1.204877	277.0593	10.199	0.42	9.072	0
11.946	14.12	306.288	1.211487	280.0485	10.205	0.42	9.072	0
11.952	14.24	411.264	1.218096	376.0559	10.211	0.42	12.096	0
11.96	14.32	309.852	1.226909	283.2794	10.219	0.42	9.072	0
11.966	14.37	3105	1.233519	283.7846	10.225	0.42	9.18	0
11.972	14.38	310.392	1.240128	283.5338	10.231	0.43	9.288	0
11.978	14.36	309.744	1.246738	282.7431	10.237	0.43	9.288	0
11.984	14.32	308.664	1.253348	281.5203	10.243	0.43	9.288	0
11.99	14.26	307.152	1.259957	279.8655	10.249	0.43	9.396	0
11.996	14.18	457.974	1.266567	426.7766	10.255	0.44	14.256	0
12.005	14.09	303.048	1.276481	275.4046	10.264	0.44	9.504	0
12.011	13.97	300.132	1.283091	272.3459	10.27	0.44	9.504	0
12.017	13.82	296.244	1.289701	268.3151	10.276	0.44	9.612	0
12.023	13.61	291.168	1.29631	263.0963	10.282	0.45	9.72	0
12.029	13.35	284.796	1.30292	256.5815	10.288	0.45	9.72	0
12.035	13.02	277.02	1.309529	248.6628	10.294	0.45	9.72	0
12.041	12.63	357.264	1.316139	319.7323	10.3	0.45	13.104	0
12.049	12.18	257.904	1.324952	229.2137	10.308	0.46	9.936	0
12.055	11.7	247.32	1.331561	218.4869	10.314	0.46	9.936	0
12.061	11.2	236.196	1.338171	207.2201	10.32	0.46	9.936	0
12.067	10.67	225.348	1.344781	195.6294	10.326	0.46	9.936	0
12.073	10.14	213.3	1.35139	184.0386	10.332	0.46	10.044	0
12.079	9.61	201.744	1.358	172.3398	10.338	0.47	10.152	0
12.085	9.07	253.44	1.36461	214.0123	10.344	0.47	13.536	0
12.093	8.53	178.632	1.373422	148.8947	10.352	0.47	10.26	0
12.099	8.01	167.616	1.380032	137.7359	10.358	0.48	10.368	0
12.105	7.51	156.924	1.386642	126.9012	10.364	0.48	10.368	0
12.111	7.02	146.556	1.393251	116.3904	10.37	0.48	10.368	0
12.117	6.55	136.728	1.399861	106.4196	10.376	0.48	10.476	0
12.123	6.11	127.332	1.406471	96.88085	10.382	0.49	10.584	0
12.129	5.68	157.968	1.41308	117.1444	10.388	0.49	14.112	0
12.137	5.29	110.376	1.421893	79.59173	10.396	0.49	10.584	0
12.143	4.93	102.924	1.428503	71.99696	10.402	0.49	10.692	0
12.149	4.6	95.928	1.435112	65.15819	10.408	0.5	10.8	0
12.155	4.31	89.896	1.441722	59.18342	10.414	0.5	10.8	0
12.161	4.06	85.212	1.448332	53.85665	10.42	0.5	10.8	0
12.167	3.83	80.568	1.454941	49.06989	10.426	0.5	10.908	0
12.173	3.63	102.096	1.461551	59.87643	10.432	0.51	14.688	0
12.181	3.46	73.416	1.470364	41.28476	10.44	0.51	11.016	0
12.187	3.31	70.092	1.476973	38.11799	10.446	0.51	11.016	0
12.193	3.18	67.5	1.483583	35.38323	10.452	0.51	11.124	0
12.199	3.07	65.232	1.490193	32.97746	10.458	0.52	11.232	0
12.205	2.97	63.18	1.496802	30.77769	10.464	0.52	11.232	0
12.211	2.88	61.452	1.503412	28.90692	10.47	0.52	11.232	0
12.217	2.81	89.91	1.510021	40.82469	10.476	0.52	13.91	0

12.226	2.74	58.536	1.519936	25.634
12.232	2.68	57.24	1.526545	24.19523
12.238	2.62	56.052	1.533155	22.86447
12.244	2.57	55.08	1.539765	21.7497
12.25	2.53	54.108	1.546374	20.63493
12.256	2.48	53.136	1.552984	19.57016
12.262	2.44	69.84	1.559594	24.7968
12.27	2.41	51.624	1.568406	17.67504
12.276	2.37	50.868	1.575016	16.77627
12.282	2.34	50.328	1.581626	16.0935
12.288	2.32	49.788	1.588235	15.41073
12.294	2.29	49.14	1.594845	14.61997
12.3	2.26	48.6	1.601455	13.9372
12.306	2.24	64.224	1.608064	17.78485
12.314	2.22	47.736	1.616877	12.74007
12.32	2.2	47.304	1.623487	12.1653
12.326	2.18	46.872	1.630096	11.59054
12.332	2.16	46.332	1.636706	10.90777
12.338	2.13	45.792	1.643316	10.225
12.344	2.11	45.36	1.649925	9.650233
12.35	2.09	59.994	1.656535	12.06889
12.358	2.07	44.496	1.665348	8.453108
12.364	2.05	43.956	1.671957	7.77034
12.37	2.02	43.416	1.678567	7.087572
12.376	2	42.984	1.685176	6.512804
12.382	1.98	42.552	1.691786	5.938036
12.388	1.96	42.12	1.698396	5.363268
12.394	1.94	55.728	1.705005	6.496941
12.402	1.93	41.472	1.713818	4.382143
12.408	1.91	41.04	1.720428	3.807375
12.414	1.89	40.608	1.727037	3.232607
12.42	1.87	40.176	1.733647	2.65784
12.426	1.85	39.744	1.740257	2.083072
12.432	1.83	39.312	1.746866	1.508304
12.438	1.81	58.32	1.753476	1.346766
12.447	1.79	38.448	1.76339	0.287384
12.453	1.77	38.016	1.77	
12.459	1.75	37.584		
12.465	1.73	37.041		
12.471	1.7	36.504		
12.477	1.68	36.072		
12.483	1.66	47.52		
12.491	1.64	35.208		
12.497	1.62	34.884		
12.503	1.61	34.56		
12.509	1.59	34.128		
12.515	1.57	33.696		
12.521	1.55	33.372		
12.527	1.54	44.064		
12.535	1.52	32.616		
12.541	1.5	32.184		
12.547	1.48	31.86		
12.553	1.47	31.536		
12.559	1.45	31.104		
12.565	1.43	30.78		
12.571	1.42	40.608		
12.579	1.4	30.132		
12.585	1.39	29.808		
12.591	1.37	29.484		
12.597	1.36	29.268		
12.603	1.35	29.052		
12.609	1.34	28.728		
12.615	1.32	42.606		
12.624	1.31	28.188		
12.63	1.3	27.972		
12.636	1.29	27.756		
12.642	1.28	27.54		
12.648	1.27	27.324		
12.654	1.26	27.216		
12.66	1.25	36.144		
12.668	1.25	26.892		
12.674	1.24	26.676		
12.68	1.23	26.568		
12.686	1.23	26.46		
12.692	1.22	26.352		
12.698	1.22	26.244		
12.704	1.21	34.848		
12.712	1.21	26.028		
12.718	1.2	25.92		
12.724	1.2	25.812		
12.73	1.19	25.704		
12.736	1.19	25.596		
12.742	1.18	25.488		
12.748	1.18	33.84		
12.756	1.17	25.272		
12.762	1.17	25.164		
12.768	1.16	25.056		
12.774	1.16	24.948		
12.78	1.15	24.84		
12.786	1.15	24.732		
12.792	1.14	32.832		

10.485	0.53	11.448	0	
10.491	0.53	11.448	0	
10.497	0.53	11.556	0	
10.503	0.54	11.664	0	
10.509	0.54	11.664	0	
10.515	0.54	11.664	0	
10.521	0.54	15.696	0	
10.529	0.55	11.88	0	
10.535	0.55	11.88	0	
10.541	0.55	11.88	0	
10.547	0.55	11.988	0	
10.553	0.56	12.096	0	
10.559	0.56	12.204	0	
10.565	0.57	16.416	0	
10.573	0.57	12.312	0	
10.579	0.57	12.42	0	
10.585	0.58	12.528	0	
10.591	0.58	12.528	0	
10.597	0.58	12.636	0	
10.603	0.59	12.744	0	
10.609	0.59	16.992	0	
10.617	0.59	12.744	0	
10.623	0.59	12.852	0	
10.629	0.6	12.96	0	
10.635	0.6	13.068	0	
10.641	0.61	13.176	0	
10.647	0.61	13.176	0	
10.653	0.62	17.712	0	
10.661	0.62	13.392	0	
10.667	0.62	13.5	0	
10.673	0.63	13.608	0	
10.679	0.63	13.608	0	
10.685	0.63	13.716	0	
10.691	0.64	13.824	0	
10.697	0.64	20.898	0	
10.706	0.65	14.04	0	
10.712	0.65	14.04	0	
10.718	0.65	14.148	0	
10.724	0.66	14.256	0	
10.73	0.66	14.364	0	
10.736	0.67	14.472	0	
10.742	0.67	19.296	0	
10.75	0.67	14.58	0	
10.756	0.68	14.688	0	
10.762	0.68	14.796	0	
10.768	0.69	14.904	0	
10.774	0.69	15.012	0	
10.78	0.7	15.12	0	
10.786	0.7	20.304	0	
10.794	0.71	15.336	0	
10.8	0.71	15.444	0	
10.806	0.72	15.552	0	
10.812	0.72	15.552	0	
10.818	0.72	15.66	0	
10.824	0.73	15.768	0	
10.83	0.73	21.168	0	
10.838	0.74	15.984	0	
10.844	0.74	16.092	0	
10.85	0.75	16.2	0	
10.856	0.75	16.2	0	
10.862	0.75	16.308	0	
10.868	0.76	16.416	0	
10.874	0.76	22.032	0	
10.882	0.77	16.632	0	
10.888	0.77	16.74	0	
10.894	0.78	16.848	0	
10.9	0.78	16.956	0	
10.906	0.79	17.064	0	
10.912	0.79	17.172	0	
10.918	0.8	28.92	0	
10.927	0.8	17.388	0	
10.933	0.81	17.496	0	
10.939	0.81	17.496	0	
10.945	0.81	17.604	0	
10.951	0.82	17.712	0	
10.957	0.82	17.82	0	
10.963	0.83	24.348	0	
10.971	0.84	18.144	0	
10.977	0.84	18.252	0.84	0.077254
10.983	0.85	18.36	0.847847	0.123763
10.989	0.85	18.468	0.845694	0.170271
10.995	0.86	18.576	0.84854	0.216778
11.001	0.86	18.576	0.851387	0.155288
11.007	0.86	24.912	0.854234	0.255398
11.015	0.87	18.792	0.85803	0.227808
11.021	0.87	18.9	0.860877	0.274317
11.027	0.88	19.008	0.863724	0.320825
11.033	0.88	19.116	0.86657	0.367334
11.039	0.89	19.332	0.869417	0.521842
11.045	0.9	19.44	0.872264	0.568351
11.051	0.9	26.064	0.875111	0.806147

12.8	1.14	24.516	0.878907	0.748871
12.806	1.13	24.408	0.881753	0.903379
12.812	1.13	24.3	0.8846	0.949888
12.818	1.12	24.192	0.887447	0.996396
12.824	1.12	24.192	0.890294	1.150905
12.83	1.12	24.084	0.893141	1.305413
12.836	1.11	35.964	0.895988	2.004823
12.845	1.11	23.868	0.900258	1.367684
12.851	1.1	23.76	0.903105	1.522193
12.857	1.1	23.652	0.905952	1.568701
12.863	1.09	23.544	0.908798	1.61521
12.869	1.09	23.436	0.911645	1.769718
12.875	1.08	23.328	0.914492	1.924227
12.881	1.08	30.096	0.917339	2.757982
12.889	1.07	23.112	0.921135	2.212747
12.895	1.07	23.004	0.923981	2.367255
12.901	1.06	22.896	0.926828	2.521764
12.907	1.06	22.896	0.929675	2.676272
12.913	1.06	22.788	0.932522	2.830781
12.919	1.05	22.68	0.935369	2.985289
12.925	1.05	30.096	0.938216	4.172732
12.933	1.04	22.464	0.942011	3.273809
12.939	1.04	22.356	0.944858	3.428318
12.945	1.03	22.248	0.947705	3.582826
12.951	1.03	22.14	0.950552	3.737335
12.957	1.02	22.032	0.953399	3.891843
12.963	1.02	21.924	0.956245	4.046352
12.969	1.01	29.088	0.959092	5.587482
12.977	1.01	21.708	0.962888	4.334872
12.983	1	21.6	0.965735	4.48938
12.989	1	21.492	0.968582	4.643889
12.995	0.99	21.384	0.971429	4.798397
13.001	0.99	21.384	0.974275	4.952906
13.007	0.99	21.276	0.977122	5.107414
13.013	0.98	28.224	0.979969	7.146232
13.021	0.98	21.06	0.983765	5.611934
13.027	0.97	20.952	0.986612	5.766442
13.033	0.97	20.844	0.989458	5.920951
13.039	0.96	20.736	0.992305	6.07546
13.045	0.96	20.736	0.995152	6.229968
13.051	0.96	20.628	0.997999	6.384477
13.057	0.95	20.78	1.000846	9.785418
13.066	0.95	20.412	1.005116	6.667748
13.072	0.94	20.304	1.007963	6.817256
13.078	0.94	20.196	1.01081	6.971765
13.084	0.93	20.088	1.013657	7.234273
13.09	0.93	20.088	1.016503	7.496782
13.096	0.93	19.98	1.01935	7.65129
13.102	0.92	26.496	1.022197	10.39407
13.11	0.92	19.872	1.025993	8.04781
13.116	0.92	19.764	1.028839	8.202319
13.122	0.91	19.656	1.031686	8.464827
13.128	0.91	19.656	1.034533	8.619336
13.134	0.91	19.548	1.03738	8.773844
13.14	0.9	19.44	1.040227	9.036353
13.146	0.9	25.92	1.043074	12.38482
13.154	0.9	19.332	1.04687	9.432873
13.16	0.89	19.224	1.049716	9.587381
13.166	0.89	19.224	1.052563	9.74189
13.172	0.89	19.224	1.05541	9.896398
13.178	0.89	19.116	1.058257	10.05091
13.184	0.88	19.008	1.061104	10.31342
13.19	0.88	25.344	1.063951	14.08757
13.198	0.88	18.9	1.067746	10.70994
13.204	0.87	18.792	1.070593	10.97244
13.21	0.87	18.792	1.07344	11.23495
13.216	0.87	18.792	1.076287	11.38946
13.222	0.87	18.792	1.079134	11.65197
13.228	0.87	18.684	1.081981	11.91448
13.234	0.86	24.768	1.084827	16.07832
13.242	0.86	18.576	1.088623	12.311
13.248	0.86	18.468	1.09147	12.68151
13.254	0.85	18.36	1.094317	13.05201
13.26	0.85	18.36	1.097163	13.63852
13.266	0.85	18.36	1.10001	14.54903
13.272	0.85	18.252	1.102857	15.67554
13.278	0.84	27.216	1.105704	25.50401
13.287	0.84	18.144	1.109974	18.65381
13.293	0.84	18.144	1.112821	20.64437
13.299	0.84	18.036	1.115668	22.74283
13.305	0.83	17.928	1.118515	24.94934
13.311	0.83	17.928	1.121362	27.37185
13.317	0.83	17.928	1.124208	29.79436
13.323	0.83	23.76	1.127055	42.94215
13.331	0.82	17.712	1.130851	34.61887
13.337	0.82	17.712	1.133698	36.93338
13.343	0.82	17.712	1.136545	39.35589
13.349	0.82	17.604	1.139391	41.7784
13.355	0.81	17.496	1.142238	44.30891
13.361	0.81	17.496	1.145085	47.27142
13.367	0.81	23.328	1.147932	67.3969

11.059	0.91	19.764	0.878907	0.748871
11.065	0.92	19.98	0.881753	0.903379
11.071	0.93	20.088	0.8846	0.949888
11.077	0.93	20.196	0.887447	0.996396
11.083	0.94	20.412	0.890294	1.150905
11.089	0.95	20.628	0.893141	1.305413
11.095	0.96	31.104	0.895988	2.004823
11.104	0.96	20.844	0.900258	1.367684
11.11	0.97	21.06	0.903105	1.522193
11.116	0.98	21.168	0.905952	1.568701
11.122	0.98	21.276	0.908798	1.61521
11.128	0.99	21.492	0.911645	1.769718
11.134	1	21.708	0.914492	1.924227
11.14	1.01	29.242	0.917339	2.757982
11.148	1.02	22.14	0.921135	2.212747
11.154	1.03	22.356	0.923981	2.367255
11.16	1.04	22.572	0.926828	2.521764
11.166	1.05	22.788	0.929675	2.676272
11.172	1.06	23.004	0.932522	2.830781
11.178	1.07	23.22	0.935369	2.985289
11.184	1.08	31.248	0.938216	4.172732
11.192	1.09	23.652	0.942011	3.273809
11.198	1.1	23.868	0.944858	3.428318
11.204	1.11	24.084	0.947705	3.582826
11.21	1.12	24.3	0.950552	3.737335
11.216	1.13	24.516	0.953399	3.891843
11.222	1.14	24.732	0.956245	4.046352
11.228	1.15	33.264	0.959092	5.587482
11.236	1.16	25.164	0.962888	4.334872
11.242	1.17	25.38	0.965735	4.48938
11.248	1.18	25.596	0.968582	4.643889
11.254	1.19	25.812	0.971429	4.798397
11.26	1.2	26.028	0.974275	4.952906
11.266	1.21	26.244	0.977122	5.107414
11.272	1.22	35.424	0.979969	7.146232
11.28	1.24	26.892	0.983765	5.611934
11.286	1.25	27.108	0.986612	5.766442
11.292	1.26	27.324	0.989458	5.920951
11.298	1.27	27.54	0.992305	6.07546
11.304	1.28	27.756	0.995152	6.229968
11.31	1.29	27.972	0.997999	6.384477
11.316	1.3	42.282	1.000846	9.785418
11.325	1.31	28.404	1.005116	6.667748
11.331	1.32	28.62	1.007963	6.817256
11.337	1.33	28.836	1.01081	6.971765
11.343	1.34	29.16	1.013657	7.234273
11.349	1.36	29.484	1.016503	7.496782
11.355	1.37	29.7	1.01935	7.65129
11.361	1.38	39.888	1.022197	10.39407
11.369	1.39	30.24	1.025993	8.04781
11.375	1.41	30.564	1.02884	8.310319
11.381	1.42	30.78	1.031686	8.464827
11.387	1.43	30.996	1.034533	8.619336
11.393	1.44	31.212	1.03738	8.773844
11.399	1.45	31.536	1.040227	9.036353
11.405	1.47	42.48	1.043074	12.38482
11.413	1.48	32.076	1.04687	9.432873
11.419	1.49	32.292	1.049716	9.587381
11.425	1.5	32.508	1.052563	9.74189
11.431	1.51	32.724	1.05541	9.896398
11.437	1.52	32.94	1.058257	10.05091
11.443	1.53	33.264	1.061104	10.31342
11.449	1.55	44.584	1.06395	14.08757
11.457	1.56	33.804	1.067746	10.70994
11.463	1.57	34.128	1.070593	10.97244
11.469	1.59	34.452	1.07344	11.23495
11.475	1.6	34.668	1.076287	11.38946
11.481	1.61	34.992	1.079134	11.65197
11.487	1.63	35.316	1.08198	11.91448
11.493	1.64	47.376	1.084827	16.07832
11.501	1.65	35.856	1.088623	12.311
11.507	1.67	36.288	1.09147	12.68151
11.513	1.69	36.72	1.094317	13.05201
11.519	1.71	37.368	1.097163	13.63852
11.525	1.75	38.34	1.10001	14.54903
11.531	1.8	39.528	1.102857	15.67554
11.537	1.86	61.398	1.105704	25.50401
11.546	1.93	42.66	1.109974	18.65381
11.552	2.02	44.712	1.112821	20.64437
11.558	2.12	46.872	1.115668	22.74283
11.564	2.22	49.14	1.118515	24.94934
11.57	2.33	51.624	1.121362	27.37185
11.576	2.45	84.308	1.124208	29.79436
11.582	2.56	75.456	1.127055	42.94215
11.59	2.68	59.076	1.130851	34.61887
11.596	2.79	61.452	1.133698	36.93338
11.602	2.9	63.936	1.136545	39.35589
11.608	3.02	66.42	1.139391	41.7784
11.614	3.13	69.012	1.142238	44.30891
11.62	3.26	72.036	1.145085	47.27142
11.626	3.41	101.512	1.147932	67.3969

13.375	0.81	17.388	11.634	3.57	79.164	1.151728	54.25594
13.381	0.8	17.28	11.64	3.75	83.481	1.154575	58.51444
13.387	0.8	17.28	11.646	3.97	88.128	1.157421	63.09695
13.393	0.8	17.28	11.652	4.19	93.203	1.160268	68.11146
13.399	0.8	17.172	11.658	4.44	98.698	1.163115	73.44997
13.405	0.79	17.064	11.664	4.69	104.112	1.165962	78.89648
13.411	0.79	22.752	11.67	4.95	146.304	1.168809	112.5877
13.419	0.79	17.064	11.678	5.21	115.152	1.172604	90.093
13.425	0.79	16.956	11.684	5.48	121.284	1.175451	95.86351
13.431	0.78	16.848	11.69	5.75	127.008	1.178298	101.526
13.437	0.78	16.848	11.696	6.01	132.516	1.181145	106.9725
13.443	0.78	16.848	11.702	6.26	137.916	1.183992	112.311
13.449	0.78	16.74	11.708	6.51	143.316	1.186839	117.6495
13.455	0.77	24.948	11.714	6.76	198.432	1.189685	164.1144
13.464	0.77	16.632	11.722	7.02	154.656	1.193481	178.8465
13.47	0.77	16.524	11.728	7.3	160.92	1.196328	135.0486
13.476	0.76	16.416	11.734	7.6	167.832	1.199175	141.8991
13.482	0.76	16.416	11.74	7.94	175.284	1.202022	149.2896
13.488	0.76	16.416	11.746	8.29	183.106	1.204868	157.0041
13.494	0.76	16.416	11.752	8.66	191.268	1.207715	165.1506
13.5	0.76	21.744	11.758	9.05	299.535	1.210562	260.2466
13.508	0.75	16.2	11.767	9.44	208.332	1.214837	182.0609
13.514	0.75	16.2	11.773	9.85	217.188	1.217679	190.8554
13.52	0.75	16.2	11.779	10.26	226.044	1.220526	199.6499
13.526	0.75	16.092	11.785	10.67	234.792	1.223373	208.3364
13.532	0.74	15.984	11.791	11.07	243.324	1.22622	216.8069
13.538	0.74	15.984	11.797	11.46	251.64	1.229067	225.0614
13.544	0.74	21.312	11.803	11.84	346.608	1.231913	311.0742
13.552	0.74	15.876	11.811	12.23	266.704	1.235709	241.9819
13.558	0.73	15.768	11.817	12.65	278.1	1.238556	251.3164
13.564	0.73	15.768	11.823	13.1	288.468	1.241403	261.673
13.57	0.73	15.768	11.829	13.61	400.24	1.24425	273.3335
13.576	0.73	15.66	11.835	14.19	313.632	1.247096	286.664
13.582	0.72	15.552	11.841	14.85	328.536	1.249943	301.5065
13.588	0.72	20.736	11.847	15.57	459.648	1.25279	423.513
13.596	0.72	15.552	11.855	16.35	362.016	1.256586	334.843
13.602	0.72	15.552	11.861	17.17	380.16	1.259433	352.9755
13.608	0.72	15.444	11.867	18.03	399.06	1.26228	371.764
13.614	0.71	15.336	11.873	18.92	418.392	1.265126	391.0345
13.62	0.71	15.336	11.879	19.82	437.832	1.267973	410.413
13.626	0.71	15.336	11.885	20.72	457.164	1.27082	429.6835
13.632	0.71	20.304	11.891	21.61	634.896	1.273667	598.1597
13.64	0.7	15.12	11.899	22.48	494.456	1.277463	466.6921
13.646	0.7	15.12	11.905	23.29	511.272	1.280309	483.5866
13.652	0.7	15.12	11.911	24.05	526.824	1.283156	499.0771
13.658	0.7	15.12	11.917	24.73	540.648	1.286003	512.8396
13.664	0.7	15.012	11.923	25.33	552.312	1.28885	524.4421
13.67	0.69	13.984	11.929	25.81	561.384	1.291697	533.4576
13.676	0.69	22.356	11.935	26.17	851.796	1.294544	809.7836
13.685	0.69	14.904	11.944	26.41	571.752	1.298814	543.6669
13.691	0.69	14.904	11.95	26.53	574.332	1.301661	545.2254
13.697	0.69	14.796	11.956	26.56	573.156	1.304507	544.9479
13.703	0.68	14.688	11.962	26.51	571.212	1.307354	542.9424
13.709	0.68	14.688	11.968	26.38	567.756	1.310201	539.4249
13.715	0.68	14.688	11.974	26.19	563.22	1.313048	534.8274
13.721	0.68	19.584	11.98	25.96	743.904	1.315895	705.9516
13.729	0.68	14.688	11.988	25.7	552.096	1.319691	523.5599
13.735	0.68	14.58	11.994	25.42	546.048	1.322537	517.4504
13.741	0.67	14.472	12	25.14	540.684	1.325384	511.125
13.747	0.67	14.472	12.006	24.84	532.98	1.328231	504.2595
13.753	0.67	14.472	12.012	24.51	525.312	1.331078	496.53
13.759	0.67	14.472	12.018	24.13	516.348	1.333925	487.5045
13.765	0.67	19.152	12.024	23.68	674.064	1.336772	635.5103
13.773	0.66	14.256	12.032	23.23	492.372	1.340567	463.385
13.779	0.66	14.256	12.038	22.46	476.752	1.343414	447.6635
13.785	0.66	14.256	12.044	21.58	458.892	1.346261	429.782
13.791	0.66	14.256	12.05	20.81	439.452	1.349108	410.2805
13.797	0.66	14.256	12.056	19.88	418.716	1.351955	389.483
13.803	0.66	14.148	12.062	18.89	396.792	1.354801	367.4975
13.809	0.65	18.72	12.068	17.85	476.06	1.357648	459.8051
13.817	0.65	14.04	12.076	16.8	351.324	1.361444	321.8861
13.823	0.65	14.04	12.082	15.73	328.212	1.364291	298.7126
13.829	0.65	14.04	12.088	14.66	305.532	1.367138	275.9711
13.835	0.65	13.932	12.094	13.63	283.824	1.369985	254.2016
13.841	0.64	13.824	12.1	12.65	263.412	1.372831	233.7281
13.847	0.64	13.824	12.106	11.74	244.296	1.375678	214.5506
13.853	0.64	18.432	12.112	10.88	301.824	1.378525	262.0678
13.861	0.64	13.824	12.12	10.08	209.736	1.382321	179.8471
13.867	0.64	13.716	12.126	9.34	194.616	1.385168	164.6656
13.873	0.63	13.608	12.132	8.68	181.008	1.388014	150.9961
13.879	0.63	13.608	12.138	8.08	168.504	1.390861	138.7307
13.885	0.63	13.608	12.144	7.55	158.112	1.393708	127.9772
13.891	0.63	13.608	12.15	7.09	148.716	1.396555	118.5197
13.897	0.63	20.412	12.156	6.68	210.762	1.399402	165.3522
13.906	0.63	13.5	12.165	6.33	133.272	1.403677	102.9219
13.912	0.62	13.392	12.171	6.01	126.9	1.406519	96.48845
13.918	0.62	13.392	12.177	5.74	121.5	1.409366	91.07696
13.924	0.62	13.392	12.183	5.51	116.748	1.412212	86.21346
13.93	0.62	13.392	12.189	5.3	112.044	1.415059	82.04797
13.936	0.62	13.392	12.195	5.13	108.108	1.417906	78.42248
13.947	0.62	17.112	12.201	4.97	141.264	1.420753	100.2917

13.95	0.61	13.176
13.956	0.61	13.176
13.962	0.61	13.176
13.968	0.61	13.176
13.974	0.61	13.068
13.98	0.6	12.96
13.986	0.6	12.96
13.994	0.6	12.96
14	0.6	12.96
14.006	0.6	12.852
14.012	0.59	12.744
14.018	0.59	12.744
14.024	0.59	12.744
14.03	0.59	16.092
14.038	0.59	12.744
14.044	0.59	12.636
14.05	0.58	12.528
14.056	0.58	12.528
14.062	0.58	12.528
14.068	0.58	12.528
14.074	0.58	16.704
14.082	0.58	12.528
14.088	0.58	12.42
14.094	0.57	12.312
14.1	0.57	12.312
14.106	0.57	12.312
14.112	0.57	12.312
14.118	0.57	18.468
14.127	0.57	12.312
14.133	0.57	12.312
14.139	0.57	12.312
14.145	0.57	12.204
14.151	0.56	12.096
14.157	0.56	12.096
14.163	0.56	16.128
14.171	0.56	12.096
14.177	0.56	12.096
14.183	0.56	12.096
14.189	0.56	12.096
14.195	0.56	12.096
14.201	0.56	12.096
14.207	0.56	16.128
14.215	0.56	12.096
14.221	0.56	11.988
14.227	0.55	11.88
14.233	0.55	11.88
14.239	0.55	11.88
14.245	0.55	11.88
14.251	0.55	15.84
14.259	0.55	11.88
14.265	0.55	11.88
14.271	0.55	11.88
14.277	0.55	11.88
14.283	0.55	11.88
14.289	0.55	11.88
14.295	0.55	17.82
14.304	0.55	11.88
14.31	0.55	11.88
14.316	0.55	11.88
14.322	0.55	11.88
14.328	0.55	11.772
14.334	0.54	11.664
14.34	0.54	15.552
14.348	0.54	11.664
14.354	0.54	11.664
14.36	0.54	11.664
14.366	0.54	11.664
14.372	0.54	11.664
14.378	0.54	11.664
14.384	0.54	15.552
14.392	0.54	11.664
14.398	0.54	11.664
14.404	0.54	11.664
14.41	0.54	11.664
14.416	0.54	11.664
14.422	0.54	11.556
14.428	0.53	15.264
14.436	0.53	11.448
14.442	0.53	11.448
14.448	0.53	11.448
14.454	0.53	11.448
14.46	0.53	11.448
14.466	0.53	11.448
14.472	0.53	15.264
14.48	0.53	11.448
14.486	0.53	11.448
14.492	0.53	11.448
14.498	0.53	11.448
14.504	0.53	11.448
14.51	0.53	11.448
14.516	0.53	15.132

12.209	4.84	103.248	1.424549	72.447
12.215	4.72	100.872	1.427396	70.00951
12.221	4.62	98.712	1.430242	67.78802
12.227	4.52	96.768	1.433089	65.78753
12.233	4.44	95.04	1.435936	63.99304
12.239	4.36	93.42	1.438783	62.31154
12.245	4.29	122.544	1.44163	80.97041
12.253	4.22	90.696	1.445425	59.14406
12.259	4.15	88.902	1.448272	57.67857
12.265	4.09	87.804	1.451119	56.42908
12.271	4.04	86.616	1.453966	55.17959
12.277	3.98	85.428	1.456813	53.9301
12.283	3.93	84.348	1.45966	52.78861
12.289	3.88	111.168	1.462506	68.99316
12.297	3.84	82.512	1.466302	50.80913
12.303	3.8	81.648	1.469149	49.88363
12.309	3.76	80.892	1.471996	49.06614
12.315	3.73	80.244	1.474843	48.35665
12.321	3.7	79.488	1.47769	47.53916
12.327	3.66	78.732	1.480536	46.72167
12.333	3.63	103.968	1.483383	61.19191
12.341	3.59	77.112	1.487179	44.95819
12.347	3.55	76.356	1.490026	44.1407
12.353	3.52	75.6	1.492873	43.32321
12.359	3.48	74.736	1.495719	42.39771
12.365	3.44	73.872	1.498566	41.47222
12.371	3.4	73.116	1.501413	40.64473
12.377	3.37	108.54	1.50426	59.7328
12.386	3.33	71.496	1.50853	38.881
12.392	3.29	70.74	1.511377	38.06351
12.398	3.26	70.092	1.514224	37.35402
12.404	3.23	69.444	1.517071	36.64453
12.41	3.2	68.796	1.519917	35.93504
12.416	3.17	68.148	1.522764	35.22556
12.422	3.14	90	1.525611	46.00774
12.43	3.11	66.744	1.529407	33.67806
12.436	3.07	65.988	1.532254	32.86057
12.447	3.04	65.232	1.535101	32.04308
12.448	3	64.368	1.537947	31.11759
12.454	2.96	63.612	1.540794	30.3001
12.46	2.93	62.856	1.543641	29.48261
12.466	2.89	82.656	1.546488	38.06249
12.474	2.85	61.128	1.550284	27.61113
12.48	2.81	60.372	1.55313	26.79364
12.486	2.78	59.616	1.555977	25.97614
12.492	2.74	58.86	1.558824	25.15865
12.498	2.71	58.212	1.561671	24.44916
12.504	2.68	57.564	1.564518	23.73967
12.51	2.65	75.888	1.567365	30.69324
12.518	2.62	56.268	1.57116	22.30019
12.524	2.59	55.62	1.574007	21.5907
12.53	2.56	54.972	1.576854	20.88121
12.536	2.53	54.324	1.579701	20.17172
12.542	2.5	53.676	1.582548	19.46222
12.548	2.47	53.136	1.585395	18.86073
12.554	2.45	70.128	1.588241	24.83199
12.562	2.42	51.948	1.592037	17.52925
12.568	2.39	51.3	1.594884	16.81976
12.574	2.36	50.76	1.597731	16.21827
12.58	2.34	50.22	1.600578	15.61678
12.586	2.31	49.68	1.603424	15.01529
12.592	2.29	49.248	1.606271	14.57179
12.598	2.27	73.224	1.609118	21.0194
12.607	2.25	48.384	1.613388	13.50407
12.613	2.23	47.952	1.616235	13.01057
12.619	2.21	47.52	1.619082	12.51708
12.625	2.19	47.196	1.621929	12.13159
12.631	2.18	46.872	1.624776	11.7461
12.637	2.16	46.548	1.627622	11.36061
12.643	2.15	61.632	1.630469	14.61982
12.651	2.13	45.9	1.634265	10.56913
12.657	2.12	45.576	1.637112	10.18364
12.663	2.1	45.252	1.639959	9.798145
12.669	2.09	45.036	1.642806	9.520654
12.675	2.08	44.82	1.645652	9.243162
12.681	2.07	44.604	1.648499	8.965671
12.687	2.06	59.184	1.651346	11.57057
12.695	2.05	44.172	1.655142	8.390191
12.701	2.04	43.956	1.657989	8.112699
12.707	2.03	43.74	1.660835	7.835208
12.713	2.02	43.524	1.663682	7.557716
12.719	2.01	43.308	1.666529	7.388225
12.725	2.01	43.308	1.669376	7.218733
12.731	2	57.456	1.672223	9.241324
12.739	1.99	42.876	1.676019	6.643253
12.745	1.98	42.66	1.678865	6.365762
12.751	1.97	42.444	1.681712	6.08827
12.757	1.96	42.336	1.684559	5.918779
12.763	1.96	42.228	1.687406	5.749287
12.769	1.95	42.012	1.690253	5.471796
12.775	1.94	62.694	1.6931	7.768397

14.525	0.53	11.448
14.531	0.53	11.34
14.537	0.52	11.232
14.543	0.52	11.232
14.549	0.52	11.232
14.555	0.52	11.232
14.561	0.52	14.976
14.569	0.52	11.232
14.575	0.52	11.232
14.581	0.52	11.232
14.587	0.52	11.232
14.593	0.52	11.232
14.599	0.52	11.232
14.605	0.52	14.976
14.613	0.52	11.232
14.619	0.52	11.232
14.625	0.52	11.124
14.631	0.51	11.016
14.637	0.51	11.016
14.643	0.51	11.016
14.649	0.51	14.688
14.657	0.51	11.016
14.663	0.51	11.016
14.669	0.51	11.016
14.675	0.51	11.016
14.681	0.51	11.016
14.687	0.51	11.016
14.693	0.51	14.688
14.701	0.51	11.016

12.784	1.93	41.58	1.69737	4.886067
12.79	1.92	41.364	1.700217	4.608576
12.796	1.91	41.148	1.703063	4.331084
12.802	1.9	41.04	1.70591	4.161593
12.808	1.9	40.932	1.708757	3.992101
12.814	1.89	40.716	1.711604	3.71461
12.82	1.88	40.608	1.714451	3.713159
12.828	1.88	40.5	1.718247	3.355129
12.834	1.87	40.284	1.721093	3.077638
12.84	1.86	40.068	1.72394	2.800146
12.846	1.85	39.852	1.726787	2.522655
12.852	1.84	39.744	1.729634	2.353163
12.858	1.84	39.636	1.732481	2.183672
12.864	1.83	52.56	1.735327	7.577909
12.872	1.82	39.204	1.739123	1.608192
12.878	1.81	38.988	1.74197	1.33807
12.884	1.8	38.772	1.744817	1.053209
12.89	1.79	38.664	1.747664	0.883717
12.896	1.79	38.556	1.750511	0.714226
12.902	1.78	38.34	1.753357	0.436734
12.908	1.77	50.832	1.756204	0.198659
12.916	1.76	38.016	1.76	
12.922	1.76	37.908		
12.928	1.75	37.692		
12.934	1.74	37.476		
12.94	1.73	37.368		
12.946	1.73	37.26		
12.952	1.72	49.392		
12.96	1.71	36.828		

DETENTION BASIN REQUIREMENTS
Analysis of proposed [illegible] sedimentation basin - Sub-district N Channel [illegible]
Contributing Area [illegible] Allowable Discharge [illegible] [illegible]

N Channel Hydrograph 2 year volume

Time (hrs)	Flow (cfs)	Vol (cf)	Disch. Flow	Vol Net
10.809	0.05	1.8	0	
10.819	0.05	1.8	0	
10.829	0.05	1.8	0	
10.839	0.05	1.8	0	
10.849	0.05	1.8	0	
10.859	0.05	1.8	0	
10.869	0.05	1.584	0	
10.877	0.06	2.16	0	
10.887	0.06	2.16	0	
10.897	0.06	2.16	0	
10.907	0.06	2.16	0	
10.917	0.06	2.16	0	
10.927	0.06	2.16	0	
10.937	0.06	1.728	0	
10.945	0.06	2.16	0	
10.955	0.06	2.16	0	
10.965	0.06	2.16	0	
10.975	0.06	2.16	0	
10.985	0.06	2.34	0	
10.995	0.07	2.52	0	
11.005	0.07	2.016	0	
11.013	0.07	2.52	0	
11.023	0.07	2.52	0	
11.033	0.07	2.52	0	
11.043	0.07	2.52	0	
11.053	0.07	2.52	0	
11.063	0.07	2.52	0	
11.073	0.07	2.016	0	
11.081	0.07	2.52	0	
11.091	0.07	2.7	0	
11.101	0.08	2.88	0	
11.111	0.08	2.88	0	
11.121	0.08	2.88	0	
11.131	0.08	2.88	0	
11.141	0.08	2.304	0	
11.149	0.08	2.88	0	
11.157	0.08	[illegible]	0	
11.169	0.09	3.24	0	
11.179	0.09	3.24	0	
11.189	0.09	3.24	0	
11.199	0.09	3.24	0	
11.209	0.09	2.592	0	
11.217	0.09	3.24	0	
11.227	0.09	3.42	0	
11.237	0.1	3.6	0	
11.247	0.1	3.6	0	
11.257	0.1	3.6	0	
11.267	0.1	3.6	0	
11.277	0.1	3.492	0	
11.286	0.11	3.96	0	
11.296	0.11	3.96	0	
11.306	0.11	3.96	0	
11.316	0.11	3.96	0	
11.326	0.11	3.96	0	
11.336	0.11	[illegible]	0	
11.346	0.12	4.356	0	
11.354	0.12	4.32	0	
11.364	0.12	4.32	0	
11.374	0.12	4.5	0	
11.384	0.13	4.68	0	
11.394	0.13	4.68	0	
11.404	0.13	4.68	0	
11.414	0.13	3.744	0	
11.422	0.13	4.68	0	
11.432	0.14	5.04	0	
11.442	0.14	5.04	0	
11.452	0.14	5.04	0	
11.462	0.14	5.04	0	
11.472	0.14	5.22	0	
11.482	0.15	[illegible]	0	
11.49	0.15	5.4	0	
11.5	0.15	5.4	0	
11.51	0.15	5.58	0.15	0.122568
11.52	0.16	5.76	0.153185	0.198005
11.53	0.16	5.94	0.15657	0.253441
11.54	0.17	[illegible]	0.159535	0.408678
11.55	0.18	5.328	0.16274	0.604469
11.558	0.19	[illegible]	0.165288	1.012284
11.568	0.2	[illegible]	0.168474	1.44762
11.578	0.22	8.1	0.171659	1.862557
11.588	0.23	8.64	0.174844	2.288294
11.598	0.29	[illegible]	0.178029	3.20363
11.608	0.32	[illegible]	0.181214	[illegible]
11.618	0.35	[illegible]	0.184399	6.308615
11.626	0.39	14.04	0.186947	[illegible]
11.636	0.42	15.84	0.190132	8.937509
11.646	0.46	17.46	0.193317	10.44425
11.656	0.51	[illegible]	0.196502	12.20658
11.666	0.57	[illegible]	0.199688	14.35442
11.676	0.63	[illegible]	0.202873	16.57925
11.686	0.7	[illegible]	0.206058	19.14685
11.694	0.77	[illegible]	0.208606	21.53286
11.704	0.85	[illegible]	0.211791	24.4582
11.714	0.93	[illegible]	0.214976	27.12353
11.724	1.01	[illegible]	0.218161	30.24687
11.734	1.11	[illegible]	0.221346	33.73421
11.744	1.21	43.56	0.224531	37.49954
11.754	1.32	[illegible]	0.227716	[illegible]
11.762	1.45	[illegible]	0.230264	[illegible]
11.772	1.59	[illegible]	0.23345	51.47849
11.782	1.74	[illegible]	0.236635	56.94482
11.792	1.9	[illegible]	0.23982	62.58016
11.802	2.06	[illegible]	0.243005	68.5945
11.812	2.24	[illegible]	0.24619	75.13083
11.822	2.43	[illegible]	0.249375	[illegible]
11.83	2.64	[illegible]	0.251923	90.23344
11.84	2.88	[illegible]	0.255108	99.29477
11.85	3.15	[illegible]	0.258293	109.4441
11.86	3.45	[illegible]	0.261478	121.0294
11.87	3.8	[illegible]	0.264663	134.2349
11.88	4.19	[illegible]	0.267849	148.5203
11.89	4.6	[illegible]	[illegible]	[illegible]
11.898	5.03	[illegible]	0.273582	179.0937
11.908	5.42	[illegible]	0.276767	194.6491
11.918	5.9	[illegible]	0.279952	209.8244
11.928	6.42	[illegible]	0.283137	224.4649
11.938	6.72	[illegible]	0.286322	237.8551

Total Volume
[illegible] cf
0.24 Ac ft
8.3

N Channel Hydrograph 10 year volume

Time (hrs)	Flow (cfs)	Vol (cf)	Disch. Flow	Det Vol
9.481	0.05	1.8	0	
9.491	0.05	1.8	0	
9.501	0.05	1.8	0	
9.511	0.05	1.8	0	
9.521	0.05	1.8	0	
9.531	0.05	1.8	0	
9.541	0.05	1.44	0	
9.549	0.05	1.8	0	
9.559	0.05	1.8	0	
9.569	0.05	1.8	0	
9.579	0.05	1.8	0	
9.589	0.05	1.8	0	
9.599	0.05	1.8	0	
9.607	0.05	1.44	0	
9.617	0.05	1.8	0	
9.627	0.05	1.8	0	
9.637	0.05	1.98	0	
9.647	0.06	2.16	0	
9.657	0.06	2.16	0	
9.667	0.06	2.16	0	
9.677	0.06	1.944	0	
9.686	0.06	2.16	0	
9.696	0.06	2.16	0	
9.706	0.06	2.16	0	
9.716	0.06	2.16	0	
9.726	0.06	2.16	0	
9.736	0.06	2.16	0	
9.746	0.06	1.728	0	
9.754	0.06	2.16	0	
9.764	0.06	2.16	0	
9.774	0.06	2.16	0	
9.784	0.06	2.16	0	
9.794	0.06	2.16	0	
9.804	0.06	2.16	0	
9.814	0.06	1.728	0	
9.822	0.06	2.16	0	
9.832	0.06	2.16	0	
9.842	0.06	2.34	0	
9.852	0.07	2.52	0	
9.862	0.07	2.52	0	
9.872	0.07	2.52	0	
9.882	0.07	2.016	0	
9.89	0.07	2.52	0	
9.9	0.07	2.52	0	
9.91	0.07	2.52	0	
9.92	0.07	2.52	0	
9.93	0.07	2.52	0	
9.94	0.07	2.52	0	
9.95	0.07	2.016	0	
9.958	0.07	2.52	0	
9.968	0.07	2.52	0	
9.978	0.07	2.52	0	
9.988	0.07	2.52	0	
9.998	0.07	2.52	0	
10.008	0.07	2.7	0	
10.018	0.08	2.304	0	
10.026	0.08	2.88	0	
10.036	0.08	2.88	0	
10.046	0.08	2.88	0	
10.056	0.08	2.88	0	
10.066	0.08	2.88	0	
10.076	0.08	2.88	0	
10.086	0.08	2.304	0	
10.094	0.08	2.88	0	
10.104	0.08	2.88	0	
10.114	0.08	2.88	0	
10.124	0.08	2.88	0	
10.134	0.08	2.88	0	
10.144	0.08	2.88	0	
10.154	0.08	2.448	0	
10.162	0.09	3.24	0	
10.172	0.09	3.24	0	
10.182	0.09	3.24	0	
10.192	0.09	3.24	0	
10.202	0.09	3.24	0	
10.212	0.09	3.24	0	
10.222	0.09	2.592	0	
10.23	0.09	3.24	0	
10.24	0.09	3.24	0	
10.25	0.09	3.24	0	
10.26	0.09	3.24	0	
10.27	0.09	3.42	0	
10.28	0.1	3.6	0	
10.29	0.1	2.88	0	
10.298	0.1	3.6	0	
10.308	0.1	3.6	0	
10.318	0.1	3.6	0	
10.328	0.1	3.6	0	
10.338	0.1	3.6	0	
10.348	0.1	3.6	0	
10.358	0.1	2.88	0	
10.366	0.1	3.6	0	
10.376	0.1	3.78	0	
10.386	0.11	3.96	0	
10.396	0.11	3.96	0	
10.406	0.11	3.96	0	
10.416	0.11	3.96	0	
10.426	0.11	3.564	0	
10.435	0.11	3.96	0	
10.445	0.11	3.96	0	
10.455	0.11	3.96	0	
10.465	0.11	3.96	0	
10.475	0.11	3.96	0	
10.485	0.11	[illegible]	0	
10.495	0.12	3.456	0	
10.505	0.12	4.32	0	
10.513	0.12	4.32	0	
10.523	0.12	4.32	0	
10.533	0.12	4.32	0	
10.543	0.12	4.32	0	
10.553	0.12	4.32	0	
10.563	0.12	3.744	0.12	[illegible]
10.571	0.14	[illegible]	0.120917	1.381669
10.581	0.18	6.48	0.122248	2.356799
10.591	0.18	6.48	0.12349	[illegible]
10.601	0.18	6.48	0.124745	[illegible]
10.611	0.18	[illegible]	0.125083	[illegible]

Total Volume
[illegible] cf
[illegible] Ac ft
17.92

11.946	7.07	[illegible]	0.289502	249.6204
11.958	7.38	[illegible]	0.292692	227.6778
11.966	7.64	[illegible]	0.29524	262.774
11.975	7.84	[illegible]	0.298425	274.4494
11.986	8.01	[illegible]	0.301611	279.7847
11.996	8.14	[illegible]	0.304796	283.03
12.006	8.24	[illegible]	0.307981	285.2154
12.015	8.29	[illegible]	0.311156	287.3607
12.025	8.3	[illegible]	0.314351	229.374
12.034	8.26	[illegible]	0.316899	284.0944
12.044	8.16	[illegible]	0.320084	279.2906
12.054	8	[illegible]	0.323269	271.965
12.064	7.76	[illegible]	0.326454	262.3303
12.074	7.47	262.44	0.329649	250.5156
12.084	7.11	[illegible]	0.332825	236.501
12.094	6.72	[illegible]	0.33601	[illegible]
12.103	6.31	[illegible]	0.338876	207.5231
12.113	5.9	[illegible]	0.342061	192.5485
12.123	5.49	[illegible]	0.345246	178.1338
12.133	5.1	[illegible]	0.348431	164.1501
12.143	4.72	[illegible]	0.351617	151.0845
12.153	4.38	[illegible]	0.354802	139.0898
12.163	4.06	[illegible]	0.357987	102.4054
12.171	3.77	[illegible]	0.360535	118.1834
12.181	3.52	[illegible]	0.36372	109.4288
12.191	3.27	111.84	0.366905	101.5741
12.201	3.09	[illegible]	0.37009	94.61947
12.211	2.91	[illegible]	0.373275	88.55476
12.221	2.76	[illegible]	0.37646	83.4301
12.231	2.63	[illegible]	0.379645	61.04552
[illegible]	2.51	[illegible]	0.382194	74.5687
12.240	2.4	[illegible]	0.385379	70.84904
12.259	2.31	[illegible]	0.388564	67.49437
12.269	2.22	[illegible]	0.391749	64.31971
12.279	2.14	[illegible]	0.394934	61.59505
12.289	2.07	[illegible]	0.398119	58.87038
12.298	2	[illegible]	0.401304	45.34175
12.307	1.94	[illegible]	0.403852	54.44499
12.317	1.89	[illegible]	0.407037	52.42533
12.327	1.84	[illegible]	0.410222	50.51466
12.337	1.79	[illegible]	0.413407	48.78
12.347	1.75	[illegible]	0.416592	47.2254
12.357	1.71	[illegible]	0.419778	45.67067
12.367	1.67	[illegible]	0.422963	[illegible]
12.375	1.63	[illegible]	0.425511	42.75428
12.385	1.6	[illegible]	0.428696	41.55952
12.395	1.57	[illegible]	0.431881	[illegible]
12.405	1.54	[illegible]	0.435066	39.00029
12.415	1.51	[illegible]	0.438251	37.94563
12.425	1.48	[illegible]	0.441436	36.79096
12.435	1.45	[illegible]	0.444621	28.48021
12.444	1.42	[illegible]	0.447169	34.62457
12.453	1.4	[illegible]	0.450355	33.5999
12.463	1.37	[illegible]	0.45554	32.57524
12.473	1.34	[illegible]	0.456725	31.48054
12.483	1.32	[illegible]	0.45991	30.38591
12.493	1.29	[illegible]	0.463095	29.45125
12.503	1.27	[illegible]	0.46628	28.67844
12.511	1.24	[illegible]	0.468828	27.64486
12.521	1.22	[illegible]	0.472013	26.51020
12.531	1.2	[illegible]	0.475198	25.62554
12.541	1.18	[illegible]	0.478383	24.84087
12.551	1.16	[illegible]	0.481569	24.0062
12.561	1.14	[illegible]	0.484754	23.17154
12.571	1.12	[illegible]	0.487939	22.47687
12.579	1.1	[illegible]	0.490487	21.52514
12.589	1.08	[illegible]	0.493672	20.65048
12.599	1.05	[illegible]	0.496857	20.03582
12.609	1.05	[illegible]	0.500042	19.58115
12.619	1.03	[illegible]	0.503227	18.72649
12.629	1.02	[illegible]	0.506412	18.07184
12.639	1	[illegible]	0.509597	17.9429
12.647	0.99	[illegible]	0.512145	16.96541
12.657	0.98	[illegible]	0.515331	16.49077
12.667	0.97	[illegible]	0.518516	16.01611
12.677	0.96	[illegible]	0.521701	15.54144
12.687	0.95	[illegible]	0.524886	15.06678
12.697	0.94	[illegible]	0.528071	14.59212
12.707	0.93	[illegible]	0.531256	[illegible]
12.715	0.92	[illegible]	0.533804	13.56572
12.725	0.91	[illegible]	0.536989	13.37106
12.735	0.91	[illegible]	0.540174	13.07629
12.745	0.9	[illegible]	0.543359	12.50174
12.755	0.89	[illegible]	0.546544	12.30707
12.765	0.89	[illegible]	0.54973	12.0124
12.775	0.88	[illegible]	0.552915	9.239365
12.783	0.87	[illegible]	0.555463	11.26805
12.793	0.87	[illegible]	0.558648	10.37135
12.803	0.86	[illegible]	0.561833	10.67668
12.813	0.86	[illegible]	0.565018	10.38202
12.823	0.85	[illegible]	0.568203	10.08736
12.833	0.85	[illegible]	0.571388	9.792692
12.843	0.84	[illegible]	0.574574	9.463596
12.851	0.83	[illegible]	0.577121	9.046298
12.861	0.83	[illegible]	0.580306	8.751635
12.871	0.82	[illegible]	0.583492	8.456971
12.881	0.82	[illegible]	0.586677	8.162308
12.891	0.81	[illegible]	0.589862	7.867644
12.901	0.81	[illegible]	0.593047	7.572981
12.911	0.8	[illegible]	0.596232	6.555645
12.92	0.8	[illegible]	0.59909	6.99512
12.93	0.79	[illegible]	0.602284	6.720457
12.94	0.79	[illegible]	0.605469	6.405795
12.95	0.78	[illegible]	0.608654	6.11131
12.96	0.78	[illegible]	0.611839	5.816466
12.97	0.77	[illegible]	0.615024	5.521803
12.98	0.77	[illegible]	0.618209	4.190885
12.988	0.76	[illegible]	0.620757	4.955409
12.998	0.76	[illegible]	0.623942	4.660745
13.006	0.75	[illegible]	0.627127	4.366082
13.018	0.75	[illegible]	0.630313	4.071418
13.028	0.74	[illegible]	0.633498	3.776755
13.038	0.74	[illegible]	0.636683	3.482091
13.048	0.73	[illegible]	0.639868	[illegible]
13.056	0.73	[illegible]	0.642416	2.950697
13.066	0.72	[illegible]	0.645601	2.621034
13.076	0.72	[illegible]	0.648786	2.32617
13.086	0.71	[illegible]	0.651971	2.041707
13.096	0.71	[illegible]	0.655155	1.737043
13.106	0.7	[illegible]	0.658341	1.44238
13.115	0.7	[illegible]	0.661526	1.071346
13.124	0.7	[illegible]	0.664074	1.055988
13.134	0.69	[illegible]	0.66726	0.761322

10.625	0.17	[illegible]	0.127229	2.23732
10.633	0.19	[illegible]	0.128475	2.25755
10.639	0.19	[illegible]	0.129473	2.319555
10.649	0.2	[illegible]	0.130719	2.421685
10.659	0.2	[illegible]	0.131965	2.426815
10.669	0.2	[illegible]	0.134212	2.561945
10.679	0.21	[illegible]	0.133458	2.597075
10.689	0.21	[illegible]	0.145774	2.552205
10.699	0.21	[illegible]	0.135951	2.253458
10.707	0.22	[illegible]	0.137948	2.93144
10.717	0.22	[illegible]	0.139194	2.88667
10.727	0.22	[illegible]	0.140441	3.0217
10.737	0.23	[illegible]	0.141687	3.156831
10.747	0.23	[illegible]	0.142933	3.111961
10.757	0.23	[illegible]	0.14418	3.247091
10.767	0.24	[illegible]	0.145426	2.709367
10.775	0.24	[illegible]	0.146424	3.446425
10.785	0.24	[illegible]	0.14767	3.481456
10.795	0.25	[illegible]	0.148916	3.616586
10.805	0.25	[illegible]	0.150162	3.571716
10.815	0.25	[illegible]	0.151409	3.706846
10.825	0.26	[illegible]	0.152655	3.841976
10.835	0.26	[illegible]	0.153902	3.185275
10.843	0.27	[illegible]	0.154899	4.121211
10.853	0.27	[illegible]	0.156145	4.076341
10.863	0.27	[illegible]	0.157391	4.211471
10.873	0.28	[illegible]	0.158638	4.346601
10.883	0.28	[illegible]	0.159884	4.481732
10.893	0.29	[illegible]	0.16113	4.616862
10.903	0.29	[illegible]	0.162377	4.661185
10.911	0.29	[illegible]	0.163374	4.716696
10.921	0.3	[illegible]	0.164621	4.851226
10.931	0.3	[illegible]	0.165867	4.986357
10.941	0.31	[illegible]	0.167113	5.121487
10.951	0.31	[illegible]	0.16836	5.076617
10.961	0.31	[illegible]	0.169606	5.211747
10.971	0.32	[illegible]	0.170852	4.281091
10.979	0.32	[illegible]	0.17185	5.490582
10.989	0.33	[illegible]	0.173096	5.626112
10.999	0.33	[illegible]	0.174342	5.761242
11.009	0.34	[illegible]	0.175589	5.896372
11.019	0.34	[illegible]	0.176835	5.031502
11.029	0.35	[illegible]	0.178081	6.166633
11.039	0.35	[illegible]	0.179328	5.045
11.047	0.36	[illegible]	0.180325	6.445857
11.057	0.36	[illegible]	0.181571	6.580997
11.067	0.37	[illegible]	0.182818	6.716127
11.077	0.37	[illegible]	0.184064	6.851258
11.087	0.38	[illegible]	0.18531	7.166388
11.097	0.39	[illegible]	0.186557	7.301518
11.107	0.39	[illegible]	0.187803	5.952998
11.115	0.4	[illegible]	0.1888	7.580752
11.125	0.4	[illegible]	0.190047	7.715882
11.135	0.41	[illegible]	0.191293	8.031013
11.145	0.42	[illegible]	0.19254	8.166143
11.155	0.42	[illegible]	0.193786	8.301273
11.165	0.43	[illegible]	0.195032	8.616403
11.175	0.44	[illegible]	0.196279	7.148816
11.183	0.45	[illegible]	0.197276	9.255638
11.193	0.46	[illegible]	0.198522	9.390768
11.203	0.46	[illegible]	0.199759	9.525858
11.213	0.47	[illegible]	0.201015	9.841028
11.223	0.48	[illegible]	0.202261	10.15616
11.233	0.49	[illegible]	0.203508	10.47129
11.243	0.5	[illegible]	0.204754	9.709798
11.251	0.51	[illegible]	0.205876	11.10604
11.261	0.52	[illegible]	0.207122	11.42117
11.271	0.53	[illegible]	0.208469	11.7363
11.282	0.54	[illegible]	0.209615	12.05143
11.292	0.55	[illegible]	0.210861	12.36656
11.302	0.56	[illegible]	0.212108	12.68169
11.312	0.57	[illegible]	0.213354	10.40104
11.32	0.58	[illegible]	0.214351	13.32092
11.33	0.59	[illegible]	0.215598	13.63605
11.34	0.6	[illegible]	0.216844	13.95118
11.35	0.61	[illegible]	0.21809	14.26631
11.36	0.62	[illegible]	0.219337	14.58144
11.37	0.63	[illegible]	0.220583	14.89657
11.38	0.64	[illegible]	0.22183	12.17295
11.388	0.65	[illegible]	0.222827	15.53581
11.398	0.66	[illegible]	0.224073	15.85094
11.408	0.67	[illegible]	0.225319	16.16607
11.418	0.68	[illegible]	0.226566	16.4812
11.428	0.69	[illegible]	0.227812	16.97633
11.438	0.71	[illegible]	0.229059	17.47146
11.448	0.72	[illegible]	0.230305	14.25286
11.456	0.73	[illegible]	0.231302	18.11069
11.466	0.74	[illegible]	0.232548	18.42582
11.476	0.75	[illegible]	0.233795	18.92095
11.486	0.77	[illegible]	0.235041	19.41608
11.496	0.78	[illegible]	0.236288	19.73121
11.506	0.79	[illegible]	0.237534	20.22634
11.516	0.81	[illegible]	0.23878	16.72477
11.524	0.83	[illegible]	0.239777	21.58558
11.534	0.85	[illegible]	0.241024	22.62071
11.544	0.89	[illegible]	0.24227	24.01584
11.554	0.93	[illegible]	0.243517	25.53097
11.564	0.98	[illegible]	0.244763	27.5261
11.574	1.04	[illegible]	0.246009	29.82123
11.584	1.11	[illegible]	0.247256	29.98464
11.592	1.19	[illegible]	0.248253	35.32046
11.602	1.27	[illegible]	0.249499	38.15559
11.612	1.35	[illegible]	0.250746	41.35072
11.622	1.45	[illegible]	0.251992	44.90585
11.632	1.55	[illegible]	0.253238	48.82098
11.642	1.67	[illegible]	0.254485	53.27611
11.652	1.8	[illegible]	0.255731	46.62058
11.66	1.95	[illegible]	0.256728	64.17545
11.67	2.13	[illegible]	0.257975	70.61048
11.68	2.31	[illegible]	0.259221	77.40561
11.69	2.57	[illegible]	0.260467	84.74074
11.7	2.72	[illegible]	0.261714	92.25587
11.71	2.93	[illegible]	0.26296	100.111
11.72	3.18	[illegible]	0.264207	86.84049
11.728	3.4	[illegible]	0.265204	117.1302
11.738	3.65	[illegible]	0.26645	126.8254
11.748	3.93	[illegible]	0.267696	137.0409
11.758	4.22	[illegible]	0.268943	148.1558
11.768	4.55	[illegible]	0.270189	160.1509
11.778	4.9	[illegible]	0.271436	173.0859
11.788	5.26	[illegible]	0.272682	186.0924
11.798	5.64	[illegible]	0.273679	200.0051
11.806	6.02	[illegible]	0.274925	214.3802

13.144	0.59	24.51	0.670445	0.646659
13.154	0.59	24.46	0.67368	0.357095
13.164	0.58	24.15	0.676815	0.257332
13.174	0.58	24.2	0.68	
13.184	0.57	[illegible]		
13.192	0.57	24.17		
13.202	0.57	23.91		
13.212	0.56	23.76		
13.222	0.56	23.76		
13.232	0.56	23.76		
13.242	0.56	23.58		
13.252	0.65	18.72		
13.26	0.65	23.4		
13.27	0.65	23.22		
13.28	0.64	23.14		
13.29	0.64	23.04		
13.3	0.64	23.04		
13.31	0.64	22.86		
13.32	0.63	18.144		
13.328	0.63	22.68		
13.338	0.63	22.5		
13.348	0.62	22.32		
13.358	0.62	22.32		
13.368	0.62	22.32		
13.378	0.62	22.14		
13.388	0.61	17.568		
13.396	0.61	21.96		
13.406	0.61	21.78		
13.416	0.6	21.6		
13.426	0.6	21.6		
13.436	0.6	21.6		
13.446	0.6	21.42		
13.456	0.59	16.992		
13.464	0.59	21.24		
13.474	0.59	21.06		
13.484	0.58	20.88		
13.494	0.58	20.88		
13.504	0.58	20.88		
13.514	0.58	20.7		
13.524	0.57	16.416		
13.532	0.57	20.52		
13.542	0.57	20.52		
13.552	0.57	20.34		
13.562	0.56	20.16		
13.572	0.56	20.16		
13.582	0.56	19.98		
13.592	0.55	15.84		
13.6	0.55	19.8		
13.61	0.55	19.8		
13.62	0.55	19.62		
13.63	0.54	19.44		
13.64	0.54	19.44		
13.65	0.54	19.44		
13.66	0.54	15.552		
13.668	0.53	19.08		
13.678	0.53	19.08		
13.688	0.53	19.08		
13.698	0.53	19.08		
13.706	0.53	18.9		
13.716	0.52	18.72		
13.726	0.52	[illegible]		
13.737	0.52	18.72		
13.747	0.52	18.72		
13.757	0.52	18.54		
13.767	0.51	18.36		
13.777	0.51	18.36		
13.787	0.51	18.36		
13.797	0.51	14.544		
13.805	0.5	18		
13.815	0.5	18		
13.825	0.5	18		
13.835	0.5	18		
13.845	0.5	17.82		
13.855	0.49	17.64		
13.865	0.49	14.112		
13.873	0.49	17.64		
13.883	0.49	17.64		
13.893	0.49	17.46		
13.903	0.48	17.28		
13.913	0.48	17.28		
13.923	0.48	17.28		
13.933	0.48	13.824		
13.941	0.48	17.1		
13.951	0.47	16.92		
13.961	0.47	16.92		
13.971	0.47	16.92		
13.981	0.47	16.74		
13.991	0.46	16.56		
14.001	0.46	13.248		
14.009	0.46	16.56		
14.019	0.46	16.56		
14.029	0.46	16.38		
14.039	0.45	16.2		
14.049	0.45	16.2		
14.059	0.45	16.2		
14.069	0.45	12.96		
14.077	0.45	16.2		
14.087	0.45	16.02		
14.097	0.44	15.84		
14.107	0.44	15.84		
14.117	0.44	15.84		
14.127	0.44	15.84		
14.137	0.44	12.672		
14.145	0.44	15.84		
14.155	0.44	15.66		
14.165	0.43	15.48		
14.175	0.43	15.48		
14.185	0.43	15.48		
14.195	0.43	15.48		
14.205	0.43	12.384		
14.213	0.43	15.48		
14.223	0.43	15.48		
14.233	0.43	15.48		
14.243	0.43	[illegible]		
14.253	0.44	[illegible]		
14.263	0.42	15.12		
14.273	0.42	12.096		
14.281	0.42	15.12		
14.291	0.42	15.12		
14.301	0.42	15.12		
14.311	0.42	15.12		
14.321	0.42	15.12		
14.331	0.42	15.12		

11.816	6.44	236.64	0.276172	239.9754
11.826	6.87	259.56	0.277418	246.8505
11.836	7.48	279.4	0.278665	265.3455
11.846	7.92	296.1	0.279911	286.0008
11.856	8.53	295.744	0.281157	247.6424
11.864	9.23	345.96	0.282154	335.78
11.874	9.99	374.4	0.283400	364.5751
11.884	10.81	321.64	0.284647	334.3703
11.894	11.67	435.96	0.285894	425.6454
11.904	12.55	367.44	0.28714	457.2805
11.914	13.44	499.6	0.288466	488.1957
11.924	14.27	422.208	0.289633	413.8522
11.932	15.05	554.76	0.29063	544.2749
11.942	15.77	579.2	0.291876	508.17
11.952	16.38	595.5	0.293125	587.9252
11.962	16.87	614.34	0.294369	603.7204
11.972	17.26	626.76	0.295615	526.3954
11.982	17.56	635.76	0.296862	625.0505
11.992	17.76	511.776	0.298108	504.6161
12	17.88	644.4	0.299105	633.5098
12.01	17.92	614.56	0.300352	633.7449
12.02	17.89	641.52	0.301598	630.64
12.03	17.75	635.5	0.302844	623.5752
12.04	17.5	623.52	0.304091	612.5503
12.05	17.14	606.4	0.305337	597.3854
12.06	16.66	479.808	0.306584	519.5505
12.069	16.25	564.48	0.307705	553.3802
12.079	15.31	536.4	0.308952	525.2553
12.089	14.49	506.16	0.310199	494.9704
12.099	13.63	474.84	0.311444	463.6056
12.109	12.75	443.16	0.312691	431.8807
12.119	11.87	412.42	0.313937	400.6358
12.129	11.02	315.936	0.315184	296.4764
12.137	10.2	354.36	0.316181	341.9351
12.147	9.43	326.88	0.317427	315.4402
12.157	8.73	302.36	0.318673	291.2653
12.167	8.09	280.8	0.31992	269.7604
12.177	7.51	261	0.321166	249.4150
12.187	6.99	243.36	0.322413	231.7407
12.197	6.53	182.304	0.323659	172.9682
12.205	6.13	214.56	0.324556	202.8409
12.215	5.79	202.86	0.325903	191.1051
12.225	5.48	192.42	0.327149	180.6202
12.235	5.21	183.24	0.328399	171.3953
12.245	4.97	174.96	0.329647	163.0705
12.255	4.75	167.4	0.330888	155.4656
12.265	4.55	126.648	0.332134	118.8682
12.273	4.37	154.44	0.333162	142.4248
12.283	4.21	148.68	0.334378	136.8
12.293	4.06	143.82	0.335624	131.7151
12.303	3.93	139.32	0.336871	127.1702
12.313	3.81	135.18	0.338117	122.9854
12.323	3.7	131.22	0.339353	118.9805
12.333	3.59	102.096	0.34066	92.27208
12.341	3.5	124.38	0.341607	112.2597
12.351	3.41	121.32	0.342855	108.9548
12.361	3.33	118.44	0.3441	106.03
12.371	3.25	115.56	0.345346	103.1051
12.381	3.17	112.86	0.346572	100.3502
12.391	3.1	110.52	0.347839	97.97547
12.401	3.04	86.544	0.349085	76.47599
12.409	2.97	105.84	0.350082	94.2146
12.419	2.91	103.68	0.351329	91.00973
12.429	2.85	101.7	0.352575	88.98486
12.439	2.8	99.72	0.353822	86.95999
12.449	2.74	97.74	0.355068	84.93512
12.459	2.69	95.94	0.356314	83.09025
12.469	2.64	75.168	0.357561	64.85585
12.477	2.58	91.98	0.358558	79.04949
12.487	2.53	90.18	0.359804	77.20462
12.497	2.48	88.38	0.361051	75.35975
12.507	2.43	86.76	0.362297	73.69488
12.517	2.39	85.14	0.363543	72.03201
12.527	2.34	83.52	0.36479	70.36514
12.537	2.3	65.664	0.356036	55.1078
12.545	2.26	80.64	0.367033	67.40437
12.555	2.22	79.2	0.36828	65.9135
12.565	2.18	77.76	0.369526	64.43463
12.575	2.14	76.32	0.370772	62.94976
12.585	2.1	74.88	0.372019	61.46489
12.595	2.06	73.62	0.373265	60.16002
12.605	2.04	58.032	0.374511	47.24171
12.613	2	71.16	0.375509	57.91926
12.623	1.97	70.2	0.376755	56.79439
12.633	1.94	69.18	0.378001	55.84952
12.643	1.92	68.22	0.379248	54.90465
12.653	1.85	67.14	0.380494	53.95978
12.663	1.87	66.06	0.38174	53.19491
12.673	1.85	52.992	0.382987	41.94762
12.681	1.83	65.52	0.383984	51.67414
12.691	1.81	64.8	0.38523	50.92027
12.701	1.79	64.08	0.386477	50.1444
12.711	1.77	63.54	0.387723	49.55353
12.721	1.76	63	0.38897	48.97466
12.731	1.74	62.28	0.390216	48.38979
12.741	1.73	49.68	0.391462	38.49154
12.749	1.72	61.56	0.392459	47.40903
12.759	1.7	61.02	0.393706	46.82416
12.769	1.69	60.66	0.394952	46.41929
12.779	1.68	60.12	0.396199	45.83442
12.789	1.66	59.58	0.397445	45.24955
12.799	1.65	59.22	0.398691	44.84468
12.809	1.64	47.232	0.399938	35.55544
12.817	1.63	58.7	0.400935	44.04491
12.827	1.62	58.32	0.402181	43.63504
12.837	1.61	57.78	0.403428	43.23417
12.847	1.6	57.42	0.404674	42.8293
12.857	1.59	57.06	0.40592	42.42443
12.867	1.58	56.88	0.407167	42.01956
12.877	1.57	45.504	0.408413	33.29324
12.886	1.55	55.62	0.409535	40.85431
12.896	1.54	55.26	0.410781	40.44944
12.906	1.53	54.9	0.412028	40.04457
12.916	1.52	54.54	0.413274	39.6397
12.926	1.51	54.18	0.41452	39.23483
12.936	1.5	53.82	0.415767	38.82996
12.946	1.49	42.768	0.417013	30.74365
12.954	1.48	53.1	0.41821	38.0292
12.964	1.47	52.74	0.419257	37.62433
12.974	1.46	52.38	0.420503	37.21946
12.984	1.45	52.02	0.421749	36.81459
12.994	1.44	51.66	0.422995	36.40972
13.004	1.44	51.3	0.424242	36.00485

14.341	0.42	[illegible]
14.349	0.42	15.12
14.359	0.42	[illegible]
14.369	0.42	15.12
14.379	0.42	[illegible]
14.389	0.42	14.44
14.399	0.41	14.76
14.409	0.41	11.508
14.417	0.41	14.76
14.427	0.41	14.76
14.437	0.41	11.76
14.447	0.41	14.76
14.457	0.41	11.76
14.467	0.41	14.76
14.477	0.41	[illegible]
14.485	0.41	14.76
14.495	0.41	11.76
14.505	0.41	14.76
14.515	0.41	11.76
14.525	0.41	14.55
14.535	0.4	[illegible]
14.545	0.4	[illegible]
14.554	0.4	14.4
14.564	0.4	[illegible]
14.574	0.4	14.4
14.584	0.4	11.4
14.594	0.4	14.4
14.604	0.4	11.4
14.614	0.4	11.52
14.623	0.4	11.4
14.632	0.4	14.4
14.642	0.4	11.4
14.652	0.4	14.4
14.662	0.4	14.22
14.672	0.39	[illegible]
14.682	0.39	11.232
14.69	0.39	[illegible]
14.7	0.39	[illegible]
14.71	0.39	[illegible]
14.72	0.39	[illegible]
14.73	0.39	[illegible]
14.74	0.39	[illegible]
14.75	0.39	11.232
14.758	0.39	[illegible]
14.768	0.39	[illegible]
14.778	0.39	[illegible]
14.788	0.39	[illegible]
14.798	0.39	[illegible]
14.808	0.38	[illegible]
14.818	0.38	[illegible]
14.826	0.38	[illegible]
14.836	0.38	[illegible]
14.846	0.38	[illegible]
14.856	0.38	[illegible]
14.866	0.38	[illegible]
14.876	0.38	[illegible]
14.886	0.38	[illegible]
14.894	0.38	[illegible]
14.904	0.38	[illegible]
14.914	0.38	[illegible]
14.924	0.38	[illegible]
14.934	0.38	[illegible]
14.944	0.38	[illegible]
14.954	0.37	[illegible]
14.962	0.37	[illegible]
14.972	0.37	[illegible]
14.982	0.37	[illegible]
14.992	0.37	[illegible]
15.002	0.37	[illegible]
15.012	0.37	[illegible]
15.022	0.37	[illegible]
15.03	0.37	[illegible]
15.04	0.37	[illegible]
15.05	0.37	[illegible]
15.06	0.37	[illegible]
15.07	0.37	[illegible]
15.08	0.36	[illegible]
15.09	0.36	[illegible]
15.098	0.36	[illegible]
15.108	0.36	[illegible]
15.118	0.36	[illegible]
15.128	0.36	[illegible]
15.138	0.36	[illegible]
15.148	0.36	[illegible]
15.158	0.36	[illegible]
15.166	0.36	[illegible]
15.176	0.36	[illegible]
15.186	0.36	[illegible]
15.196	0.36	[illegible]
15.206	0.36	[illegible]
15.216	0.35	[illegible]
15.225	0.35	[illegible]
15.234	0.35	[illegible]
15.244	0.35	[illegible]
15.254	0.35	[illegible]
15.264	0.35	[illegible]
15.274	0.35	[illegible]
15.284	0.35	[illegible]
15.294	0.35	11.34
15.303	0.35	[illegible]
15.313	0.35	[illegible]
15.323	0.35	[illegible]
15.333	0.35	[illegible]
15.343	0.35	[illegible]
15.353	0.34	[illegible]
15.363	0.34	[illegible]
15.372	0.34	[illegible]
15.382	0.34	[illegible]
15.392	0.34	[illegible]
15.401	0.34	[illegible]
15.411	0.34	[illegible]
15.421	0.34	[illegible]
15.431	0.34	[illegible]
15.439	0.34	[illegible]
15.449	0.34	[illegible]
15.459	0.34	[illegible]
15.469	0.34	[illegible]
15.479	0.33	[illegible]
15.489	0.33	[illegible]
15.499	0.33	[illegible]
15.507	0.33	[illegible]
15.517	0.33	[illegible]
15.527	0.33	[illegible]

13.014	1.42	[illegible]	0.425489	28.48557
13.022	1.41	[illegible]	0.426485	35.20408
13.032	1.4	[illegible]	0.427742	34.79901
13.042	1.39	[illegible]	0.428978	34.57434
13.052	1.39	[illegible]	0.430225	34.44947
13.062	1.38	[illegible]	0.431471	33.9446
13.072	1.37	[illegible]	0.432718	33.54924
13.082	1.36	[illegible]	0.433964	26.51148
13.09	1.35	[illegible]	0.434967	32.75892
13.1	1.34	[illegible]	0.436207	32.3341
13.11	1.33	[illegible]	0.437454	31.92523
13.12	1.32	47.52	0.4387	31.70456
13.13	1.32	[illegible]	0.439947	31.47949
13.14	1.31	[illegible]	0.441193	31.07463
13.15	1.3	[illegible]	0.442439	24.53939
13.158	1.29	[illegible]	0.443436	40.45485
13.168	1.29	[illegible]	0.444683	30.22838
13.178	1.28	[illegible]	0.445929	29.82411
13.188	1.27	[illegible]	0.447176	29.59924
13.198	1.27	[illegible]	0.448422	29.37437
13.208	1.26	[illegible]	0.449668	28.9695
13.218	1.25	[illegible]	0.450915	22.9095
13.226	1.25	44.82	0.451912	28.52874
13.236	1.24	[illegible]	0.453158	28.30387
13.246	1.24	[illegible]	0.454405	28.079
13.256	1.23	[illegible]	0.455651	27.57413
13.266	1.22	[illegible]	0.456897	27.44926
13.275	1.22	[illegible]	0.458144	27.22439
13.285	1.21	[illegible]	0.45939	21.6037
13.294	1.21	[illegible]	0.460387	26.78362
13.304	1.2	[illegible]	0.461634	26.55875
13.314	1.2	[illegible]	0.46288	26.33388
13.324	1.19	[illegible]	0.464126	25.92901
13.334	1.18	[illegible]	0.465373	25.70414
13.344	1.18	[illegible]	0.466619	25.47927
13.354	1.17	[illegible]	0.467866	22.20711
13.362	1.17	[illegible]	0.468863	25.03851
13.372	1.16	[illegible]	0.470109	24.81364
13.382	1.16	[illegible]	0.471355	24.58877
13.392	1.15	[illegible]	0.472602	24.3639
13.402	1.15	[illegible]	0.473848	24.13501
13.412	1.14	[illegible]	0.475095	23.74416
13.422	1.13	[illegible]	0.476341	18.81303
13.43	1.13	[illegible]	0.477338	23.29339
13.44	1.12	[illegible]	0.478584	23.06852
13.45	1.12	[illegible]	0.479831	22.84365
13.46	1.11	[illegible]	0.481077	22.61878
13.47	1.11	[illegible]	0.482324	22.39391
13.48	1.1	[illegible]	0.48357	22.16905
13.49	1.1	[illegible]	0.484816	17.55893
13.498	1.09	[illegible]	0.485813	21.72828
13.508	1.09	[illegible]	0.48706	21.50341
13.518	1.08	[illegible]	0.488306	21.09854
13.528	1.07	[illegible]	0.489553	20.87367
13.538	1.07	[illegible]	0.490799	20.6488
13.548	1.06	[illegible]	0.492045	20.42393
13.556	1.06	[illegible]	0.493292	16.16284
13.566	1.05	[illegible]	0.494289	19.78326
13.576	1.05	[illegible]	0.495535	19.7563
13.586	1.04	[illegible]	0.496782	19.53343
13.596	1.04	[illegible]	0.498028	19.30856
13.606	1.03	[illegible]	0.499274	19.08369
13.616	1.03	[illegible]	0.500521	18.85882
13.625	1.02	[illegible]	0.501767	14.01075
13.634	1.02	[illegible]	0.502764	18.41805
13.644	1.01	[illegible]	0.504011	18.19318
13.654	1.01	[illegible]	0.505257	17.96831
13.664	1	[illegible]	0.506503	17.74344
13.674	1	[illegible]	0.50775	17.69857
13.684	1	[illegible]	0.508996	17.4737
13.694	0.99	[illegible]	0.510243	15.52597
13.702	0.99	[illegible]	0.511364	17.02845
13.712	0.98	[illegible]	0.512611	16.80358
13.722	0.98	[illegible]	0.513857	16.57871
13.733	0.97	[illegible]	0.515104	16.35384
13.743	0.97	[illegible]	0.51635	16.30897
13.753	0.97	54.74	0.517596	16.0841
13.763	0.96	[illegible]	0.518843	12.63097
13.773	0.96	[illegible]	0.51984	15.64443
13.781	0.95	[illegible]	0.521086	15.41849
13.791	0.95	[illegible]	0.522333	[illegible]
13.801	0.95	[illegible]	0.523579	15.14872
13.811	0.94	[illegible]	0.524825	14.92385
13.821	0.94	[illegible]	0.526072	14.69898
13.831	0.94	[illegible]	0.527318	11.58288
13.839	0.93	[illegible]	0.528315	14.43822
13.849	0.93	[illegible]	0.529562	14.21335
13.859	0.92	[illegible]	0.530808	13.98848
13.869	0.92	[illegible]	0.532054	13.76361
13.879	0.91	[illegible]	0.533301	13.53874
13.889	0.91	[illegible]	0.534547	13.49487
13.899	0.91	[illegible]	0.535793	10.61879
13.907	0.9	[illegible]	0.536791	13.0641
13.917	0.9	[illegible]	0.538037	12.82924
13.927	0.89	[illegible]	0.539283	12.60437
13.937	0.89	[illegible]	0.54053	12.5585
13.947	0.89	[illegible]	0.541776	12.33363
13.957	0.88	[illegible]	0.543022	12.10876
13.967	0.88	25.2	0.544269	9.570648
13.975	0.87	[illegible]	0.545266	11.66709
13.985	0.87	[illegible]	0.546512	11.62412
13.995	0.87	[illegible]	0.547759	11.39825
14.005	0.86	[illegible]	0.549005	11.17438
14.015	0.86	[illegible]	0.550252	10.94951
14.025	0.85	[illegible]	0.551498	10.72464
14.035	0.85	[illegible]	0.552744	8.546607
14.043	0.85	[illegible]	0.553741	10.46288
14.053	0.84	[illegible]	0.554988	10.23801
14.063	0.84	[illegible]	0.556234	10.19314
14.073	0.84	[illegible]	0.557481	9.788266
14.083	0.83	29.88	0.558727	9.743396
14.093	0.83	[illegible]	0.559973	9.698527
14.103	0.83	[illegible]	0.56122	7.582515
14.111	0.82	[illegible]	0.562217	9.257761
14.121	0.82	[illegible]	0.563463	9.212891
14.131	0.82	[illegible]	0.56471	6.988021
14.141	0.81	[illegible]	0.565956	8.763152
14.151	0.81	[illegible]	0.567202	8.718282
14.161	0.81	[illegible]	0.568449	8.673412
14.171	0.81	[illegible]	0.569695	6.906423
14.179	0.81	[illegible]	0.570692	8.412646
14.189	0.8	[illegible]	0.571939	8.187777
14.199	0.8	[illegible]	0.573185	8.142907

15.537	0.33	11.88
15.547	0.33	11.88
15.557	0.33	11.88
15.567	0.33	9.504
15.575	0.33	11.88
15.585	0.33	11.88
15.595	0.33	11.7
15.605	0.32	11.52
15.615	0.32	11.52
15.625	0.32	11.52
15.635	0.32	9.216
15.643	0.32	11.52
15.653	0.32	11.52
15.663	0.32	11.52
15.673	0.32	11.52
15.683	0.32	11.52
15.693	0.32	11.52
15.703	0.32	9.216
15.711	0.32	11.52
15.721	0.32	11.34
15.731	0.31	11.16
15.741	0.31	11.16
15.751	0.31	11.16
15.761	0.31	11.16
15.771	0.31	8.928
15.779	0.31	11.16
15.789	0.31	11.16
15.799	0.31	11.16
15.809	0.31	11.16
15.819	0.31	11.16
15.829	0.31	11.16
15.839	0.31	8.928
15.847	0.31	[illegible]
15.857	0.3	10.8
15.867	0.3	10.8
15.877	0.3	10.8
15.887	0.3	10.8
15.897	0.3	10.8
15.907	0.3	8.64
15.915	0.3	10.8
15.925	0.3	10.8
15.935	0.3	10.8
15.945	0.3	10.8
15.955	0.3	10.8
15.965	0.3	10.8
15.975	0.3	8.64
15.983	0.29	10.62
15.993	0.29	10.44
16.003	0.29	10.44
16.013	0.29	10.44
16.023	0.29	10.44
16.033	0.29	10.44
16.043	0.29	8.352
16.053	0.29	10.44
16.063	0.29	10.44
16.073	0.29	10.44
16.083	0.29	10.44
16.093	0.29	10.44
16.103	0.29	10.44
16.111	0.29	8.352
16.12	0.28	10.08
16.13	0.28	10.08
16.14	0.28	10.08
16.15	0.28	10.08
16.16	0.28	10.08
16.17	0.28	10.08
16.18	0.28	8.064
16.188	0.28	[illegible]
16.198	0.28	[illegible]
16.208	0.28	[illegible]
16.218	0.28	[illegible]
16.228	0.28	[illegible]
16.238	0.28	[illegible]
16.248	0.28	8.064
16.256	0.28	[illegible]
16.266	0.28	10.08
16.276	0.28	[illegible]
16.286	0.28	10.08
16.296	0.28	10.08
16.306	0.28	10.08
16.316	0.28	8.064
16.324	0.28	10.08
16.334	0.28	10.08
16.344	0.28	10.08
16.354	0.28	10.08
16.364	0.28	10.08
16.374	0.28	10.08
16.384	0.28	8.064
16.392	0.28	10.08
16.402	0.28	9.9
16.412	0.27	9.72
16.422	0.27	9.72
16.432	0.27	9.72
16.442	0.27	9.72
16.452	0.27	[illegible]
16.46	0.27	9.72
16.47	0.27	9.72
16.48	0.27	9.72
16.49	0.27	9.72
16.5	0.27	9.72
16.51	0.27	9.72
16.52	0.27	7.776
16.528	0.27	9.72
16.538	0.27	9.72
16.548	0.27	9.72
16.558	0.27	9.72
16.568	0.27	9.72
16.578	0.27	9.72
16.588	0.27	7.776
16.596	0.27	9.72
16.606	0.27	9.72
16.616	0.27	9.72
16.626	0.27	9.72
16.636	0.27	9.72
16.646	0.27	9.72
16.656	0.27	[illegible]
16.664	0.27	9.72
16.674	0.27	9.72
16.684	0.27	9.72
16.694	0.27	9.72
16.704	0.27	9.72
16.714	0.27	9.72
16.724	0.27	7.776

14.209	0.8	[illegible]	0.574411	8.298037
14.219	0.8	25.62	0.575678	7.874167
14.229	0.79	25.44	0.576924	7.648297
14.239	0.79	20.352	[illegible]	6.036342
14.247	0.79	25.44	0.579168	7.557512
14.257	0.79	25.44	0.580414	7.522662
14.267	0.79	25.44	0.58166	7.477792
14.277	0.79	25.44	0.582907	7.432922
14.287	0.79	25.26	0.584153	7.208053
14.297	0.78	[illegible]	0.5854	6.983183
14.307	0.78	20.404	0.586646	5.55424
14.315	0.78	[illegible]	0.587643	6.902417
14.325	0.78	[illegible]	0.588889	6.857547
14.335	0.78	[illegible]	0.590136	6.812677
14.345	0.78	[illegible]	0.591382	6.767808
14.355	0.78	[illegible]	0.592629	6.542938
14.365	0.77	27.72	0.593875	6.318068
14.375	0.77	22.176	0.595121	5.022148
14.383	0.77	27.72	0.596118	6.237402
14.393	0.77	27.72	0.597365	6.192433
14.403	0.77	27.72	0.598611	6.147563
14.413	0.77	27.72	0.599858	6.102693
14.423	0.77	27.54	0.601104	5.877823
14.433	0.76	27.36	0.60235	5.652954
14.442	0.76	21.888	0.603597	4.400057
14.451	0.76	27.36	0.604594	5.572188
14.461	0.76	27.36	0.60584	5.527318
14.471	0.76	27.36	0.607087	5.482448
14.481	0.76	27.36	0.608333	5.437578
14.491	0.75	27.18	0.609579	5.212709
14.501	0.75	27	0.610826	4.987839
14.511	0.75	21.6	0.612072	4.450671
14.52	0.75	27	0.613394	4.902580
14.53	0.75	27	0.61444	4.857716
14.54	0.75	27	0.615687	4.812847
14.55	0.75	27	0.616933	4.767977
14.56	0.75	27	0.618179	4.723107
14.57	0.75	26.82	0.619426	4.498237
14.58	0.74	21.312	0.620672	3.422284
14.588	0.74	26.64	0.621669	4.237472
14.598	0.74	26.64	0.622916	4.192602
14.608	0.74	26.64	0.624162	4.147732
14.618	0.74	26.64	0.625408	4.102862
14.628	0.74	26.64	0.626655	4.057992
14.638	0.74	26.46	0.627901	3.833123
14.648	0.73	21.024	0.629148	2.890192
14.656	0.73	26.28	0.630145	3.572357
14.666	0.73	26.28	0.631391	3.527487
14.676	0.73	26.28	0.632637	3.482617
14.686	0.73	26.28	0.633884	3.437748
14.696	0.73	26.28	0.63513	3.392878
14.706	0.73	[illegible]	0.636377	3.168008
14.716	0.72	20.736	0.637623	[illegible]
14.724	0.72	25.92	0.63862	2.907242
14.734	0.72	25.92	0.639866	2.862373
14.744	0.72	25.92	0.641113	2.817503
14.754	0.72	25.92	0.642359	2.772634
14.764	0.72	25.92	0.643606	2.727763
14.774	0.72	25.92	0.644852	2.682893
14.784	0.72	[illegible]	0.646098	1.970008
14.792	0.71	25.56	0.647095	2.242128
14.802	0.71	25.56	0.648342	2.197258
14.812	0.71	25.56	0.649588	2.152388
14.822	0.71	25.56	0.650835	2.107518
14.832	0.71	25.56	0.652081	2.062649
14.842	0.71	25.56	0.653327	2.017779
14.852	0.71	20.448	0.654574	1.437917
14.86	0.7	25.2	0.655571	1.577013
14.87	0.7	25.2	0.656817	1.532143
14.88	0.7	25.2	0.658064	1.487274
14.89	0.7	25.2	0.65931	1.442404
14.9	0.7	25.2	0.660556	1.397534
14.91	0.7	25.2	0.661803	1.352664
14.92	0.7	20.016	0.663049	0.905825
14.928	0.69	24.84	0.664046	0.912855
14.938	0.69	24.84	0.665293	0.867025
14.948	0.69	24.84	0.666539	0.822155
14.958	0.69	24.84	0.667785	0.777289
14.968	0.69	24.84	0.669032	0.732419
14.978	0.69	24.84	0.670278	0.68755
14.988	0.69	19.728	0.671525	0.275754
14.996	0.68	24.48	0.672522	0.246784
15.006	0.68	24.48	0.673768	0.201914
15.016	0.68	24.48	0.675014	0.157044
15.026	0.68	24.48	0.676261	0.112174
15.036	0.68	24.48	0.677507	0.067305
15.046	0.68	24.48	0.678754	0.022435
15.056	0.68	19.44	0.68	
15.064	0.67	24.12		
15.074	0.67	24.12		
15.084	0.67	24.12		
15.094	0.67	24.12		
15.104	0.67	24.12		
15.114	0.67	24.12		
15.124	0.67	19.296		
15.132	0.66	23.76		
15.142	0.66	23.76		
15.152	0.66	23.76		
15.162	0.66	23.76		
15.172	0.66	23.76		
15.182	0.66	23.76		
15.192	0.66	19.008		
15.2	0.65	23.58		
15.21	0.65	23.4		
15.22	0.65	23.4		
15.23	0.65	23.4		
15.24	0.65	23.4		
15.25	0.65	23.4		
15.26	0.65	18.72		
15.268	0.65	23.22		
15.278	0.64	23.04		
15.288	0.64	23.04		
15.298	0.64	23.04		
15.308	0.64	23.04		
15.318	0.64	23.04		
15.328	0.64	[illegible]		
15.337	0.64	22.86		
15.347	0.63	22.68		
15.357	0.63	22.68		
15.367	0.63	22.68		
15.377	0.63	22.68		
15.387	0.63	22.68		
15.397	0.63	18.144		

17.93	0.23	5.26
17.94	0.23	5.26
17.95	0.23	0.0021
17.958	0.23	5.26
17.968	0.23	5.26
17.978	0.23	5.26
17.988	0.23	5.26
17.998	0.23	5.26
18.008	0.23	5.26
18.018	0.23	0.0021
18.026	0.23	5.26
18.036	0.23	5.26
18.046	0.23	5.26
18.056	0.23	5.26
18.066	0.23	5.26
18.076	0.23	5.26
18.085	0.23	0.0021
18.094	0.23	5.26
18.104	0.23	5.26
18.114	0.23	5.26
18.124	0.23	5.26
18.134	0.23	5.26
18.144	0.23	5.26
18.154	0.23	0.0021
18.162	0.23	5.26
18.172	0.23	5.26
18.182	0.23	5.26
18.192	0.23	5.26
18.202	0.23	5.26
18.212	0.23	5.26
18.222	0.22	0.0021
18.23	0.22	5.07
18.24	0.22	5.07
18.25	0.22	5.07
18.26	0.22	5.07
18.27	0.22	5.07
18.28	0.22	5.07
18.29	0.22	0.0021
18.298	0.22	5.07
18.308	0.22	5.07
18.318	0.22	5.07
18.328	0.22	5.07
18.338	0.22	5.07
18.348	0.22	5.07
18.358	0.22	0.0021
18.368	0.22	5.07
18.378	0.22	5.07
18.388	0.22	5.07
18.398	0.22	5.07
18.408	0.22	5.07
18.418	0.22	5.07
18.428	0.22	0.0021
18.434	0.22	5.07
18.444	0.22	5.07
18.454	0.22	5.07
18.464	0.22	5.07
18.474	0.22	5.07
18.484	0.22	5.07
18.494	0.22	0.0021
18.502	0.22	5.07
18.512	0.22	5.07
18.522	0.22	5.07
18.532	0.22	5.07
18.542	0.22	5.07
18.552	0.22	5.07
18.562	0.22	0.0021
18.571	0.21	5.06
18.581	0.21	5.06
18.591	0.21	5.06
18.601	0.21	5.06
18.611	0.21	5.06
18.621	0.21	5.06
18.631	0.21	0.0021
18.639	0.21	5.06
18.649	0.21	5.06
18.658	0.21	5.06
18.665	0.21	5.06
18.675	0.21	5.06
18.685	0.21	5.06
18.695	0.21	0.0021
18.703	0.21	5.06
18.713	0.21	5.06
18.727	0.21	5.06
18.743	0.21	5.06
18.747	0.21	5.06
18.757	0.21	5.06
18.767	0.21	0.0021
18.775	0.21	5.06
18.785	0.21	5.06
18.795	0.21	5.06
18.805	0.21	5.06
18.815	0.21	5.06
18.825	0.21	5.06
18.835	0.21	0.0021
18.843	0.21	5.06
18.853	0.21	5.06
18.863	0.21	5.06
18.873	0.21	5.06
18.883	0.21	5.06
18.894	0.21	5.06
18.903	0.21	0.0021
18.911	0.2	5.2
18.921	0.2	5.2
18.931	0.2	5.2
18.941	0.2	5.2
18.951	0.2	5.2
18.961	0.2	5.2
18.971	0.2	5.2
18.979	0.2	5.2
18.989	0.2	5.2
18.999	0.2	5.2
19.009	0.2	5.2
19.019	0.2	5.2
19.029	0.2	5.2
19.039	0.2	5.2
19.047	0.2	5.2
19.057	0.2	5.2
19.067	0.2	5.2
19.077	0.2	5.2
19.087	0.2	5.2
19.097	0.2	5.2
19.107	0.2	5.2
19.115	0.2	5.2

16.672	0.49	5.61
16.682	0.49	5.61
16.692	0.49	5.61
16.63	0.49	5.61
16.64	0.49	5.61
16.65	0.49	5.61
16.66	0.49	5.61
16.67	0.49	5.61
16.68	0.49	5.61
16.69	0.49	14.12
15.998	0.49	5.64
15.708	0.49	5.64
16.718	0.49	5.64
16.728	0.49	5.64
16.738	0.49	5.64
16.748	0.49	5.64
16.758	0.49	5.621
16.766	0.49	5.64
16.776	0.49	5.64
16.786	0.49	5.64
16.796	0.49	5.64
16.806	0.49	5.64
16.816	0.49	5.64
16.826	0.49	14.521
26.834	0.49	5.64
26.844	0.49	5.64
26.854	0.49	5.64
26.864	0.49	5.64
26.874	0.49	5.64
26.884	0.49	5.64
25.894	0.49	14.521
16.903	0.49	5.64
16.913	0.49	5.64
16.923	0.49	5.64
16.933	0.49	5.64
16.944	0.47	16.03
16.953	0.47	16.02
16.964	0.47	5.506
16.973	0.47	16.02
16.983	0.47	16.02
16.993	0.47	16.02
17.003	0.47	16.02
17.013	0.47	16.02
17.023	0.47	16.02
17.033	0.47	14.536
17.043	0.47	16.02
17.049	0.47	16.02
17.059	0.47	16.02
17.069	0.47	16.02
17.079	0.47	16.02
17.089	0.47	16.02
17.099	0.47	14.536
17.109	0.47	16.02
17.117	0.47	16.02
17.127	0.47	16.02
17.137	0.46	16.59
17.147	0.46	16.59
17.157	0.46	16.59
17.167	0.46	14.748
17.175	0.46	16.59
17.185	0.46	16.59
17.195	0.46	16.59
17.205	0.46	16.59
17.215	0.46	16.59
17.225	0.46	16.59
17.235	0.46	14.748
17.244	0.46	16.59
17.253	0.46	16.59
17.263	0.46	16.59
17.273	0.46	16.59
17.283	0.46	16.59
17.293	0.46	16.59
17.303	0.46	14.748
17.311	0.46	16.59
17.321	0.46	16.59
17.331	0.45	16.12
17.341	0.45	16.12
17.351	0.45	16.12
17.361	0.45	16.12
17.371	0.45	12.896
17.379	0.45	16.12
17.389	0.45	16.12
17.399	0.45	16.12
17.409	0.45	16.12
17.419	0.45	16.12
17.429	0.45	16.12
17.439	0.45	12.896
17.447	0.45	16.12
17.457	0.45	16.12
17.467	0.45	16.12
17.477	0.45	16.12
17.487	0.45	16.12
17.497	0.45	16.12
17.507	0.45	12.896
17.515	0.44	15.84
17.525	0.44	15.84
17.535	0.44	15.84
17.545	0.44	15.84
17.555	0.44	15.84
17.565	0.44	15.84
17.575	0.44	12.672
17.583	0.44	15.84
17.593	0.44	15.84
17.603	0.44	15.84
17.613	0.44	15.84
17.623	0.44	15.84
17.633	0.44	15.84
17.643	0.44	12.672
17.651	0.44	15.84
17.661	0.44	15.84
17.671	0.44	15.84
17.681	0.44	15.84
17.691	0.44	15.84
17.701	0.43	15.45
17.711	0.44	15.45
17.72	0.44	15.45
17.73	0.43	15.45
17.74	0.44	15.45
17.75	0.43	15.45
17.77	0.43	15.45
17.78	0.43	15.45
17.788	0.43	15.45

22.716	0.11	5.155
22.724	0.11	5.16
22.734	0.11	5.16
22.744	0.11	5.16
22.754	0.11	5.16
22.764	0.11	5.16
22.774	0.11	5.16
22.784	0.11	5.165
22.792	0.11	5.165
22.802	0.11	5.165
22.812	0.11	5.165
22.822	0.11	5.165
22.832	0.1	5.16
22.842	0.1	5.16
22.852	0.1	5.155
22.86	0.1	5.16
22.87	0.1	5.16
22.88	0.1	5.16
22.889	0.1	5.16
22.9	0.1	5.16
22.91	0.1	5.16
22.92	0.1	5.155
22.928	0.1	5.16
22.938	0.1	5.16
22.948	0.1	5.16
22.958	0.1	5.16
22.968	0.1	5.16
22.978	0.1	5.16
22.988	0.1	5.155
22.996	0.1	5.16
23.006	0.1	5.16
23.016	0.1	5.16
23.026	0.1	5.16
23.036	0.1	5.16
23.046	0.1	5.16
23.056	0.1	5.155
23.066	0.1	5.16
23.074	0.1	5.16
23.084	0.1	5.16
23.094	0.1	5.16
23.104	0.1	5.16
23.114	0.1	5.16
23.124	0.1	5.155
23.132	0.1	5.16
23.142	0.1	5.16
23.152	0.1	5.16
23.162	0.1	5.16
23.172	0.1	5.16
23.182	0.1	5.16
23.192	0.1	5.155
23.2	0.1	5.16
23.21	0.1	5.16
23.22	0.1	5.16
23.23	0.1	5.16
23.24	0.1	5.16
23.25	0.1	5.16
23.26	0.1	5.155
23.268	0.1	5.16
23.278	0.1	5.16
23.288	0.1	5.16
23.298	0.1	5.16
23.308	0.1	5.16
23.318	0.1	5.16
23.326	0.1	5.155
23.336	0.1	5.16
23.346	0.1	5.16
23.356	0.1	5.16
23.366	0.1	5.16
23.376	0.1	5.16
23.386	0.1	5.16
23.396	0.1	5.155
23.405	0.1	5.16
23.415	0.1	5.16
23.425	0.1	5.16
23.435	0.1	5.16
23.445	0.1	5.16
23.455	0.1	5.16
23.465	0.1	5.155
23.473	0.1	5.16
23.483	0.1	5.16
23.493	0.1	5.16
23.503	0.1	5.16
23.513	0.1	5.16
23.523	0.1	5.16
23.533	0.1	5.155
23.541	0.1	5.16
23.551	0.1	5.16
23.561	0.1	5.16
23.571	0.1	5.16
23.581	0.1	5.16
23.591	0.1	5.16
23.601	0.1	5.155
23.609	0.1	5.16
23.619	0.1	5.16
23.629	0.1	5.16
23.639	0.1	5.16
23.649	0.1	5.16
23.659	0.1	5.16
23.669	0.1	5.155
23.677	0.1	5.16
23.687	0.1	5.16
23.697	0.1	5.16
23.707	0.1	5.16
23.717	0.1	5.16
23.727	0.1	5.16
23.737	0.1	5.155
23.745	0.1	5.16
23.755	0.1	5.16
23.765	0.1	5.16
23.775	0.1	5.16
23.785	0.1	5.16
23.795	0.1	5.16
23.805	0.1	5.155
23.813	0.1	5.16
23.823	0.1	5.16
23.833	0.1	5.16
23.843	0.1	5.16
23.853	0.1	5.16
23.863	0.1	5.16
23.873	0.1	5.155
23.881	0.1	5.16
23.891	0.1	5.16
23.901	0.1	5.16

21.368	0.27	5.352
21.386	0.27	5.41
21.405	0.27	5.41
21.423	0.27	5.41
21.425	0.27	5.41
21.443	0.27	5.41
21.448	0.27	5.41
21.466	0.27	5.352
21.468	0.27	5.41
21.474	0.27	5.41
21.484	0.27	5.41
21.494	0.27	5.41
21.504	0.27	5.41
21.514	0.27	5.41
21.524	0.27	5.352
21.532	0.27	5.41
21.542	0.27	5.41
21.552	0.27	5.41
21.562	0.27	5.41
21.572	0.27	5.41
21.582	0.27	5.41
21.592	0.27	5.352
21.6	0.27	5.41
21.61	0.27	5.41
21.62	0.27	5.41
21.63	0.27	5.41
21.64	0.27	5.41
21.65	0.27	5.41
21.66	0.27	5.352
21.668	0.27	5.41
21.678	0.27	5.41
21.688	0.27	5.41
21.698	0.27	5.41
21.708	0.27	5.41
21.718	0.27	5.41
21.728	0.27	5.352
21.736	0.28	5.46
21.746	0.28	5.46
21.756	0.28	5.46
21.766	0.28	5.46
21.776	0.28	5.46
21.786	0.28	5.46
21.796	0.28	5.432
21.805	0.28	5.46
21.815	0.28	5.46
21.825	0.28	5.46
21.835	0.28	5.46
21.845	0.28	5.46
21.855	0.28	5.46
21.865	0.28	5.411
21.874	0.28	5.46
21.883	0.28	5.46
21.894	0.28	5.46
21.903	0.28	5.46
21.913	0.28	5.46
21.923	0.28	5.46
21.933	0.28	5.46
21.941	0.28	5.46
21.951	0.28	5.46
21.961	0.28	5.46
21.971	0.28	5.46
21.981	0.28	5.46
21.991	0.28	5.46
22.001	0.28	5.411
22.009	0.28	5.46
22.019	0.28	5.46
22.029	0.28	5.46
22.039	0.28	5.46
22.049	0.28	5.46
22.059	0.28	5.46
22.069	0.28	5.411
22.077	0.28	5.46
22.087	0.28	5.46
22.097	0.28	5.46
22.107	0.28	5.46
22.117	0.28	5.46
22.127	0.28	5.46
22.137	0.28	5.411
22.145	0.28	5.46
22.155	0.28	5.46
22.165	0.28	5.46
22.175	0.28	5.46
22.185	0.28	5.46
22.195	0.28	5.411
22.205	0.28	5.46
22.213	0.28	5.46
22.223	0.28	5.46
22.233	0.28	5.46
22.243	0.28	5.46
22.253	0.28	5.46
22.263	0.28	5.46
22.273	0.28	5.411
22.281	0.28	5.46
22.291	0.28	5.46
22.301	0.28	5.46
22.311	0.28	5.46
22.321	0.28	5.46
22.331	0.28	5.46
22.341	0.28	5.411
22.349	0.28	5.46
22.359	0.28	5.46
22.369	0.28	5.46
22.379	0.28	5.46
22.389	0.28	5.46
22.409	0.28	5.411
22.417	0.28	5.46
22.427	0.28	5.46
22.437	0.28	5.46
22.447	0.28	5.46
22.457	0.28	5.46
22.467	0.28	5.46
22.477	0.28	5.411
22.485	0.28	5.46
22.495	0.28	5.46
22.505	0.28	5.46
22.515	0.28	5.46
22.525	0.28	5.46
22.535	0.28	5.46
22.545	0.28	5.411
22.553	0.28	5.46
22.563	0.28	5.46
22.573	0.28	5.46

24 911	0.1	3.6
23 921	0.1	3.6
24 941	0.1	3.6
23 941	0.1	2.56
24 949	0.1	3.6
23 959	0.1	3.6
24 969	0.1	3.6
23 979	0.1	3.6
24 989	0.1	3.6
23 999	0.1	3.6
24 009	0.1	3.68
24 017	0.1	3.6
24 027	0.1	3.6
24 037	0.1	3.6
24 047	0.1	3.12
24 057	0.09	3.24
24 067	0.09	3.24
24 077	0.09	2.448
24 085	0.08	2.56
24 095	0.08	2.7
24 105	0.07	2.52
24 115	0.07	2.52
24 125	0.06	1.98
24 135	0.05	

22 585	0.28	10.08
22 595	0.28	10.08
22 605	0.28	10.08
22 615	0.28	8.456
22 622	0.28	10.08
22 632	0.28	10.08
22 642	0.28	10.08
22 652	0.28	10.08
22 662	0.28	10.08
22 672	0.27	9.72
22 682	0.27	9.72
22 69	0.27	9.72
22 7	0.27	9.72
22 71	0.27	9.72
22 72	0.27	9.72
22 73	0.27	9.72
22 74	0.27	9.72
22 75	0.27	7.776
22 758	0.27	9.72
22 768	0.27	9.72
22 778	0.27	9.72
22 788	0.27	9.72
22 798	0.27	9.72
22 808	0.27	9.72
22 818	0.27	7.776
22 826	0.27	9.72
22 836	0.27	9.72
22 846	0.27	9.72
22 856	0.27	9.72
22 866	0.27	9.72
22 876	0.27	9.72
22 886	0.27	7.776
22 894	0.27	9.72
22 904	0.27	9.72
22 914	0.27	9.72
22 924	0.27	9.72
22 934	0.27	9.72
22 944	0.27	9.72
22 954	0.27	7.776
22 962	0.27	9.72
22 972	0.27	9.72
22 982	0.27	9.72
22 992	0.27	9.72
23 002	0.27	9.72
23 012	0.27	9.72
23 022	0.27	7.776
23 03	0.27	9.72
23 04	0.27	9.72
23 05	0.27	9.72
23 06	0.27	9.72
23 07	0.27	9.72
23 08	0.27	9.72
23 09	0.27	7.776
23 098	0.27	9.72
23 108	0.27	9.72
23 118	0.27	9.72
23 128	0.27	9.72
23 138	0.27	9.72
23 148	0.27	9.72
23 158	0.27	7.776
23 166	0.27	9.72
23 176	0.27	9.72
23 186	0.27	9.72
23 196	0.27	9.72
23 206	0.27	9.72
23 216	0.27	9.72
23 226	0.27	7.776
23 234	0.27	9.72
23 244	0.27	9.72
23 254	0.27	9.72
23 264	0.27	9.72
23 274	0.27	9.72
23 284	0.27	9.72
23 294	0.27	7.776
23 302	0.27	9.72
23 312	0.27	9.72
23 322	0.27	9.72
23 332	0.27	9.72
23 342	0.27	9.72
23 352	0.27	9.72
23 362	0.27	8.748
23 372	0.27	9.72
23 382	0.27	9.72
23 392	0.27	9.72
23 402	0.27	9.72
23 412	0.27	9.72
23 422	0.27	9.72
23 432	0.27	7.776
23 442	0.27	9.72
23 452	0.27	9.72
23 462	0.27	9.72
23 472	0.27	9.72
23 482	0.27	9.72
23 492	0.27	9.72
23 502	0.27	7.776
23 512	0.27	9.72
23 522	0.27	9.72
23 532	0.27	9.72
23 542	0.27	9.72
23 552	0.27	9.72
23 562	0.27	7.776
23 572	0.27	9.72
23 582	0.27	9.72
23 592	0.27	9.72
23 602	0.27	9.72
23 612	0.27	9.72
23 622	0.27	7.776
23 632	0.27	9.72
23 642	0.27	9.72
23 652	0.27	9.72
23 662	0.27	9.72
23 672	0.27	9.72
23 682	0.27	9.72
23 692	0.27	9.72
23 702	0.27	7.776
23 712	0.27	9.72
23 722	0.27	9.72
23 732	0.27	9.72
23 742	0.27	9.72
23 752	0.27	9.72
23 762	0.27	7.776

23.779	0.26	[illegible]
23.793	0.26	[illegible]
23.819	0.26	[illegible]
23.832	0.26	[illegible]
23.859	0.26	[illegible]
23.872	0.26	[illegible]
23.898	0.26	[illegible]
23.911	0.26	[illegible]
23.925	0.26	[illegible]
23.938	0.26	[illegible]
23.965	0.26	[illegible]
23.978	0.26	[illegible]
24.003	0.25	[illegible]
24.016	0.25	[illegible]
24.033	0.25	[illegible]
24.046	0.25	[illegible]
24.059	0.24	[illegible]
24.071	0.22	[illegible]
24.081	0.21	[illegible]
24.091	0.19	[illegible]
24.101	0.18	[illegible]
24.111	0.13	[illegible]
24.119	0.11	[illegible]
24.129	[illegible]	[illegible]
24.139	0.09	[illegible]
24.149	0.08	[illegible]
24.159	0.07	[illegible]
24.169	0.07	[illegible]
24.179	0.06	[illegible]
24.186	0.05	

DETENTION BASIN REQUIREMENTS

Analysis of proposed south detention basin

Contributing Area = 6.78 Ac

Allowable Discharge = 0.15 cfs/Ac = 1.017 cfs

Sediment Sump Basin = 1800 cfs/ disturbed Acre 0.280165

N. Channel hydrograph - 2 year volume

Time (hrs)	Flows (cfs)	Vol (cft)	Disch Line	Det Vol		Total Volume
11.831	0.07	3.24	0			2251.04 cft
11.841	0.11	4.86	0			0.05 Ac-ft
11.851	0.16	7.2	0.16	1.120585		
11.861	0.24	11.16	0.177745	4.443754		
11.871	0.38	16.38	0.195491	9.022923	3.32	
11.881	0.53	21.96	0.213236	13.96409		
11.891	0.69	22.464	0.230981	15.60732		
11.899	0.87	34.92	0.245177	25.7742		
11.909	1.07	42.48	0.262923	32.69537		
11.919	1.29	50.4	0.280668	39.97653		
11.929	1.51	58.32	0.298413	47.2577		
11.939	1.73	66.24	0.316159	54.53887		
11.949	1.95	73.8	0.333904	61.46004		
11.959	2.15	72.738	0.351649	61.08584		
11.968	2.34	87.48	0.36762	73.92626		
11.978	2.52	93.78	0.385365	79.58743		
11.988	2.69	99.72	0.403111	84.8886		
11.998	2.85	105.12	0.420856	89.64977		
12.008	2.99	109.98	0.438602	93.87094		
12.018	3.12	114.12	0.456347	97.37211		
12.028	3.22	93.744	0.474092	79.88573		
12.036	3.29	118.98	0.488288	101.0822		
12.046	3.32	119.52	0.506033	100.9834		
12.056	3.32	118.44	0.523779	99.26455		
12.066	3.26	115.92	0.541524	96.10572		
12.076	3.18	112.32	0.559269	91.86689		
12.086	3.06	107.64	0.577015	86.54806		
12.096	2.92	92.178	0.59476	72.64905		
12.105	2.77	96.84	0.610731	74.53428		
12.115	2.61	91.08	0.628476	68.13545		
12.125	2.45	85.5	0.646221	61.91662		
12.135	2.3	80.1	0.663967	55.87779		
12.145	2.15	75.06	0.681712	50.19896		
12.155	2.02	70.74	0.699457	45.24013		
12.165	1.91	53.568	0.717203	32.70814		
12.173	1.81	63.36	0.731399	36.71023		
12.183	1.71	59.94	0.749144	32.6514		
12.193	1.62	57.06	0.766889	29.13257		
12.203	1.55	54.36	0.784635	25.79374		
12.213	1.47	51.84	0.80238	22.63491		
12.223	1.41	49.68	0.820125	19.83608		
12.233	1.35	42.93	0.837871	15.52427		
12.242	1.3	46.08	0.853841	15.0273		
12.252	1.26	44.64	0.871587	12.94347		
12.262	1.22	43.2	0.889332	10.86463		
12.272	1.18	41.76	0.907077	8.785804		
12.282	1.14	40.5	0.924823	6.886973		
12.292	1.11	39.42	0.942568	5.168142		
12.302	1.08	30.816	0.960313	2.954555		
12.31	1.06	37.62	0.974509	2.218246		
12.32	1.03	36.72	0.992255	0.679415		
12.33	1.01	36	1.01			
12.34	0.99	35.28				
12.35	0.97	34.56				
12.36	0.95	33.84				
12.37	0.93	29.97				
12.379	0.92	32.76				
12.389	0.9	32.04				
12.399	0.88	31.5				
12.409	0.87	30.96				
12.419	0.85	30.42				
12.429	0.84	29.88				
12.439	0.82	26.406				
12.448	0.81	28.98				
12.458	0.8	28.44				
12.468	0.78	27.9				
12.478	0.77	27.54				
12.488	0.76	27				
12.498	0.74	26.46				
12.508	0.73	20.88				
12.516	0.72	25.74				
12.526	0.71	25.38				
12.536	0.7	24.84				
12.546	0.68	24.3				
12.556	0.67	23.94				
12.566	0.66	23.58				
12.576	0.65	20.898				
12.585	0.64	22.86				
12.595	0.63	22.5				
12.605	0.62	22.14				
12.615	0.61	21.78				
12.625	0.6	21.6				
12.635	0.6	21.42				
12.645	0.59	16.848				

N. Channel hydrograph - 10 year volume

Time (hrs)	Flows (cfs)	Vol (cft)	Disch Line	Det Vol		Total Volume
11.57	0.06	2.34	0			13836.10 cft
11.58	0.07	2.7	0			0.32 Ac-ft
11.59	0.08	3.24	0			
11.6	0.1	3.78	0			
11.61	0.11	4.32	0		11.06	
11.62	0.13	5.04	0.13			
11.63	0.15	5.184	0.135945	1.700289		
11.638	0.21	8.64	0.140701	3.467735		
11.648	0.27	10.44	0.146647	5.053707		
11.658	0.31	12.24	0.152592	6.639679		
11.668	0.37	14.4	0.158537	8.585651		
11.678	0.43	16.74	0.164482	10.72162		
11.688	0.5	19.26	0.170428	13.0176		
11.698	0.57	19.764	0.176373	13.96284		
11.707	0.65	25.02	0.181723	18.37094		
11.717	0.74	28.44	0.187669	21.57691		
11.727	0.84	32.22	0.193614	25.14289		
11.737	0.95	36.54	0.199559	29.74886		
11.747	1.08	41.4	0.205504	33.89483		
11.757	1.22	46.8	0.21145	39.0808		
11.767	1.38	42.192	0.217395	35.86254		
11.775	1.55	59.22	0.222151	51.11555		
11.785	1.74	66.24	0.228096	57.92152		
11.795	1.94	73.8	0.234041	65.26749		
11.805	2.16	82.08	0.239987	73.33347		
11.815	2.4	91.08	0.245932	82.11944		
11.825	2.66	101.16	0.251877	91.98541		
11.835	2.96	101.25	0.257822	92.80988		
11.844	3.29	125.64	0.263173	116.0588		
11.854	3.69	140.76	0.269118	130.9647		
11.864	4.13	157.68	0.275063	147.6707		
11.874	4.63	176.58	0.281009	166.3567		
11.884	5.18	197.1	0.286954	186.6676		
11.894	5.77	218.7	0.292899	208.0486		
11.904	6.38	192.672	0.298844	183.9968		
11.912	7	262.98	0.303601	251.9434		
11.922	7.61	284.58	0.309546	273.3293		
11.932	8.2	304.92	0.315491	293.4553		
11.942	8.74	323.46	0.321436	311.7813		
11.952	9.23	339.66	0.327381	327.7673		
11.962	9.64	353.34	0.333327	341.2332		
11.972	9.99	328.536	0.339272	317.4569		
11.981	10.29	374.76	0.344623	362.2466		
11.991	10.53	383.04	0.350568	370.3125		
12.001	10.75	389.88	0.356513	376.9385		
12.011	10.91	394.74	0.362458	381.5845		
12.021	11.02	397.44	0.368403	384.0705		
12.031	11.06	397.26	0.374349	383.6764		
12.041	11.01	315.072	0.380294	304.051		
12.049	10.87	386.82	0.38505	372.8512		
12.059	10.62	375.84	0.390995	361.6572		
12.069	10.26	361.44	0.396941	347.0431		
12.079	9.82	344.7	0.402886	330.0891		
12.089	9.33	326.34	0.408831	311.5151		
12.099	8.8	306.9	0.414776	291.861		
12.109	8.25	258.552	0.420721	244.8339		
12.118	7.71	268.02	0.426072	252.5744		
12.128	7.18	249.48	0.432017	233.8204		
12.138	6.68	232.38	0.437963	216.5063		
12.148	6.23	216.9	0.443908	200.8123		
12.158	5.82	203.04	0.449853	186.7383		
12.168	5.46	190.62	0.455798	174.1042		
12.178	5.23	161.352	0.461743	146.3048		
12.187	4.83	169.02	0.467094	152.0976		
12.197	4.56	159.66	0.473039	142.5236		
12.207	4.31	151.2	0.478985	133.8495		
12.217	4.09	143.46	0.48493	125.8955		
12.227	3.88	136.62	0.490875	118.8415		
12.237	3.71	130.68	0.49682	112.6875		
12.247	3.55	100.224	0.502766	85.67586		
12.255	3.41	120.42	0.507522	102.0422		
12.265	3.28	115.92	0.513467	97.32818		
12.275	3.16	111.96	0.519412	93.15415		
12.285	3.06	108.36	0.525357	89.34012		
12.295	2.96	104.94	0.531303	85.70609		
12.305	2.87	101.88	0.537248	82.43206		
12.315	2.79	89.262	0.543193	71.57586		
12.324	2.72	96.66	0.548544	76.80541		
12.334	2.65	94.14	0.554489	74.07138		
12.344	2.58	91.8	0.560434	71.51735		
12.354	2.52	89.64	0.566379	69.14333		
12.364	2.46	87.66	0.572325	66.9493		
12.374	2.41	85.68	0.57827	64.75527		
12.384	2.35	66.96	0.584215	50.06612		

12.653	0.58	20.88
12.663	0.58	20.7
12.673	0.57	20.34
12.683	0.56	20.16
12.693	0.56	19.98
12.703	0.55	19.8
12.713	0.55	17.82
12.722	0.55	19.62
12.732	0.54	19.44
12.742	0.54	19.26
12.752	0.53	19.08
12.762	0.53	19.08
12.772	0.53	18.9
12.782	0.52	14.976
12.79	0.52	18.72
12.8	0.52	18.84
12.81	0.51	18.36
12.82	0.51	18.36
12.83	0.51	18.36
12.84	0.51	18.18
12.85	0.5	16.2
12.859	0.5	18
12.869	0.5	17.82
12.879	0.49	17.64
12.889	0.49	17.64
12.899	0.49	17.64
12.909	0.49	17.46
12.919	0.48	13.824
12.927	0.48	17.28
12.937	0.48	17.1
12.947	0.47	16.92
12.957	0.47	16.92
12.967	0.47	16.92
12.977	0.47	16.74
12.987	0.46	14.904
12.996	0.46	16.56
13.006	0.46	16.38
13.016	0.45	16.2
13.026	0.45	16.2
13.036	0.45	16.2
13.046	0.45	16.02
13.056	0.44	12.672
13.064	0.44	15.84
13.074	0.44	15.84
13.084	0.44	15.66
13.094	0.43	15.48
13.104	0.43	15.48
13.114	0.43	15.48
13.124	0.43	13.77
13.133	0.42	15.12
13.143	0.42	15.12
13.153	0.42	15.12
13.163	0.42	15.12
13.173	0.42	14.94
13.183	0.41	14.76
13.193	0.41	11.808
13.201	0.41	14.76
13.211	0.41	14.76
13.221	0.41	14.76
13.231	0.41	14.58
13.241	0.4	14.4
13.251	0.4	14.4
13.261	0.4	12.96
13.27	0.4	14.4
13.28	0.4	14.4
13.29	0.4	14.22
13.3	0.39	14.04
13.31	0.39	14.04
13.32	0.39	14.04
13.33	0.39	11.232
13.338	0.39	14.04
13.348	0.39	14.04
13.358	0.39	13.86
13.368	0.38	13.68
13.378	0.38	13.68
13.388	0.38	13.68
13.398	0.38	12.312
13.407	0.38	13.68
13.417	0.38	13.5
13.427	0.37	13.32
13.437	0.37	13.32
13.447	0.37	13.32
13.457	0.37	13.32
13.467	0.37	10.656
13.475	0.37	13.14
13.485	0.36	12.96
13.495	0.36	12.96
13.505	0.36	12.96
13.515	0.36	12.96
13.525	0.36	12.96
13.535	0.36	11.664

12.392	2.3	82.08	0.588971	60.77007
12.402	2.26	80.46	0.594916	58.93599
12.412	2.21	78.84	0.600862	57.10196
12.427	2.17	77.4	0.606807	55.44794
12.432	2.13	75.96	0.612752	53.79391
12.442	2.09	74.52	0.618697	52.13988
12.452	2.05	65.772	0.624643	45.4469
12.461	2.01	71.64	0.629993	48.85323
12.471	1.97	70.2	0.635939	47.1992
12.481	1.93	68.76	0.641884	45.54517
12.491	1.89	67.5	0.647829	44.07114
12.501	1.86	66.24	0.653774	42.59711
12.511	1.82	64.98	0.659719	41.12309
12.521	1.79	51.12	0.665665	31.88037
12.529	1.76	62.82	0.670421	38.57784
12.539	1.73	61.74	0.676366	37.28381
12.549	1.7	60.66	0.682311	35.98978
12.559	1.67	59.58	0.688257	34.69575
12.569	1.64	58.5	0.694202	33.40172
12.579	1.61	57.42	0.700147	32.1077
12.589	1.58	50.706	0.706092	27.74193
12.598	1.55	55.44	0.711443	29.72104
12.608	1.53	54.72	0.717388	28.78701
12.618	1.51	53.82	0.723333	27.67299
12.628	1.48	52.92	0.729279	26.55896
12.638	1.46	52.2	0.735224	25.62493
12.648	1.44	51.66	0.741169	24.8709
12.658	1.43	40.898	0.747114	19.31062
12.666	1.41	50.4	0.75187	23.22565
12.676	1.39	49.86	0.757816	22.47162
12.686	1.38	49.32	0.763761	21.7176
12.696	1.36	48.78	0.769706	20.96357
12.706	1.35	48.42	0.775651	20.38954
12.716	1.34	48.06	0.781597	19.81551
12.726	1.33	42.93	0.787542	17.32697
12.735	1.32	47.34	0.792892	18.68886
12.745	1.31	46.98	0.798838	18.11483
12.755	1.3	46.62	0.804783	17.5408
12.765	1.29	46.26	0.810728	16.96677
12.775	1.28	45.9	0.816673	16.39275
12.785	1.27	45.54	0.822619	15.81872
12.795	1.26	36.144	0.828564	12.71287
12.803	1.25	44.82	0.83332	14.71347
12.813	1.24	44.46	0.839265	14.13944
12.823	1.23	44.28	0.84521	13.74541
12.833	1.23	44.1	0.851156	13.35138
12.843	1.22	43.74	0.857101	12.77735
12.853	1.21	43.38	0.863046	12.20333
12.863	1.2	38.88	0.868991	10.638
12.872	1.2	43.02	0.874342	11.43667
12.882	1.19	42.66	0.880287	10.86265
12.892	1.18	42.3	0.886232	10.28862
12.902	1.17	42.12	0.892178	9.894589
12.912	1.17	41.94	0.898123	9.500561
12.922	1.16	41.58	0.904068	8.926533
12.932	1.15	32.976	0.910013	6.699126
12.94	1.14	41.04	0.91477	8.001283
12.95	1.14	40.86	0.920715	7.607255
12.96	1.13	40.5	0.92666	7.033226
12.97	1.12	40.14	0.932605	6.459198
12.98	1.11	39.96	0.93855	6.06517
12.99	1.11	39.78	0.944496	5.671142
13	1.1	35.478	0.950441	4.597034
13.009	1.09	39.06	0.955792	4.544489
13.019	1.08	38.88	0.961737	4.150461
13.029	1.08	38.7	0.967682	3.756433
13.039	1.07	38.34	0.973627	3.182405
13.049	1.06	38.16	0.979572	2.788377
13.059	1.06	37.98	0.985518	2.394349
13.069	1.05	40.096	0.991463	1.473379
13.077	1.04	37.44	0.996219	1.469098
13.087	1.04	37.26	1.002164	1.07507
13.097	1.03	36.9	1.00811	0.501042
13.107	1.02	36.72	1.014055	0.107014
13.117	1.02	36.54	1.02	
13.127	1.01	36.36		
13.137	1.01	32.562		
13.146	1	36		
13.156	1	35.82		
13.166	0.99	35.64		
13.176	0.99	35.46		
13.186	0.98	35.28		
13.196	0.98	35.1		
13.206	0.97	23.936		
13.214	0.97	34.74		
13.224	0.96	34.56		
13.234	0.96	34.38		
13.244	0.95	34.2		
13.254	0.95	34.2		
13.264	0.95	34.02		
13.274	0.94	30.456		

13.544	0.36	12.78
13.554	0.35	12.6
13.564	0.35	12.6
13.574	0.35	12.6
13.584	0.35	12.6
13.594	0.35	12.6
13.604	0.35	9.9936
13.612	0.34	12.24
13.622	0.34	12.24
13.632	0.34	12.24
13.642	0.34	12.24
13.652	0.34	12.24
13.662	0.34	12.24
13.672	0.34	11.016

13.283	0.94	33.66
13.293	0.93	33.48
13.303	0.93	33.3
13.313	0.92	33.12
13.323	0.92	33.12
13.333	0.92	32.94
13.343	0.91	26.208
13.351	0.91	32.58
13.361	0.9	32.4
13.371	0.9	32.4
13.381	0.9	32.22
13.391	0.89	32.04
13.401	0.89	31.86
13.411	0.88	28.512

Size Diversion channels in Phase 2 and 3. Assume vegetated and trapezoidal. Size for 10-yr flow.

Phase 3 Diversion Channel (To Proposed Phase 3 pond)

Max Velocity =	3.00	ft/sec	(Permissible velocity for vegetated channels)
Q =	26.56	cfs	
Area =	8.85	sq. ft	

Trapezoidal Channel Dimensions

Bottom	8	Area =	10	sq ft
Top	12			
Depth	1			

Phase 2 Diversion Channel (To Proposed Phase 2 pond)

Max Velocity =	3.00	ft/sec	(Permissible velocity for vegetated channels)
Q =	3.08	cfs	
Area =	1.03	sq. ft	

Trapezoidal Channel Dimensions

Bottom	3	Area =	2	sq ft
Top	5			
Depth	0.5			

APPENDIX B

DETAILS

Temporary Gravel Construction Entrance/Exit

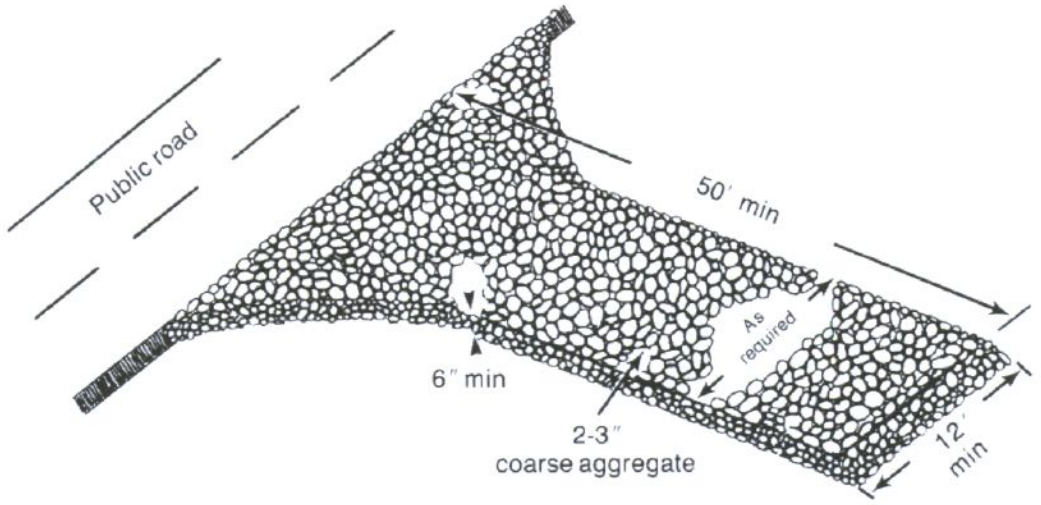
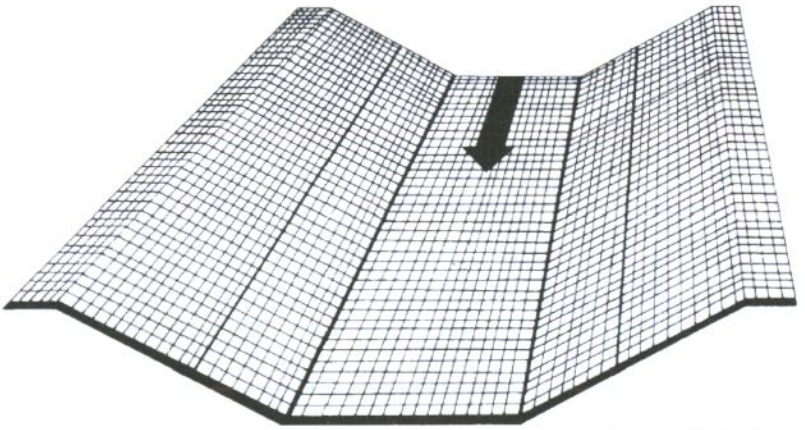
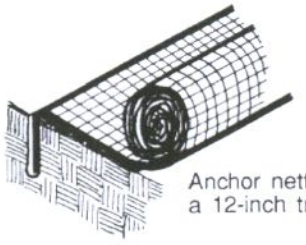


Figure 6.06a Gravel entrance/exit keeps sediment from leaving the construction site (modified from Va SWCC).

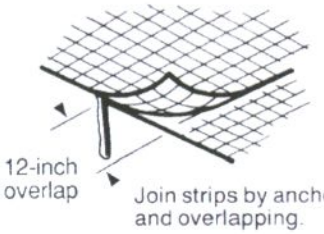
Mulching (Netting and Matting)



In channels, roll out strips of netting parallel to the direction of flow and over the protective mulch.



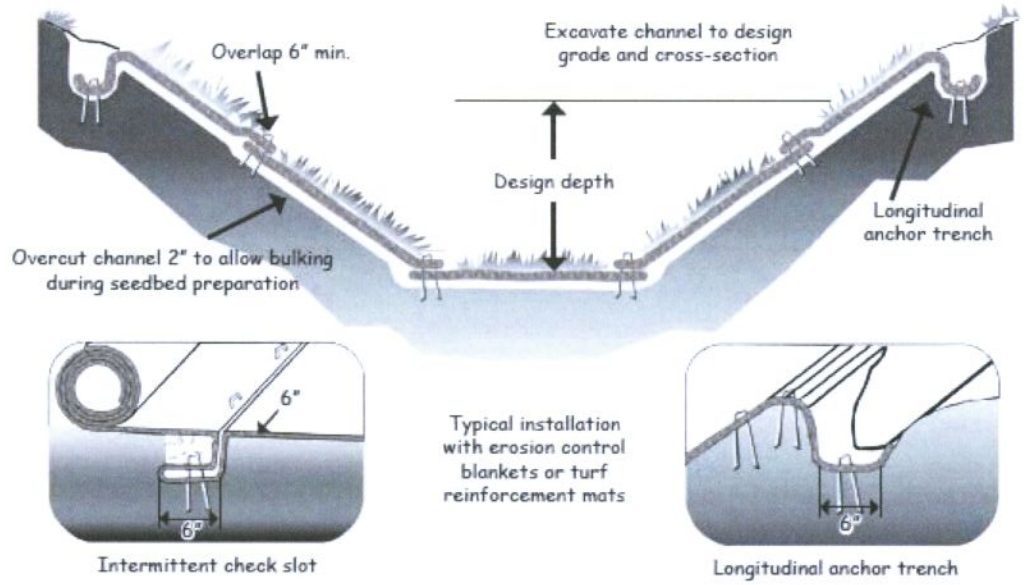
Anchor netting in a 12-inch trench

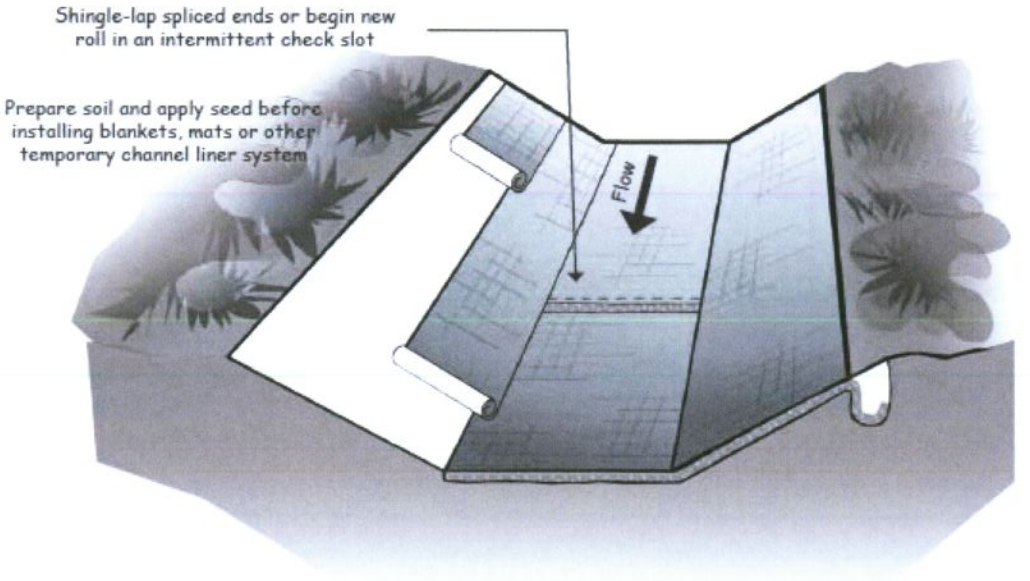


Join strips by anchoring and overlapping.

Figure 6.14a Installation of netting and matting (modified from Va. Div. of Forestry).

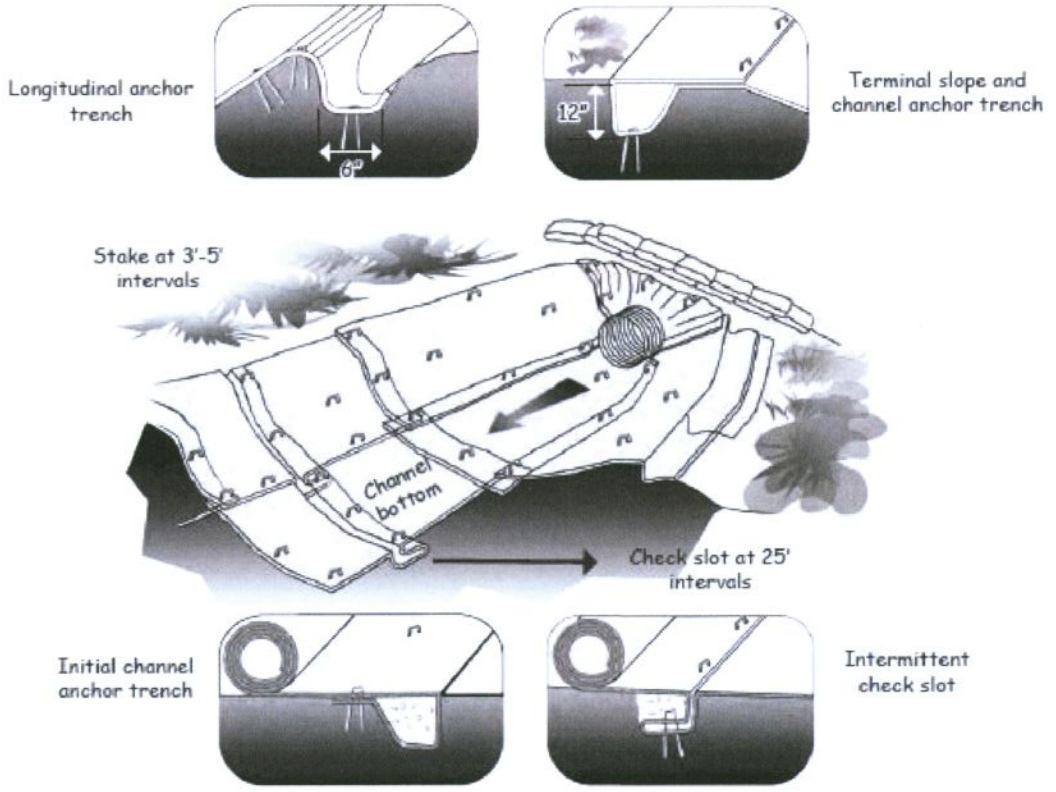
Figure 6.17d Temporary Channel Liners; Washington State Department of Ecology



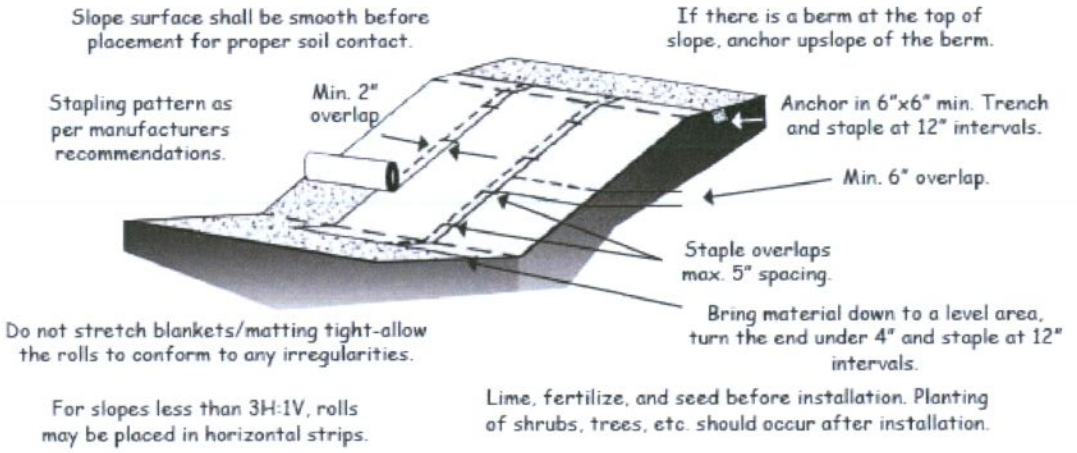


NOTES:
1. Design velocities exceeding 2 ft/sec require temporary blankets, mats or similar liners to protect seed and soil until vegetation becomes established.
2. Grass-lined channels with design velocities exceeding 6 ft/sec should include turf reinforcement mats

Figure 6.17e Channel Installation and Slope Installation; Washington State Ecology Department

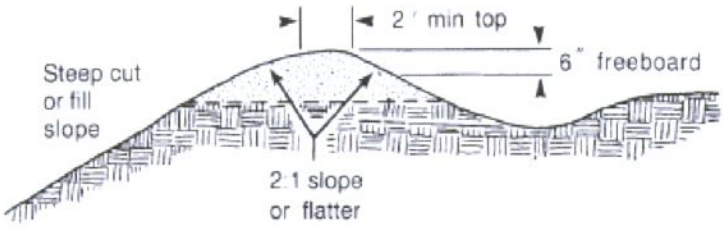


NOTE:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.



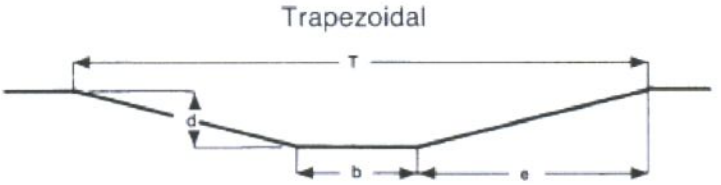
Permanent Diversions

Figure 6.21b Permanent diversion located above a slope.



Grass-Lined Channels

Figure 6.30a Cross section geometry of trapezoidal channel.



x-section area (A) = $bd + Zd^2$
top width (T) = $b + 2dz$

$$Z = \frac{e}{d}$$

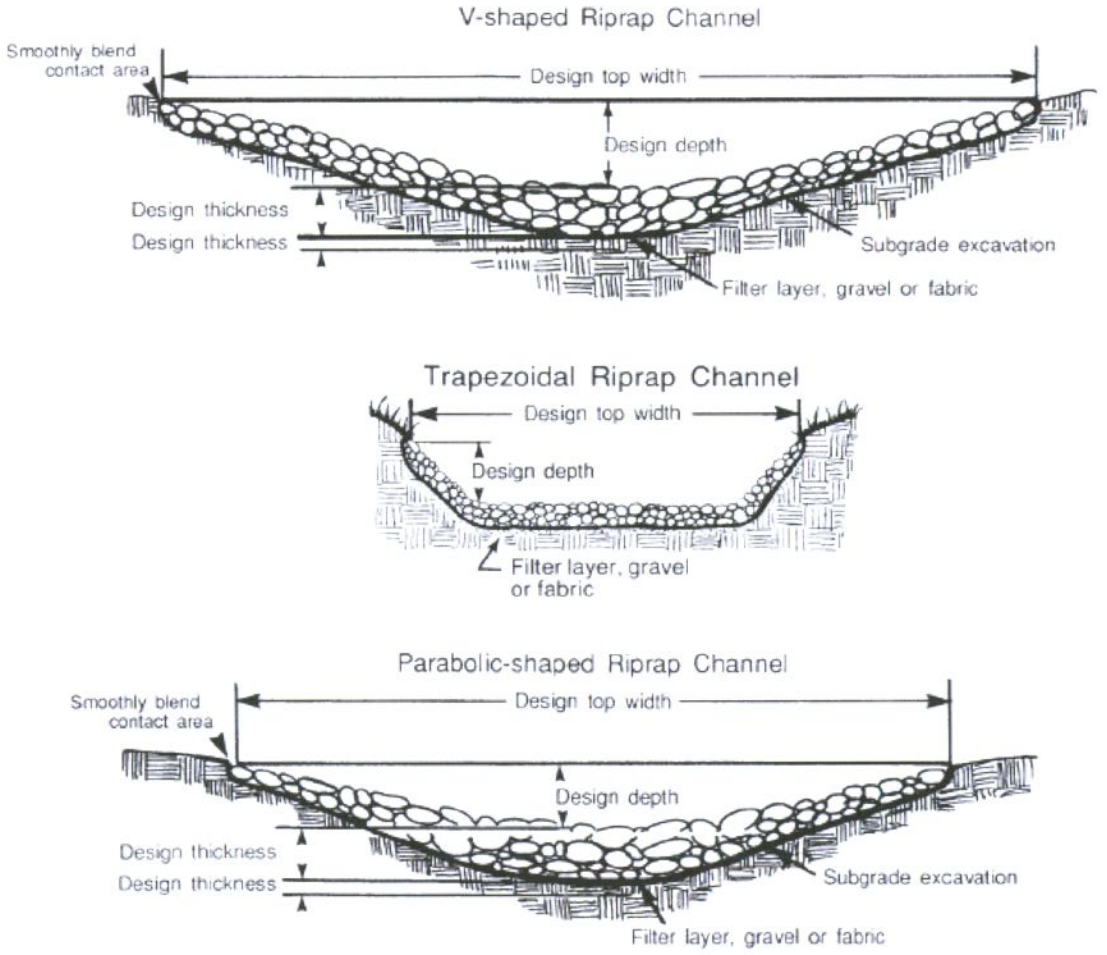


Figure 6.31a Construction detail of riprap channel cross sections

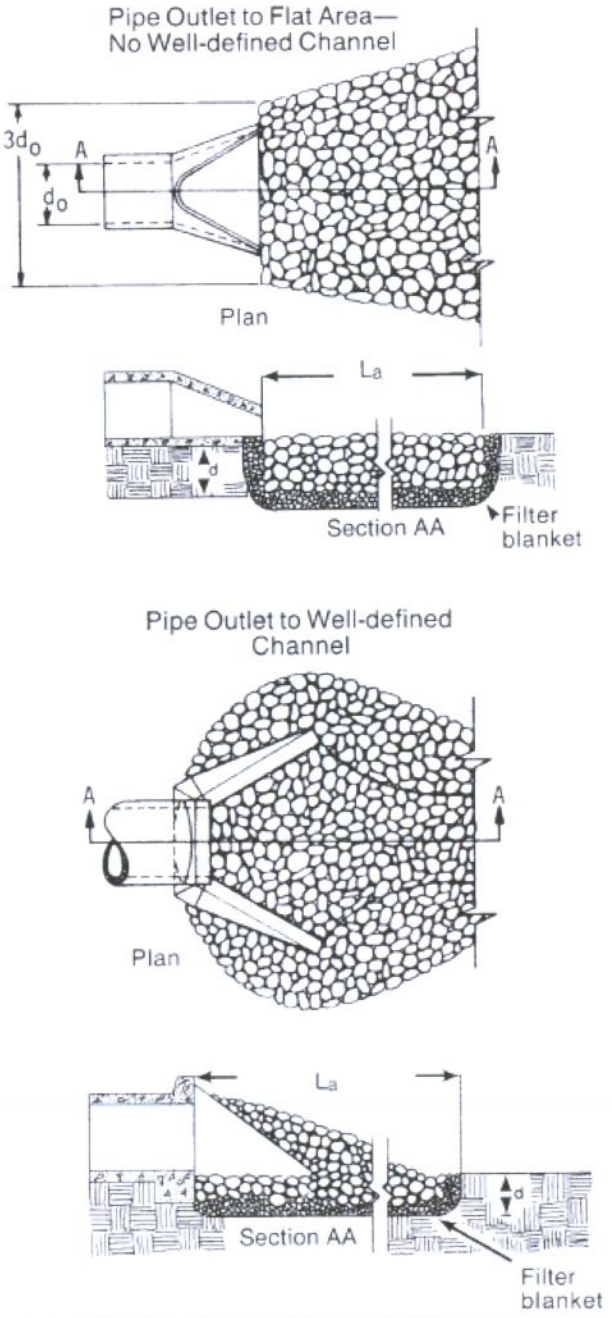


Figure 6.41c Riprap outlet protection (modified from Va SWCC)

Notes

1. L_a is the length of the riprap apron.
2. d = 1.5 times the maximum stone diameter but not less than 6".
3. In a well-defined channel extend the apron up the channel banks to an elevation of 6" above the maximum tailwater depth or to the top of the bank, whichever is less.
4. A filter blanket or filter fabric should be installed between the riprap and soil foundation.

Rock Pipe Inlet Protection

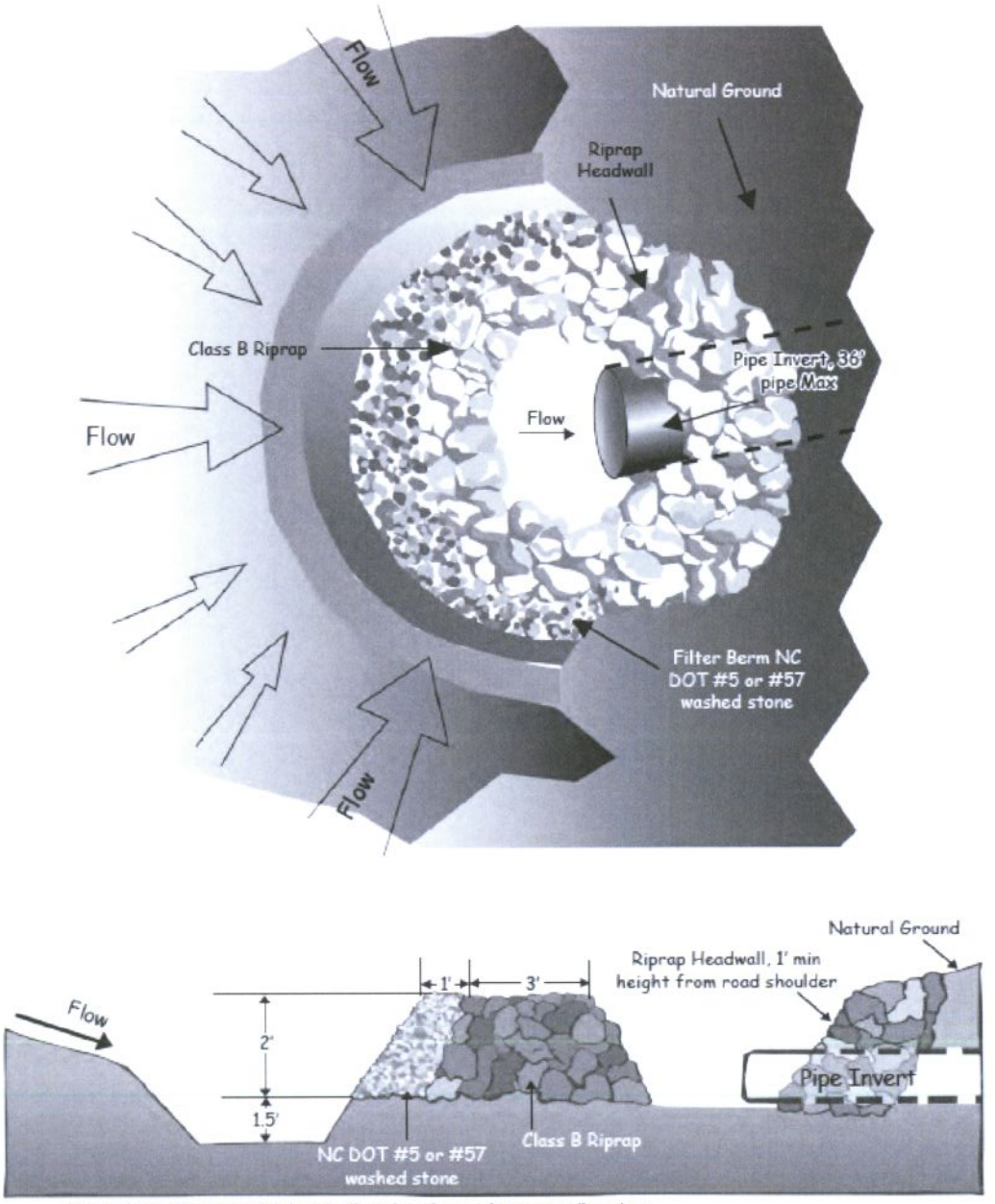
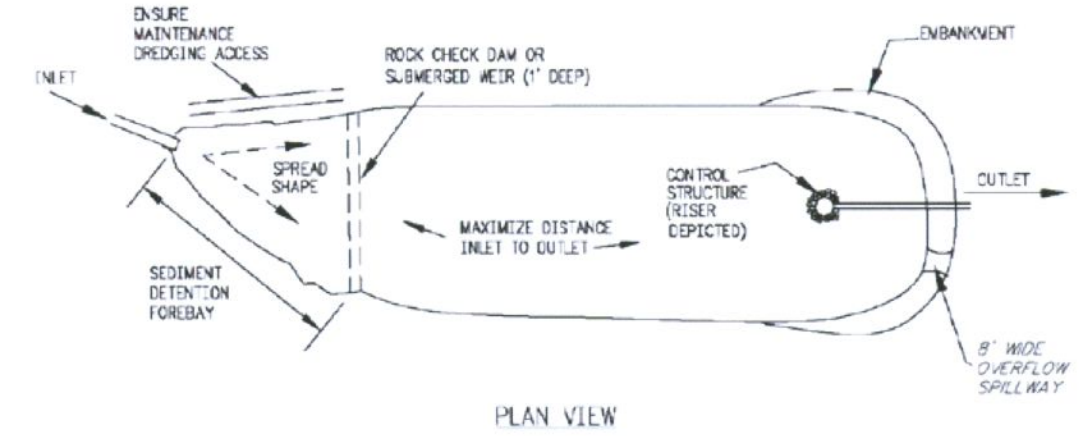
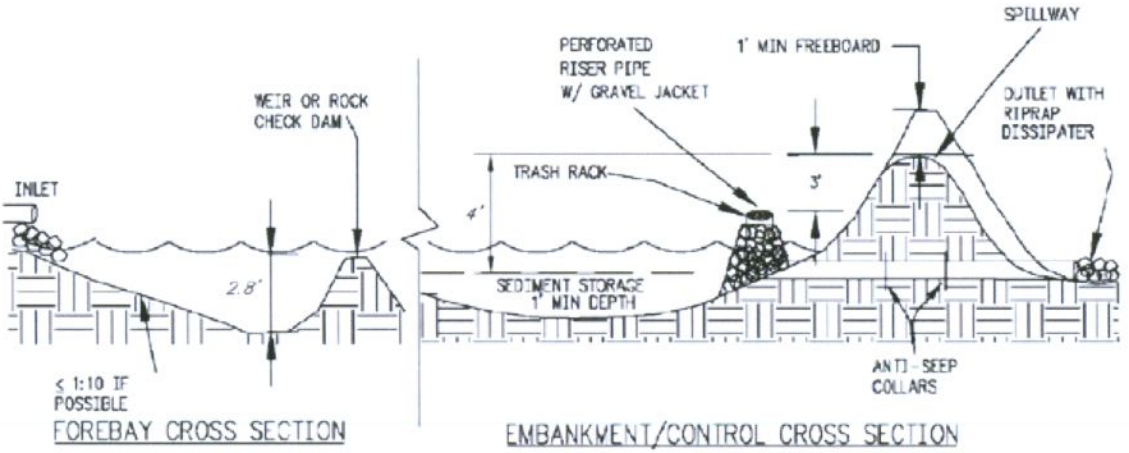


Figure 6.55a Rock pipe inlet protection plan view and cross-section view

Sediment Basin and Outlet Riser



PLAN VIEW



*ALL ELEVATIONS TO BE FIELD VERIFIED PRIOR TO CONSTRUCTION.

Sediment Fence (Silt Fence)

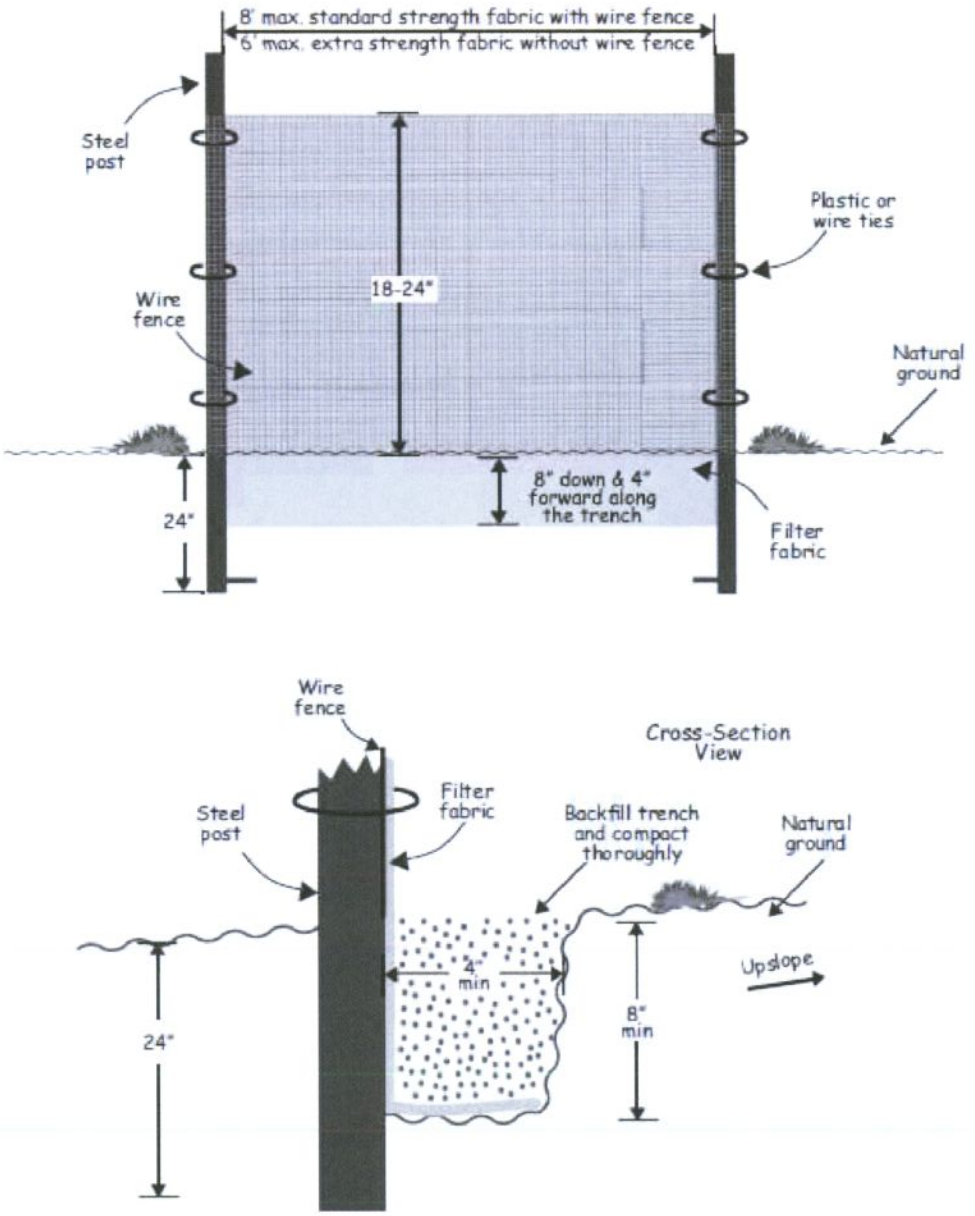


Figure 6.62a Installation detail of a sediment fence.

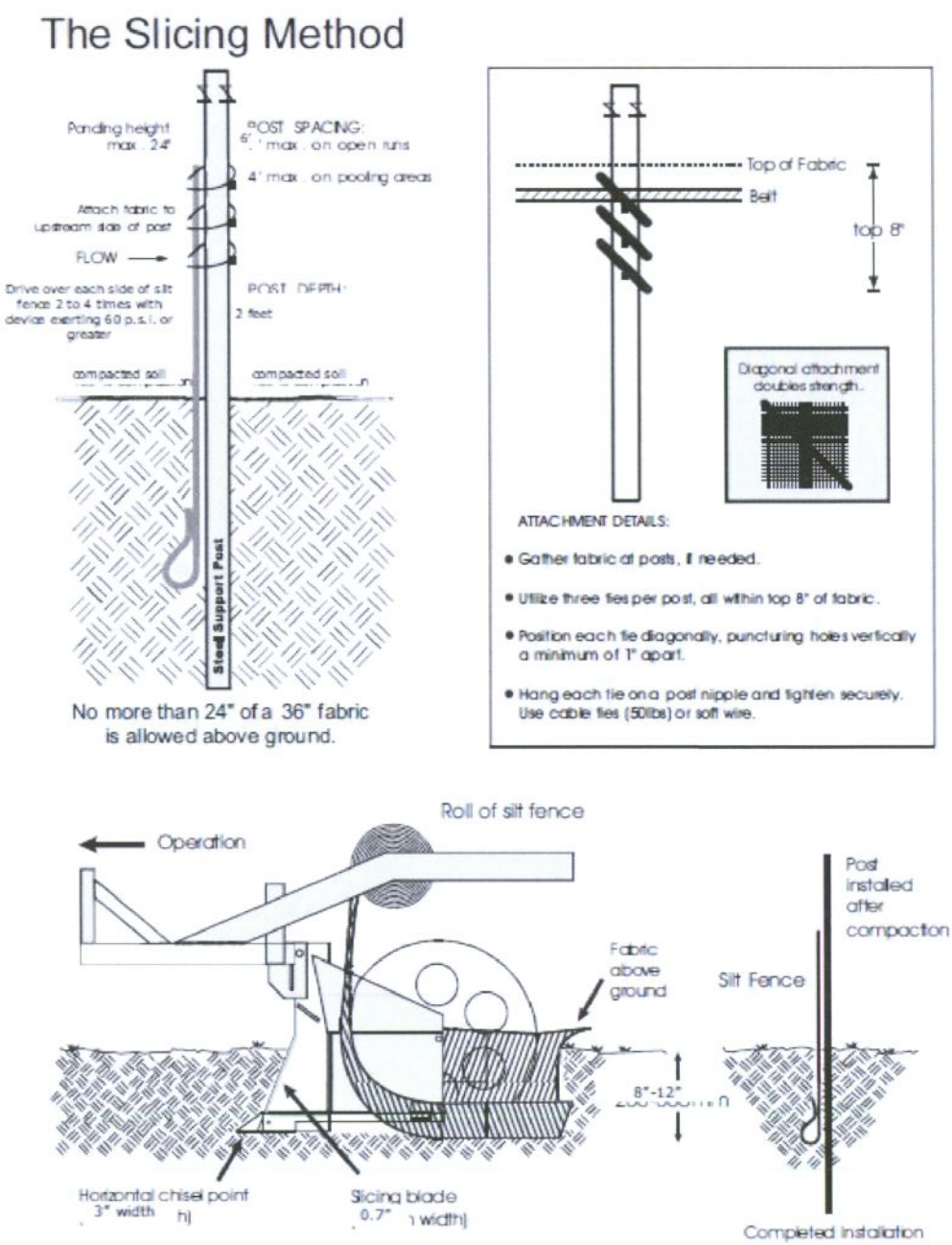


Figure 6.62b Schematics for using the slicing method to install a sediment fence. Adapted from *Silt Fence that Works*

Rock Dam

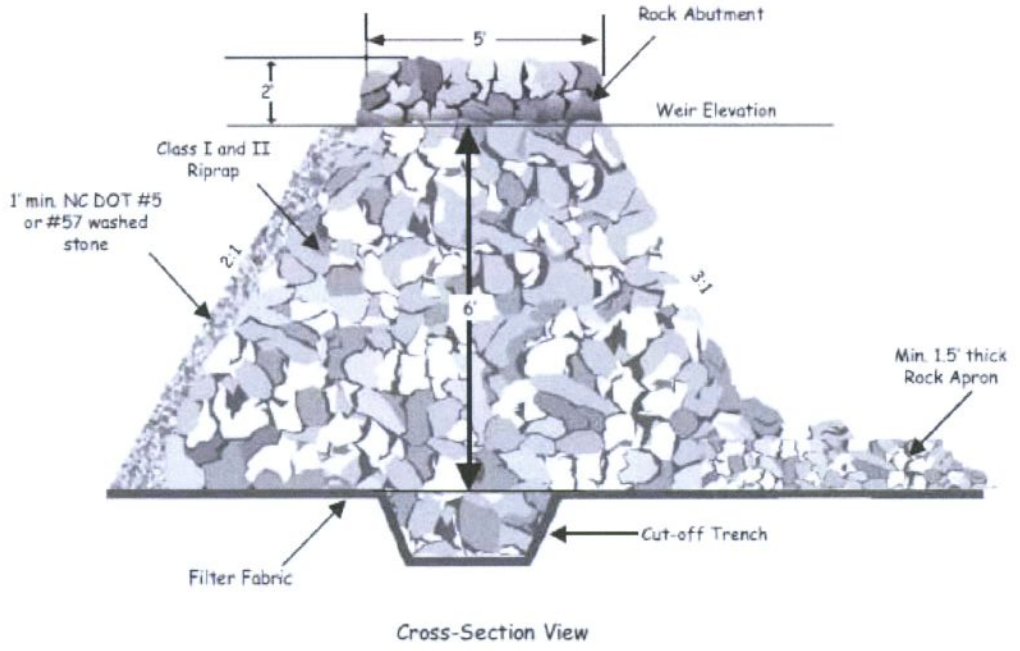
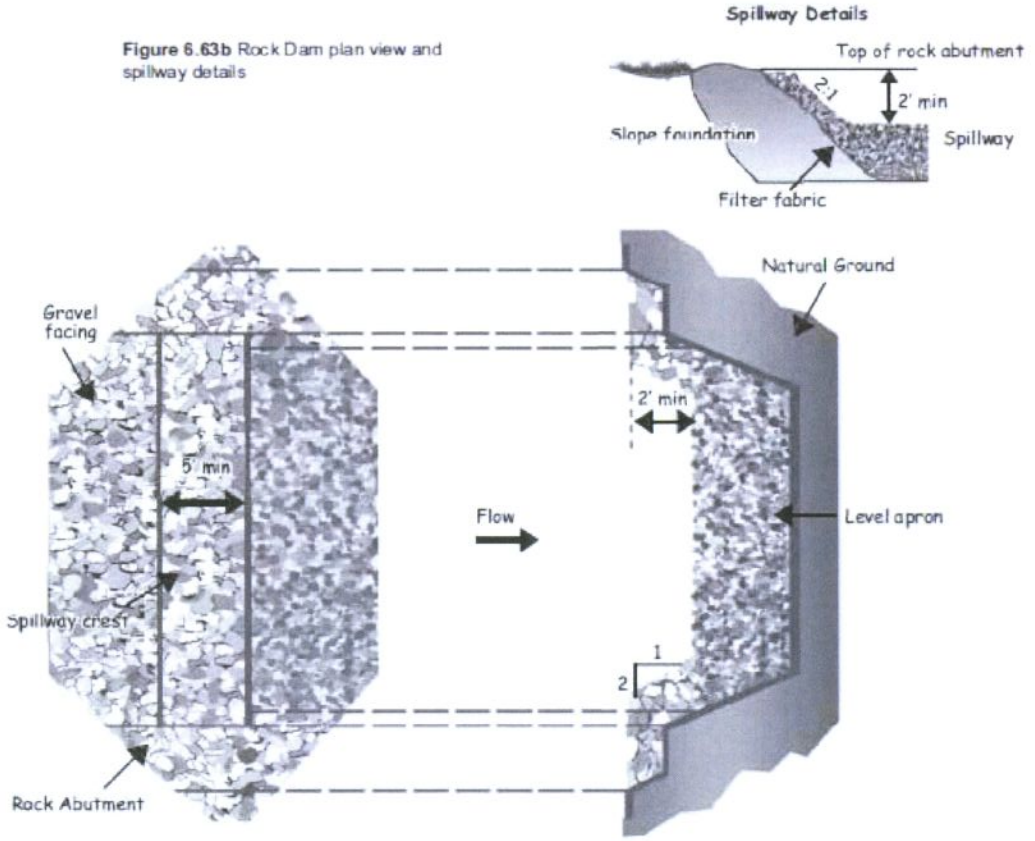


Figure 6.63a Rock Dam cross section

Figure 6.63b Rock Dam plan view and spillway details



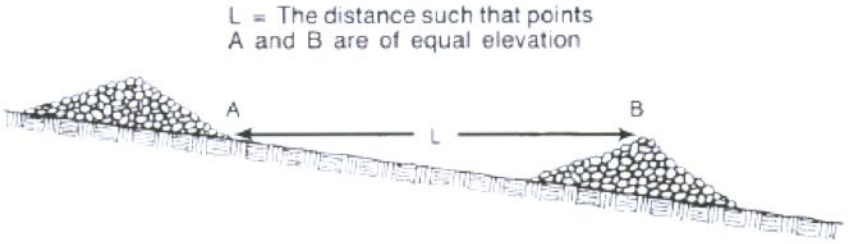


Figure 6.83a Space check dams in a channel so that the crest of downstream dam is at elevation of the toe of upstream dam.

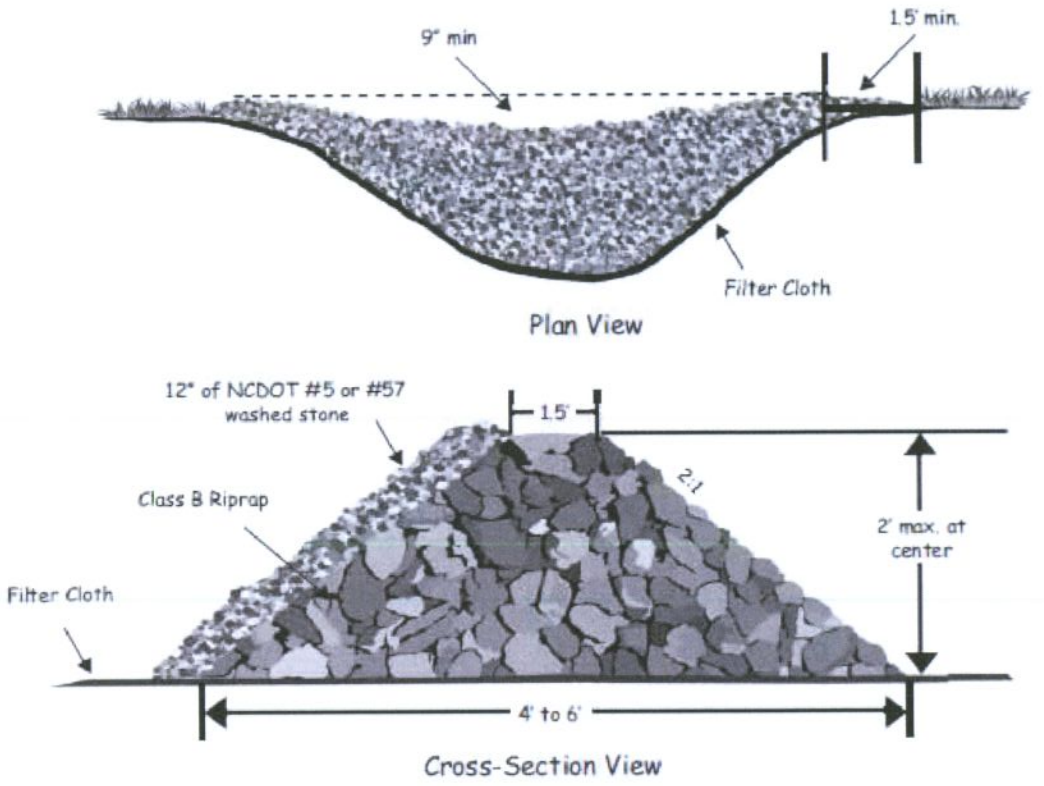


Figure 6.83b Stone check dam stone should be placed over the channel banks to keep water from cutting around the dam.

APPENDIX C

SPECIFICATIONS

Specifications – Land Grading (Practice 6.02)

1. Construct and maintain all erosion and sedimentation control practices and measures in accordance with the approved sedimentation control plan and construction schedule.

2. Remove good topsoil from areas to be graded and filled, and preserve it for use in finishing the grading of all critical areas.

3. Scarify areas to be topsoiled to a minimum depth of 2 inches before placing topsoil (Practice 6.04, *Topsoiling*).

4. Clear and grub areas to be filled by removing trees, vegetation, roots, or other objectionable material that would affect the planned stability of the fill.

5. Ensure that fill material is free of brush, rubbish, rocks, logs, stumps, building debris, and other materials inappropriate for constructing stable fills.

6. Place all fill in layers not to exceed 9 inches in thickness, and compact the layers as required to reduce erosion, slippage, settlement, or other related problems.

7. Do not incorporate frozen, soft, mucky, or highly compressible materials into fill slopes.

8. Keep diversions and other water conveyance measures free of sediment during all phases of development.

9. Permanently stabilize all graded areas immediately after final grading is completed on each area in the grading plan. Apply temporary stabilization measures on all graded areas when work is to be interrupted or delayed for 30 working days or longer.

10. Show topsoil stockpiles, borrow areas, and spoil areas on the plans, and make sure they are adequately protected from erosion. Include final stabilization of these areas in the plan.

Specifications – Surface Roughening (Practice 6.03)

1. Place fill slopes with a gradient steeper than 3:1 in lifts not to exceed 9 inches, and make sure each lift is properly compacted. Ensure that the face of the slope consists of loose, uncompacted fill 4 to 6 inches deep. Use grooving to roughen the face of the slopes, if necessary.

2. Grooving uses machinery to create a series of ridges and depressions that run across the slope (on the contour).

3. Groove using any appropriate implement that can be safely operated on the slope, such as disks, tillers, spring harrows, or the teeth on a front-end loader bucket. Do not make such grooves less than 3 inches deep nor more than 15 inches apart.

4. Do not blade or scrape the final slope face.

5. Limit roughening with tracked machinery to sandy soils to avoid undue compaction of the soil surface. Tracking is generally not as effective as the other roughening methods described.

6. Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.

Specifications – Topsoil (Practice 6.04)

1. Determine whether the quality and quantity of available topsoil justifies selective handling. Quality topsoil has the following characteristics:

    - Texture shall be loam, sandy loam, and silt loam are best; sandy clay loam, silty clay loam, clay loam, and loamy sand are fair. Do not use heavy clay and organic soils such as peat or muck as topsoil.

    - Organic matter content (sometimes referred to as "humic matter") should be greater than 1.5% by weight.

    - pH should be greater than 3.6 before liming, and liming is required if it is less than 6.0.

    - Soluble salts should be less than 500 ppm.

    - Sodium adsorption ratio should be less than 12.

    - The depth of material meeting the above qualifications should be at least 2 inches. Soil factors such as rock fragments, slope, depth to water table, and layer thickness affects the ease of excavation and spreading of topsoil. Generally, the upper part of the soil, which is richest in organic matter, is most desirable; however, material excavated from deeper layers may be worth storing if it meets the other criteria listed above. Organic soils such as mucks and peats do not make good topsoil. They can be identified by their extremely light weight when dry.

2. Strip topsoil only from those areas that will be disturbed by excavation, filling, road building, or compaction by equipment. A 4-6 inch stripping depth is common, but depth varies depending on the site. Determine depth of stripping by taking soil cores at several locations within each area to be stripped. Topsoil depth generally varies along a gradient from hilltop to toe of the slope. Put sediment basins, diversions, and other controls into place before stripping.

3. Select stockpile location to avoid slopes, natural drainageways, and traffic routes. On large sites, respreading is easier and more economical when topsoil is stockpiled in small piles located near areas where they will be used.

4. Use sediment fences or other barriers where necessary to retain sediment.

5. Protect topsoil stockpiles by temporarily seeding as soon as possible, no more than 21 calendar days after the formation of the stockpile .

Specifications – Topsoil Continued

6. If stockpiles will not be used within 90 days they must be stabilized with permanent vegetation to control erosion and weed growth (Practice 6.11, *Permanent Seeding*).

7. Before spreading topsoil, establish erosion and sedimentation control practices such as diversions, berms, dikes, waterways, and sediment basins.

8. Maintain grades on the areas to be topsoiled according to the approved plan and do not alter them by adding topsoil.

9. Where the pH of the existing subsoil is 6.0 or less, or the soil is composed of heavy clays, incorporate agricultural limestone in amounts recommended by soil tests or specified for the seeding mixture to be used (Practice 6.11, *Permanent Seeding*). Incorporate lime to a depth of at least 2 inches by disking.

10. Immediately prior to spreading the topsoil, loosen the subgrade by disking or scarifying to a depth of at least 4 inches, to ensure bonding of the topsoil and subsoil. If no amendments have been incorporated, loosen the soil to a depth of at least 6 inches before spreading topsoil.

11. Uniformly distribute topsoil to a minimum compacted depth of 2 inches on 3:1 slopes and 4 inches on flatter slopes. To determine the volume of topsoil required for application to various depths, use Table 6.04a. Do not spread topsoil while it is frozen or muddy or when the subgrade is wet or frozen. Correct any irregularities in the surface that result from topsoiling or other operations to prevent the formation of depressions or water pockets.

12. Compact the topsoil enough to ensure good contact with the underlying soil, but avoid excessive compaction, as it increases runoff and inhibits seed germination. Light packing with a roller is recommended where high maintenance turf is to be established.

Specifications – Topsoil Continued

Table 6.04a
Cubic Yards of Topsoil
Required for Application to Various Depths

Depth (Inches)	Per 1,000 Sq. Ft.	Per Acre
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	536
5	15.5	670
6	18.6	804

13. On slopes and areas that will not be mowed, the surface may be left rough after spreading topsoil. A disk may be used to promote bonding at the interface between the topsoil and subsoil.

14. After topsoil application, follow procedures for seedbed preparation, taking care to avoid excessive mixing of topsoil into the subsoil.

Specifications – Temporary Gravel Construction Entrance / Exit (Practice 6.06)

1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.

2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.

3. Provide drainage to carry water to a sediment trap or other suitable outlet.

4. Use geotextile fabrics because they improve stability of the foundation in locations subject to seepage or high water table.

Specifications – Permanent Seeding (Practice 6.11)

1. Seed all disturbed areas of construction.

2. Preparation for primary/permanent stabilization shall not begin until all construction and utility work within the preparation area is complete. However, it may be necessary to prepare for nurse crops prior to completion of construction and installation of utilities.

3. No seeding should be undertaken in windy or unfavorable weather, when the ground is too wet to rake easily, when it is in a frozen condition, or too dry.

4. A North Carolina Department of Agriculture Soils Test (or equal) shall be obtained for all areas to be seeded, sprigged, sodded or planted. Recommended fertilizer and pH adjusting products shall be incorporated into the prepared areas and backfill material per the test.

5. All stones larger than three (3) inches on any side, sticks, roots, and other extraneous materials that surface during the bed preparation shall be removed.

6. Till or disc the prepared areas to be seeded to a minimum depth of four (4) inches. Remove stones larger than three (3) inches on any side, sticks, roots and other extraneous materials that surface. If not incorporated during the soil preparation process, add pH modifier and fertilizers at the rate specified in the soil test report.

7. Re-compact the area utilizing a cultipacker roller. The finished grade shall be a smooth even soil surface with a loose, uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage.

8. Immediately following surface preparation, the seed shall be uniformly applied and lightly rakes into the surface. Lightly roll the surface and water with fine spray. Seed shall be applied at the following rates:

Seeding (February 1 to May 1)

Rye (grain) 120 lbs/acre
Korean lespedeza 50 lbs/acre
Lime shall be applied at the rate of 2,000 lbs per acre.
10-10-10 Fertilizer shall be applied at the rate of 750 lbs per acre.

Seeding (May 15 to August 15)

German millet 40 lbs/acre
Lime shall be applied at the rate of 2,000 lbs per acre.
10-10-10 Fertilizer shall be applied at the rate of 750 lbs per acre.

Specifications – Permanent Seeding Continued

Seeding (August 15 to December 15)

Rye (grain) 120 lbs/acre
Lime shall be applied at the rate of 2,000 lbs per acre.
10-10-10 Fertilizer shall be applied at the rate of 1000 lbs per acre.

9. The Contractor shall keep all seeded areas watered and in good condition. Reseeding shall be done if and when necessary until a good, healthy, uniform growth is established over the entire area seeded. Payment for areas seeded and mulched will not be approved until the establishment of healthy, uniform grass growth as examined and approved by the Project Manager.

10. On slopes, the Contractor shall provide against washouts by an approved method. Any washout which occurs shall be regarded and reseeded at the Contractor's expense until good sod is established.

11. Temporary Seeding shall be performed as necessary to comply with all applicable regulations, the sedimentation and erosion control plan and applicable permits. Contractor shall use a seed mix that is suitable for the growing conditions that are encountered and shall apply fertilizer, lime and mulch as required to temporarily stabilize disturbed areas.

Specifications – Mulching (Practice 6.14)

1. Select a material based on site and practice requirements, availability of material, labor, and equipment.

2. Before mulching, complete the required grading, install sediment control practices, and prepare the seedbed.

3. Spread mulch uniformly by hand, or with a mulch blower. Apply 2,000 lbs/acre. After spreading mulch, no more than 25% of the ground surface should be visible. In hydroseeding operations a green dye, added to the slurry, assures a uniform application.

4. Straw mulch must be anchored immediately after spreading.

5. A mulch anchoring tool may be used. A tractor-drawn implement designed to punch mulch into the soil, a mulch anchoring tool provides maximum erosion control with straw. A regular farm disk, weighted and set nearly straight, may substitute, but will not do a job comparable to the mulch anchoring tool. The disk should not be sharp enough to cut the straw. These methods are limited to slopes no steeper than 3:1, where equipment can operate safely. Operate machinery on the contour.

6. Mulch nettings—Lightweight plastic, cotton, jute, wire, or paper nets may be stapled over the mulch according to the manufacturer's recommendations. Nets alone generally provide little moisture conservation benefits and only limited erosion protection. Therefore, they are usually used in conjunction with an organic mulch such as straw. Except when wood fiber slurry is used, netting should always be installed over the mulch. Wood fiber may be sprayed on top of an installed net.

7. Mats, including "excelsior" (wood fiber) blankets, are considered protective mulches and may be used alone, on erodible soils, and during all times of the year. Place the matting in firm contact with the soil, and staple securely.

8. Chemical mulches may be effective for soil stabilization if used between May 1 and June 15, or Sept. 15 and Oct. 15, provided that they are used on slopes **no steeper** than 4:1, and that proper seedbed preparation has been accomplished, including surface roughening where required.

9. Chemical mulches may be used to bind other mulches, or with wood fiber in a hydroseeded slurry at any time. Follow the manufacturer's recommendations for application.

Specifications – Permanent Diversions (Practice 6.21)

1. Remove and properly dispose of all trees, brush, stumps, and other objectionable material.

2. Ensure that the minimum constructed cross section meets all design requirements.

3. Provide sufficient room around diversions to permit machine regrading and cleanout.

4. Vegetate the ridge immediately after construction, unless it will remain in place less than 30 working days.

Specifications – Grass-Lined Channels (Practice 6.30)

1. Remove all trees, brush, stumps, and other objectionable material from the foundation area, and dispose of properly.

2. Excavate the channel, and shape it to neat lines and dimensions shown on the plans plus a 0.2-foot overcut around the channel perimeter to allow for bulking during seedbed preparations and sod buildup.

3. Remove and properly dispose of all excess soil so that surface water may enter the channel freely.

4. The procedure used to establish grass in the channel will depend upon the severity of the conditions and selection of species. Protect the channel with mulch or a temporary liner sufficient to withstand anticipated velocities during the establishment period.

Specifications – Riprap-Lined Channels (Practice 6.31)

1. Clear the foundation area of trees, stumps, roots, loose rock, and other objectionable material.

2. Excavate the cross section to the lines and grades of the foundation of the liner as shown on the plans. Bring over-excavated areas to grade by increasing the thickness of the liner or by backfilling with moist soil compacted to the density of the surrounding material.

3. Place filters, beddings, and foundation drains to line and grade in the manner specified.

4. Place filter and bedding materials immediately after slope preparation. For synthetic filter fabrics, overlap the downstream edge by at least 12 inches with the upstream edge which is buried a minimum 12 inches in a trench. Space anchor pins every 3 feet along the overlap.

5. Spread granular materials in a uniform layer. When more than one gradation is required, spread the layers so there is minimal mixing.

6. Perform all channel construction to keep erosion and water pollution to a minimum. Immediately upon completion of the channel, vegetate all disturbed areas or otherwise protect them against soil erosion. Where channel construction will take longer than 30 days, stabilize channels by reaches.

Specifications – Outlet Stabilization Structure (Practice 6.41)

1. Ensure that the subgrade for the filter and riprap follows the required lines and grades shown in the plan. Compact any fill required in the subgrade to the density of the surrounding undisturbed material. Low areas in the subgrade on undisturbed soil may also be filled by increasing the riprap thickness.

2. The riprap and gravel filter must conform to the specified grading limits shown on the plans.

3. Filter cloth, when used, must meet design requirements and be properly protected from punching or tearing during installation. Repair any damage by removing the riprap and placing another piece of filter cloth over the damaged area. All connecting joints should overlap so the top layer is above the downstream layer a minimum of 1 foot. If the damage is extensive, replace the entire filter cloth.

4. Riprap may be placed by equipment, but take care to avoid damaging the filter.

5. The minimum thickness of the riprap should be 1.5 times the maximum stone diameter.

6. Riprap may be field stone or rough quarry stone. It should be hard, angular, highly weather-resistant and well graded.

7. Construct the apron on zero grade with no overfill at the end. Make the top of the riprap at the downstream end level with the receiving area or slightly below it.

8. Ensure that the apron is properly aligned with the receiving stream and preferably straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron.

9. Immediately after construction, stabilize all disturbed areas with vegetation (Practice 6.11, *Permanent Seeding*).

Specifications – Rock Pipe Inlet Protection (Practice 6.55)

1. Clear the area of all debris that might hinder excavation and disposal of spoil.

2. Install the Class B or Class I riprap in a semi-circle around the pipe inlet. The stone should be built up higher on each end where it ties into the embankment. The minimum crest width of the riprap should be 3 feet, with a minimum bottom width of 11 feet. The minimum height should be 2 feet, but also 1 foot lower than the shoulder of the embankment or diversions.

3. A 1 foot thick layer of NC DOT #5 or #57 stone should be placed on the outside slope of the riprap.

4. The sediment storage area should be excavated around the outside of the stone horseshoe 18 inches below natural grade.

5. When the contributing drainage area has been stabilized, fill depression and establish final grading elevations, compact area properly, and stabilize with ground cover.

Specifications – Sediment Basin (Practice 6.61)

1. Site Preparations-Clear, grub, and strip topsoil from areas under the embankment to remove trees, vegetation, roots, and other objectionable material. Delay clearing the pool area until the dam is complete and then remove brush, trees, and other objectional materials to facilitate sediment cleanout. Stockpile all topsoil or soil containing organic matter for use on the outer shell of the embankment to facilitate vegetative establishment. Place temporary sediment control measures below the basin as needed.

2. Cut-off trench-Excavate a cut-off trench along the center line of the earth fill embankment. Cut the trench to stable soil material, but in no case make it less than 2 feet deep. The cut-off trench must extend into both abutments to at least the elevation of the riser crest. Make the minimum bottom width wide enough to permit operation of excavation and compaction equipment, but in no case less than 2 feet. Make slide slopes of the trench no steeper that 1:1. Compaction requirements are the same as those for the embankment. Keep the trench dry during backfilling and compaction operations.

3. Embankment-Take fill material from the approved areas shown on the plans. It should be clean mineral soil, free of roots, woody vegetation, rocks, and other objectionable material. Scarify areas on which fill is to be placed before placing fill. The fill material must contact sufficient moisture so it can be formed by hand into a ball without crumbling.

4. Conduit spillways-Securely attach the riser to the barrel or barrel stub to make a watertight structural connection. Secure all connections between barrel sections by approved watertight assemblies. Place the barrel and rise on a firm, smooth foundation of impervious soil. Do not use pervious material such as sand, gravel, or crushed stone as backfill around the pipe or antiseep collars. Place the fill material around the pipe spillway in 4-inch layers, and compact it under and around the pipe to at least the same density as the adjacent embankment. **Care must be taken not to raise the pipe from firm contact with its foundation when compacting under the pipe haunches.**

5. Place a minimum depth of 2 feet of compacted backfill over the pipe spillway before crossing it with construction equipment. Anchor the riser in place by concrete or other satisfactory means to prevent flotation. In no case should the pipe conduit be installed by cutting a trench through the dam after the embankment is complete.

Specifications – Sediment Basin Continued

6. Emergency spillway-Install the emergency spillway in undisturbed soil. The achievement of planned elevations, grade, design width, and entrance and exit channel slopes are critical to the successful operation of the emergency spillway.

7. Inlets-Discharge water into the basin in a manner to prevent erosion. Use diversions with outlet protection to divert sediment-laden water to the upper end of the pool care to improve basin trap efficiency.

8. Erosion control-Construct the structure so that the disturbed area is minimized. Divert surface water away from bare areas. Complete the embankment before the area is cleared. Stabilize the emergency spillway embankment and all other disturbed areas above the crest of the principal spillway immediately after construction.

Specifications – Sediment Fence (Practice 6.62)

1. Use a synthetic filter fabric of at least 95% by weight of polyolefins or polyester, which is certified by the manufacturer or supplier as conforming to the requirements in ASTM D 6461. Synthetic filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120°F.

2. Ensure that posts for sediment fences are 1.33 lb/linear ft steel with a minimum length of 5 feet. Make sure that steel posts have projections to facilitate the fabric.

3. For reinforcement of standard strength filter fabric, use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

4. Construct the sediment barrier of standard strength or extra strength synthetic filter fabrics.

5. Ensure that the height of the sediment fence does not exceed 24 inches above the ground surface. (Higher fences may impound volume of water sufficient to cause failure of the structure.)

6. Construct the filter fabric from a continuous roll cut to the length of the barrier to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.

7. Support standard strength filter fabric by wire mesh fastened securely to the upslope side of the posts. Extend the wire mesh support to the bottom of the trench. Fasten the wire reinforcement, then fabric on the upslope side of the fence post. Wire or plastic zip ties should have minimum 50 pound tensile strength.

8. When a wire mesh support fence is used, space posts a maximum of 8 feet apart. Support posts should be driven securely into the ground a minimum of 24 inches.

9. Extra strength filter fabric with 6 feet post spacing does not require wire mesh support fence. Securely fasten the filter fabric directly to posts. Wire or plastic zip ties should have minimum 50 pound tensile strength.

10. Excavate a trench approximately 4 inches wide and 8 inches deep along the proposed line of posts and upslope from the barrier.

11. Place 12 inches of fabric along the bottom and side of the trench.

Specifications – Sediment Fence Continued

12. Backfill the trench with soil placed over the filter fabric and compact. Thorough compaction of the backfill is critical to silt fence performance.

13. Do not attach filter fabric to existing trees.

14. Sediment Fence may be installed using the slicing method

Slicing Method

1. The base of both end posts should be at least one foot higher than the middle of the fence. Check with a level if necessary.

2. Install posts 4 feet apart in critical areas and 6 feet apart on standard applications.

3. Install posts 2 feet deep on the downstream side of the silt fence, and as close as possible to the fabric, enabling posts to support the fabric from upstream water pressure.

4. Install posts with the nipples facing away from the silt fence.

5. Attach fabric to each post with 3 ties, all spaced within the top 8 inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1 inch vertically apart. Also, each tie should be positioned to hand on a post nipple when tightened to prevent sagging.

6. Wrap approximately 6 inches of fabric around the end posts and secure with 3 ties.

7. No more than 24 inches of a 36 inch fabric is allowed above ground level.

8. The installation should be checked and corrected for any deviations before compaction.

9. Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first, and then each side twice for a total of 4 trips.

Specifications – Rock Dam (Practice 6.63)

1. Clear the areas under the embankment and strip of roots and other objectionable material. Delay cleaning the reservoir area until the dam is in place.

2. Cover the foundation area including the abutments with extra-strength filter fabric before backfilling with rock. If a cutoff trench is required, excavate at centerline of dam, extending all the way up the earth abutments. Apply filter fabric under the rockfill embankment from the upstream edge of the dam to the downstream edge of the apron. Overlap fill material a minimum of 1 foot at all joints, with the upstream strip laid over the downstream strip.

3. Construct the embankment with well-graded rock and gravel to the size and dimensions shown on the drawings. It is important that rock abutments be at least 2 feet higher than the spillway crest and at least 1 foot higher than the dam, all the way to the downstream toe, to prevent scour and erosion at the abutments.

4. Sediment-laden water from the construction site should be diverted into the basin reservoir at the furthest area from the dam.

5. Construct the rock dam before the basin area is cleared to minimize sediment yield from construction of the basin. Immediately stabilize all areas disturbed during the construction of the dam except the sediment pool.

6. Safety-Sediment basins should be considered dangerous because they attract children. Steep side slopes should be avoided. Fences with warning signs may be needed if trespassing is likely. All state and local requirements must be followed.

Specifications – Check Dam (Practice 6.83)

1. Place stone to the lines and dimensions show in the plan on a filter fabric foundation.

2. Keep the center stone section at least 9 inches below natural ground level where the dam abuts the channel banks.

3. Extend stone at least 1.5 feet beyond the ditch bank to keep water from cutting around the ends of the check dam.

4. Set spacing between dams to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.

5. Protect the channel after the lowest check dam from heavy flow that could cause erosion.

6. Make sure that the channel reach above the most upstream dam is stable.

7. Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.

Specifications – Dust Control (Practice 6.84)

1. Vegetative cover, for disturbed areas not subject to traffic, vegetation provides the most practical method of dust control.

2. Mulch, when properly applied, mulch offers a fast, effective means of controlling dust.

3. Calcium chloride may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist, but not so high as to cause water pollution or plant damage.

4. Sprinkling, the site may be sprinkled until the surface is wet. Sprinkling is especially effective for dust control on haul roads and other traffic routes.

5. Stone, used to stabilize construction roads can also be effective for dust control.

6. Barriers, a board fence, wind fence, sediment fence, or similar barrier can control air currents and blowing soil. Place barriers perpendicular to prevailing air currents at intervals about 15 times the barrier height. Where dust is a known problem preserve windbreak vegetation.

7. Tillage, deep plow large open undisturbed areas and bring clods to the surface. This is a temporary emergency measure that can be used as soon as soil blowing starts. Begin plowing on the windward edge of the site.

APPENDIX D

FINANCIAL RESPONSIBILITY / OWNERSHIP FORM

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM
SEDIMENTATION POLLUTION CONTROL ACT

No person may initiate any land-disturbing activity on one or more acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environment and Natural Resources. (Please type or print and, if the question is not applicable or the e-mail and/or fax information unavailable, place N/A in the blank.)

Part A.

1. Project Name____OLD FORT LANDFILL PERMIT #56-03_____

2. Location of land-disturbing activity: County_ McDowell ____ City or Township_Old Fort_____

   Highway/Street_Parker Padget Road Latitude_3537398420_ Longitude_8273943510_____

3. Approximate date land-disturbing activity will commence:__March 2013_____

4. Purpose of development (residential, commercial, industrial, institutional, etc.):_institutional_____

5. Total acreage disturbed or uncovered (including off-site borrow and waste areas):_11_____

6. Amount of fee enclosed: $_650.00_____. The application fee of $65.00 per acre (rounded up to the next acre) is assessed without a ceiling amount (Example: a 9-acre application fee is $585).

7. Has an erosion and sediment control plan been filed? Yes_____ No_____ Enclosed_x_____

8. Person to contact should erosion and sediment control issues arise during land-disturbing activity:

   Name__Robert Nowakowski_____ E-mail Address_rjn@rjnenv.com_____

   Telephone_586-872-2416_____ Cell # __248-219-9228__ Fax # _586-879-0176_____

9. Landowner(s) of Record (attach accompanied page to list additional owners):

   __IAC Old Fort II, LLO_____248-455-7000_____ 248-455-7001_____
   Name Telephone Fax Number

   __28333 Telegraph Road_____ _____
   Current Mailing Address Current Street Address

   __Southfield_____MI_____48034____
   City State Zip

10. Deed Book No.__655_____ Page No.___485_____ Provide a copy of the most current deed.

Part B.

1. Person(s) or firm(s) who are financially responsible for the land-disturbing activity (Provide a comprehensive list of all responsible parties on an attached sheet):

   __c/o David Sudzina_____dsudzina@iacgroup.com_____
   Name E-mail Address

   __1506 E Main Street_____ _____
   Current Mailing Address Current Street Address

   __Old Fort _____NC____ _28762
   City State Zip
   Telephone__828-688-7601_____Fax Number_____

2. (a) If the Financially Responsible Party is not a resident of North Carolina, give name and street address of the designated North Carolina Agent:

Name	E-mail Address
Current Mailing Address	Current Street Address
City State Zip	City State Zip
Telephone	Fax Number

(b) If the Financially Responsible Party is a Partnership or other person engaging in business under an assumed name, **attach a copy of the Certificate of Assumed Name.** If the Financially Responsible Party is a Corporation, give name and street address of the Registered Agent:

CT Corporation System
Name of Registered Agent — E-mail Address

225 Hilsborough Street
Current Mailing Address

Raleigh, NC 27603
City State Zip

Telephone (919) 821-7139 — Fax Number

The above information is true and correct to the best of my knowledge and belief and was provided by me under oath (This form must be signed by the Financially Responsible Person if an individual or his attorney-in-fact, or if not an individual, by an officer, director, partner, or registered agent with the authority to execute instruments for the Financially Responsible Person). I agree to provide corrected information should there be any change in the information provided herein.

David Sudzina — Plant Manager – Old Fort
Type or print name — Title or Authority

Signature — 11/14/2012
Date

I, Sharon H. McClure, a Notary Public of the County of McDowell

State of North Carolina, hereby certify that David Sudzina appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him.

Witness my hand and notarial seal, this 14th day of November, 2012

Sharon H. McClure
Notary

Seal

My commission expires 5-1-2016

DATE 12/06/12

CHECK NO. 036627

00017169 NCDENR

DATE	INVOICE	DESCRIPTION	GROSS AMOUNT	DISCOUNT	NET AMOUNT
11/28/12	ENVIRONMENTA	999172	650.00	0.00	650.00
			650.00	0.00	650.00

THE FACE OF THIS DOCUMENT HAS MICROPRINTING AND IS NOT CASHED IF MISSING

IAC Group North America, Inc.
28333 Telegraph Road
Southfield, MI 48034

JP MORGAN CHASE
SYRACUSE, NY 13206
50-937
213

DATE 12/06/12

CHECK NO. 036627

Pay **Six Hundred Fifty Dollars And No Cents**

USD **********650.00

Security features included. Details on back.

TO THE ORDER OF

NCDENR
Asheville Regional Office
Division of Waste Mgt
2090 U.S. 70 Highway
Swannanoa, NC 28778

VOID IF NOT CASHED IN 180 DAYS

⑈036627⑈ ⑆021309379⑆60187189⑈

DEED OF TRUST, SECURITY AGREEMENT, ASSIGNMENT OF RENTS AND LEASES AND FIXTURE FILING

by and from

IAC OLD FORT II, LLC, "Trustor"

to

FIDELITY NATIONAL TITLE INSURANCE COMPANY, "Trustee"

for the benefit of

GENERAL ELECTRIC CAPITAL CORPORATION, in its capacity as Administrative Agent, "Beneficiary"

Dated as of March ___, 2008

Location:	1240 Parker Padgett Road
Municipality:	Old Fort City
County:	McDowell
State:	North Carolina

Trustor's Organizational Identification No: 4391397

THE SECURED PARTY (BENEFICIARY) DESIRES THIS FIXTURE FILING TO BE INDEXED AGAINST THE RECORD OWNER OF THE REAL ESTATE DESCRIBED HEREIN.

PREPARED BY, RECORDING REQUESTED BY,
AND WHEN RECORDED MAIL TO:
Weil, Gotshal & Manges LLP
767 Fifth Avenue
New York, New York
Attention: Samuel Zylberberg, Esq

DEED OF TRUST, SECURITY AGREEMENT, ASSIGNMENT OF RENTS AND LEASES AND FIXTURE FILING

THIS DEED OF TRUST, SECURITY AGREEMENT, ASSIGNMENT OF RENTS AND LEASES AND FIXTURE FILING (this "Deed of Trust") is dated as of March __, 2008 by IAC OLD FORT II, LLC, a Delaware limited liability company ("Trustor"), whose address is 5300 Auto Club Drive Dearborn, Michigan 48126, in favor of FIDELITY NATIONAL TITLE INSURANCE COMPANY, whose address for all purposes hereunder is 150 Fayetteville Street, Suite 1140, Raleigh, North Carolina 27601, (together with its successors and assigns, "Trustee") for the benefit of GENERAL ELECTRIC CAPITAL CORPORATION., as beneficiary, assignee and secured party, in its capacity as Administrative Agent and Collateral Agent (as defined in the Credit Agreement referred to below) (in such capacity, "Agent") (Agent, together with its successors and assigns, "Beneficiary") having an address at 201 Merritt 7, P.O. Box 5201, Norwalk, CT 06851.

RECITALS:

WHEREAS, pursuant to that certain Senior Secured Revolving Credit Agreement, dated as of January 18, 2008 (as the same may be amended, restated, supplemented or otherwise modified from time to time, the "Credit Agreement"), among INTERNATIONAL AUTOMOTIVE COMPONENTS GROUP NORTH AMERICA, INC., a Delaware corporation ("**Borrower**"), INTERNATIONAL AUTOMOTIVE COMPONENTS GROUP NORTH AMERICA, LLC, a Delaware limited liability company ("**Holdings**"), as one of the Guarantors, the Lenders and L/C Issuers party thereto from time to time, GENERAL ELECTRIC CAPITAL CORPORATION ("**GE Capital**"), as Administrative Agent and Collateral Agent for the Lenders and L/C Issuers (together with its permitted successors in such capacity, "**Administrative Agent**"), the CIT GROUP/BUSINESS CREDIT, INC., as Syndication Agent, BANK OF AMERICA, N.A. as Documentation Agent, GE CAPITAL MARKETS, INC., GOLDMAN SACHS CREDIT PARTNERS L.P. and the CIT GROUP/BUSINESS CREDIT, INC., as Joint Lead Arrangers and GE CAPITAL MARKETS, INC. and GOLDMAN SACHS CREDIT PARTNERS L.P., as Joint Bookrunners, the Lenders have severally agreed to make extensions of credit to the Borrower upon the terms and subject to the conditions set forth therein;

WHEREAS, Trustor is the owner and holder of fee simple title in and to all of the real estate located in the County of McDowell and State of North Carolina (the "State"), and more fully described in Exhibit A attached hereto (the "Land"), which Land forms a portion of the Mortgaged Property described below;

WHEREAS, the Credit Agreement evidences certain indebtedness, including, without limitation, a revolving credit facility in an aggregate amount not to exceed Two Hundred Million and No/100ths Dollars ($200,000,000.00);

WHEREAS, the Trustor guaranteed the Obligations (as defined in the Credit Agreement) of Borrower pursuant to the Guaranty and Security Agreement dated as of January 18, 2008, among Borrower, Trustor, Agent and such other parties which are from time to time a party thereto (the "Guaranty and Security Agreement");

WHEREAS, the Obligations of Trustor under the Loan Documents (as defined in the Credit Agreement), are secured, *inter alia*, by this Deed of Trust;

WHEREAS, Trustor acknowledges that it will derive substantial direct and indirect benefit from the Lenders making the loan to Borrower; and

WHEREAS, it is a condition precedent to the obligation of the Lenders to make their respective extensions of credit to the Borrower under the Credit Agreement that the Trustor shall have executed and delivered this Deed of Trust to Trustee;

NOW, THEREFORE, in consideration of the premises and to induce the Lenders and Agent to enter into the Credit Agreement and to induce the Lenders to make their respective extensions of credit to the Borrower thereunder, Trustor hereby agrees with Agent as follows:

ARTICLE 1

DEFINITIONS

Section 1.1 Definitions. Unless otherwise defined herein, terms defined in the Credit Agreement and used herein have the meanings given to them in the Credit Agreement. As used herein, the following terms shall have the following meanings:

(a) "Default Rate": The rate of interest specified in Section 2.9 of the Credit Agreement.

(b) "Indebtedness": (1) the Obligations of Borrower, and (2) all other indebtedness, obligations and liabilities now or hereafter existing of any kind of Trustor to Beneficiary or any of the Secured Parties under documents which recite that they are intended to be secured by this Deed of Trust.

(c) "Mortgaged Property": All of Trustor's right, title and interest in and to (1) the Land, together with any greater estate therein as hereafter may be acquired by Trustor, (2) all improvements now owned or hereafter acquired by Trustor, now or at any time situated, placed or constructed upon the Land (the "Improvements"; the Land and Improvements are collectively referred to as the "Premises"), (3) all materials, supplies, equipment, fixtures, apparatus and other items of personal property now owned or hereafter acquired by Trustor, now or hereafter attached to, installed in or used in connection with any of the Improvements or the Land, and water, gas, electrical, telephone, storm and sanitary sewer facilities and all other utilities whether or not situated in easements (the "Fixtures"), (4) all goods, accounts, general intangibles, instruments, documents, chattel paper and all other personal property of any kind or character, including such items of personal property as defined in the UCC (defined below), now owned or hereafter acquired by Trustor, now or hereafter affixed to, placed upon, used in connection with, arising from or otherwise related to the Premises (the "Personalty"), (5) all reserves, escrows or impounds required under the Credit Agreement and all deposit accounts maintained by Trustor with respect to the Mortgaged Property (the "Deposit Accounts"), (6) all leases, licenses, concessions, occupancy agreements or other agreements (written or oral, now or at any time in effect) which grant to any Person a possessory interest in, or the right to use, all or any part of the Mortgaged Property, together with all related security and other deposits (the "Leases"), (7) all of the rents, revenues, royalties, income, proceeds, profits, security and other types of deposits, and other benefits paid or payable by parties to the Leases for using, leasing, licensing possessing, operating from, residing in, selling or otherwise enjoying the Mortgaged Property (the "Rents"), (8) all other agreements, to the extent transferable, such as construction contracts, architects' agreements, engineers' contracts, utility contracts, maintenance agreements, management agreements, service contracts, listing agreements, guaranties, warranties, permits, licenses, certificates and entitlements in any way relating to the construction, use, occupancy, operation, maintenance, enjoyment or ownership of the Mortgaged Property (the "Property Agreements"), (9) all rights, privileges, tenements, hereditaments, rights-of-way, easements, appendages and appurtenances appertaining to the foregoing, (10) all property tax refunds payable with respect to the Mortgaged Property (the "Tax Refunds"), (11) all accessions, replacements and substitutions for any of the foregoing and all proceeds thereof (the "Proceeds"), (12) all insurance policies, unearned premiums

therefor and proceeds from such policies covering any of the above property now or hereafter acquired by Trustor (the "Insurance"), and (13) all awards, damages, remunerations, reimbursements, settlements or compensation heretofore made or hereafter to be made by any governmental authority pertaining to any condemnation or other taking (or any purchase in lieu thereof) of all or any portion of the Land, Improvements, Fixtures or Personalty (the "Condemnation Awards"). As used in this Deed of Trust, the term "Mortgaged Property" shall mean all or, where the context permits or requires, any portion of the above or any interest therein but shall exclude the Excluded Property (as defined in the Guaranty and Security Agreement).

(d) "UCC": the Uniform Commercial Code as from time to time in effect in the State of New York; *provided, however*, that, in the event that, by reason of mandatory provisions of law, any of the attachment, perfection or priority of the Administrative Agent's security interest in any Mortgaged Property is governed by the Uniform Commercial Code as in effect in a jurisdiction other than the State of New York, the term "UCC" shall mean the Uniform Commercial Code as in effect in such other jurisdiction for purposes of the provisions hereof relating to such attachment, perfection or priority and for purposes of definitions related to such provisions.

ARTICLE 2

GRANT

Section 2.1 Grant. To secure the full, prompt and complete payment and performance when due (whether at stated maturity, by acceleration or otherwise) of the Indebtedness, Trustor GRANTS, BARGAINS, ASSIGNS, SELLS, CONVEYS and CONFIRMS, to Trustee and its successors and assigns, for the benefit of Beneficiary and its successors and assigns (for the benefit of the Lenders) all of the Mortgaged Property, subject, however, only to Permitted Liens. To have and to hold the Mortgaged Property and all parts thereof unto Trustee, its successors and assigns, forever upon the trust, terms and conditions contained herein.

ARTICLE 3

WARRANTIES, REPRESENTATIONS AND COVENANTS

Trustor warrants, represents and covenants to Beneficiary as follows:

Section 3.1 Title to Mortgaged Property and Lien of this Instrument. Trustor owns good and marketable title to the Mortgaged Property free and clear of any liens, claims or interests, except Permitted Liens. This Deed of Trust creates valid, enforceable first priority lien and security interests against the Mortgaged Property subject only to Permitted Liens.

Section 3.2 First Lien Status. Trustor shall preserve and protect the first lien and security interest status of this Deed of Trust and the other Loan Documents. If any lien or security interest other than a Permitted Lien is asserted against the Mortgaged Property, Trustor shall promptly, and at its expense, (a) give Beneficiary a detailed written notice of such lien or security interest (including origin, amount and other terms), and (b) pay the underlying claim in full or take such other action so as to cause it to be released or contest the same in compliance with the requirements of the Credit Agreement.

Section 3.3 Payment and Performance. Trustor shall pay and perform the Indebtedness in full when the Indebtedness is required to be paid or performed in the manner provided in the Credit Agreement and any note secured hereby.

Section 3.4 Replacement of Fixtures and Personalty. Trustor shall not, without the prior written consent of Beneficiary, permit any of the Fixtures or Personalty owned or leased by Trustor to be removed at any time from the Land or Improvements, unless the removed item is removed temporarily for maintenance and repair or is permitted to be removed pursuant to the terms of the Credit Agreement.

Section 3.5 Inspection. Subject to Section 7.7 of the Credit Agreement, Trustor shall from time to time permit the Administrative Agent and the Lenders, or any agents or representatives thereof, within two Business Days after written notification of the same (except that during the continuance of an Event of Default, no such notice shall be required) to (a) examine and make copies of and abstracts from the records and books of account of Trustor and (b) visit the Mortgaged Property; provided, however, any agent or representative of Trustor shall have the right but not the obligation to accompany such visits and examinations and the same shall be performed in a manner as to minimize the disruption to the use and operation of the Mortgaged Property.

Section 3.6 Insurance: Condemnation Awards and Insurance Proceeds.

(a) Insurance. Trustor shall maintain or cause to be maintained, with financially sound and reputable insurers, insurance with respect to the Mortgaged Property against loss or damage of the kinds customarily carried or maintained under similar circumstances by corporations of established reputation engaged in similar businesses. Each such policy of insurance shall name Beneficiary as the loss payee (or, in the case of liability insurance, an additional insured) thereunder for the ratable benefit of the Secured Parties, and shall provide for at least 30 days' prior written notice of any material modification or cancellation of such policy. In addition to the foregoing, if any portion of the Mortgaged Property is located in an area identified by the Federal Emergency Management Agency as an area having special flood hazards and in which flood insurance has been made available under the National Flood Insurance Act of 1968 (and any amendment or successor act thereto), then Trustor shall maintain, or cause to be maintained, with a sound and reputable insurer, flood insurance in an amount sufficient to comply with all applicable rules and regulations promulgated pursuant to such Act, and as otherwise provided in Section 7.5 of the Credit Agreement.

(b) Condemnation Awards. Trustor assigns all Condemnation Awards to Beneficiary and authorizes Beneficiary to collect and receive such Condemnation Awards and to give proper receipts and acquittances therefor, and to apply such Condemnation Awards in accordance with Section 2.12(b) of the Credit Agreement.

(c) Insurance Proceeds. Trustor assigns to Beneficiary all proceeds of any insurance policies insuring against loss or damage to the Mortgaged Property. Trustor authorizes Beneficiary to collect and receive such proceeds and authorizes and directs the issuer of each of such insurance policies to make payment for all such losses directly to Beneficiary, instead of to Trustor and Beneficiary jointly, and subject to Section 2.8 of the Credit Agreement, to apply such insurance proceeds in accordance with the provisions of the Credit Agreement.

Section 3.7 Other Covenants. All of the covenants in the Credit Agreement are incorporated herein by reference and, together with covenants in this Article 3, shall be covenants running with the Land.

ARTICLE 4

DEFAULT AND FORECLOSURE

Section 4.1 Remedies. Upon the occurrence and during the continuance of an Event of Default, Beneficiary may, at Beneficiary's election exercise any or all of the following rights, remedies and recourses:

(a) Acceleration. Subject to any provisions of the Loan Documents providing for the automatic acceleration of the Indebtedness upon the occurrence of certain Events of Default, declare the Indebtedness to be immediately due and payable, without further notice, presentment, protest, notice of intent to accelerate, notice of acceleration, demand or action of any nature whatsoever (each of which hereby is expressly waived by Trustor), whereupon the same shall become immediately due and payable.

(b) Entry on Mortgaged Property. Enter the Mortgaged Property and take exclusive possession thereof and of all books, records and accounts relating thereto or located thereon. If Trustor remains in possession of the Mortgaged Property following the occurrence and during the continuance of an Event of Default and without Beneficiary's prior written consent, Beneficiary may invoke any legal remedies to dispossess Trustor.

(c) Operation of Mortgaged Property. Hold, lease, develop, manage, operate or otherwise use the Mortgaged Property upon such terms and conditions as Beneficiary may deem reasonable under the circumstances (making such repairs, alterations, additions and improvements and taking other actions, from time to time, as Beneficiary deems necessary or desirable), and apply all Rents and other amounts collected in connection therewith in accordance with the provisions of Section 4.7.

(d) Foreclosure and Sale. The Trustee shall, upon being requested to do so by Beneficiary, institute proceedings for the complete foreclosure of this Deed of Trust, either by judicial action or by power of sale, in which case the Mortgaged Property may be sold by the Trustee at public or private foreclosure sale in accordance with applicable law for cash or credit in one or more parcels as Beneficiary or Trustee may determine. With respect to any notices required or permitted under the UCC, Trustor agrees that fifteen (15) days' prior written notice shall be deemed commercially reasonable. Beneficiary or any of the Secured Parties may be a purchaser at such sale. If Beneficiary is the highest bidder, Beneficiary may credit the portion of the purchase price that would be distributed to Beneficiary against the Indebtedness in lieu of paying cash. In the event this Deed of Trust is foreclosed by judicial action, appraisement of the Mortgaged Property is waived. The proceeds of the sale shall be applied pursuant to the terms of Section 4.7 hereof after the Trustee retains Trustee's commission, together with attorneys' fees incurred by the Trustee in such proceeding, and after paying the costs of sale, including, but not limited to, costs of collection, taxes, assessments, costs of recording, service fees and incidental expenditures, other sums expended by Beneficiary or Trustee according to the provisions hereof and otherwise as required by the then existing law relating to foreclosures and the expense, if any, of obtaining possession.

(e) Receiver. Make application to a court of competent jurisdiction for, and obtain from such court as a matter of strict right and without notice to Trustor or regard to the adequacy of the Mortgaged Property for the repayment of the Indebtedness, the appointment of a receiver of the Mortgaged Property, and Trustor irrevocably consents to such appointment. Any such receiver shall have all the usual powers and duties of receivers in similar cases, including the full power to rent, maintain and otherwise operate the Mortgaged Property upon such terms as may be approved by the court, and shall apply such Rents in accordance with the provisions of Section 4.7.

(f) Other. Exercise all other rights, remedies and recourses granted under the Loan Documents or otherwise available at law or in equity.

Section 4.2 Separate Sales. The Mortgaged Property may be sold in one or more parcels and in such manner and order as Beneficiary or Trustee in their sole discretion may elect; the right of sale arising out of any Event of Default shall not be exhausted by any one or more sales.

Section 4.3 Remedies Cumulative, Concurrent and Nonexclusive. Beneficiary and the Secured Parties shall have all rights, remedies and recourses granted in the Loan Documents and available at law or equity (including the UCC and the remedy of specific performance), which rights (a) shall be cumulative and concurrent, (b) may be pursued separately, successively or concurrently against Trustor or others obligated under the Loan Documents, or against the Mortgaged Property, or against any one or more of them, at the sole discretion of Beneficiary or the Secured Parties, as the case may be, (c) may be exercised as often as occasion therefor shall arise, and the exercise or failure to exercise any of them shall not be construed as a waiver or release thereof or of any other right, remedy or recourse, and (d) are intended to be, and shall be, nonexclusive. No action by Beneficiary or the Secured Parties in the enforcement of any rights, remedies or recourses under the Loan Documents or otherwise at law or equity shall be deemed to cure any Event of Default.

Section 4.4 Release of and Resort to Collateral. Beneficiary may release, regardless of consideration and without the necessity for any notice to or consent by the holder of any subordinate lien on the Mortgaged Property, any part of the Mortgaged Property without, as to the remainder, in any way impairing, affecting, subordinating or releasing the lien or security interest created in or evidenced by the Loan Documents or their status as a first and prior lien and security interest in and to the Mortgaged Property. For payment of the Indebtedness, Beneficiary may resort to any other security in such order and manner as Beneficiary may elect.

Section 4.5 Waiver of Redemption, Notice and Marshalling of Assets. To the fullest extent permitted by law, Trustor hereby irrevocably and unconditionally waives and releases (a) all benefit that might accrue to Trustor by virtue of any present or future statute of limitations or law or judicial decision exempting the Mortgaged Property from attachment, levy or sale on execution or providing for any stay of execution, exemption from civil process, redemption or extension of time for payment, (b) all notices of any Event of Default or of any election by Beneficiary to exercise or the actual exercise of any right, remedy or recourse provided for under the Loan Documents, (c) any right to a marshalling of assets or a sale in inverse order of alienation, and (d) all rights that Trustor may have under N.C.G.S Section 26-7 et seq.

Section 4.6 Discontinuance of Proceedings. If Beneficiary or the Secured Parties shall have proceeded to invoke any right, remedy or recourse permitted under the Loan Documents and shall thereafter elect to discontinue or abandon it for any reason, Beneficiary or the Secured Parties, as the case may be, shall have the unqualified right to do so and, in such an event, Trustor, Beneficiary and the Secured Parties shall be restored to their former positions with respect to the Indebtedness, the Loan Documents, the Mortgaged Property and otherwise, and the rights, remedies, recourses and powers of Beneficiary and the Secured Parties shall continue as if the right, remedy or recourse had never been invoked, but no such discontinuance or abandonment shall waive any Event of Default which may then exist or the right of Beneficiary or the Secured Parties thereafter to exercise any right, remedy or recourse under the Loan Documents for such Event of Default.

Section 4.7 Application of Proceeds. Subject to Section 4.1(d) of this Deed of Trust, the proceeds of any sale of, and the Rents and other amounts generated by the holding, leasing,

management, operation or other use of the Mortgaged Property, shall be applied by Beneficiary (or the receiver, if one is appointed) as set forth in the Credit Agreement.

Section 4.8 Occupancy After Foreclosure. Any sale of the Mortgaged Property or any part thereof in accordance with Section 4.1(d) will divest all right, title and interest of Trustor in and to the property sold. Subject to applicable law, any purchaser at a foreclosure sale will receive immediate possession of the property purchased. If Trustor retains possession of such property or any part thereof subsequent to such sale, Trustor will be considered a tenant at sufferance of the purchaser, and will, if Trustor remains in possession after demand to remove, be subject to eviction and removal, forcible or otherwise, pursuant to applicable law.

Section 4.9 Additional Advances and Disbursements: Costs of Enforcement.

(a) Upon the occurrence and during the continuance of any Event of Default, Beneficiary and each of the Secured Parties shall have the right, but not the obligation, to cure such Event of Default in the name and on behalf of Trustor. All sums advanced and expenses incurred at any time by Beneficiary or any Secured Party under this Section 4.9, or otherwise under this Deed of Trust or any of the other Loan Documents or applicable law, shall bear interest from the date that such sum is advanced or expense incurred, to and including the date of reimbursement, computed at the Default Rate, and all such sums, together with interest thereon, shall be secured by this Deed of Trust.

(b) Trustor shall pay all expenses actually incurred (including reasonable attorneys' fees and expenses) of or incidental to the perfection and enforcement of this Deed of Trust and the other Loan Documents, or the enforcement, compromise or settlement of the Indebtedness or any claim under this Deed of Trust and the other Loan Documents, and for the curing thereof, or for defending or asserting the rights and claims of Beneficiary in respect thereof, by litigation or otherwise including all costs and expenses of Trustee including, without limitation, attorneys' fees and Trustee's commission pursuant to Section 8.1 hereof.

Section 4.10 No Beneficiary in Possession. Neither the enforcement of any of the remedies under this Article 4, the assignment of the Rents and Leases under Article 5, the security interests under Article 6, nor any other remedies afforded to Beneficiary under the Loan Documents, at law or in equity shall cause Beneficiary or any Secured Party to be deemed or construed to be a Beneficiary in possession of the Mortgaged Property, to obligate Beneficiary or any Secured Party to lease the Mortgaged Property or attempt to do so, or to take any action, incur any expense, or perform or discharge any obligation, duty or liability whatsoever under any of the Leases or otherwise.

ARTICLE 5

ASSIGNMENT OF RENTS AND LEASES

Section 5.1 Assignment. In furtherance of and in addition to the assignment made by Trustor in Section 2.1 of this Deed of Trust, Trustor hereby absolutely, unconditionally and irrevocably assigns, sells, transfers and conveys to Beneficiary all of its right, title and interest in and to all Leases, whether now existing or hereafter entered into and all subleases, extensions, amendments, modifications and renewals thereof and all guaranties thereof, and all of its right, title and interest in and to all Rents. This assignment is an absolute assignment and not an assignment for additional security only. So long as no Event of Default shall have occurred and be continuing, Trustor shall have a revocable license from Beneficiary to exercise all rights extended to the landlord under the Leases, including the right to receive and collect all Rents and to hold the Rents for use in the payment and performance of the Indebtedness and to otherwise use the same. The foregoing license is granted subject to the conditional limitation that

no Event of Default shall have occurred and be continuing. Upon the occurrence and during the continuance of an Event of Default, whether or not legal proceedings have commenced, and without regard to waste, adequacy of security for the Indebtedness or solvency of Trustor, the license herein granted shall automatically expire and terminate, without notice to Trustor by Beneficiary (any such notice being hereby expressly waived by Trustor to the extent permitted by applicable law).

Section 5.2 Perfection Upon Recordation. Trustor acknowledges that Beneficiary has taken all actions necessary to obtain, and that upon recordation of this Deed of Trust Beneficiary shall have, to the extent permitted under applicable law, a valid and fully perfected, first priority, present assignment of the Rents arising out of the Leases and all security for such Leases. Trustor acknowledges and agrees that upon recordation of this Deed of Trust, Beneficiary's interest in the Rents shall be deemed to be fully perfected, "choate" and enforced as to Trustor and to the extent permitted under applicable law, all third parties, including, without limitation, any subsequently appointed trustee in any case under Title 11 of the United States Code (the "Bankruptcy Code"), without the necessity of commencing a foreclosure action with respect to this Deed of Trust, making formal demand for the Rents, obtaining the appointment of a receiver or taking any other affirmative action.

Section 5.3 Bankruptcy Provisions. Without limitation of the absolute nature of the assignment of the Rents hereunder, Trustor and Beneficiary agree that (a) this Deed of Trust shall constitute a "security agreement" for purposes of Section 552(b) of the Bankruptcy Code, (b) the security interest created by this Deed of Trust extends to property of Trustor acquired before the commencement of a case in bankruptcy and to all amounts paid as Rents and (c) such security interest shall extend to all Rents acquired by the estate after the commencement of any case in bankruptcy.

Section 5.4 No Merger of Estates. So long as part of the Indebtedness remain unpaid and undischarged, the fee and leasehold estates to the Mortgaged Property shall not merge, but shall remain separate and distinct, notwithstanding the union of such estates either in Trustor, Beneficiary, any tenant or any third party by purchase or otherwise.

ARTICLE 6

SECURITY AGREEMENT

Section 6.1 Security Interest. This Deed of Trust constitutes a "security agreement" on personal property within the meaning of the UCC and other applicable law and with respect to the Personalty, Fixtures, Leases, Rents, Deposit Accounts, Property Agreements, Tax Refunds, Proceeds, Insurance and Condemnation Awards. To this end, Trustor grants to Beneficiary a first and prior security interest in the Personalty, Fixtures, Leases, Rents, Deposit Accounts, Property Agreements, Tax Refunds, Proceeds, Insurance, Condemnation Awards and all other Mortgaged Property which is personal property and all proceeds and products thereof to secure the payment and performance of the Indebtedness, and agrees that Beneficiary shall have all the rights and remedies of a secured party under the UCC with respect to such property. Any notice of sale, disposition or other intended action by Beneficiary with respect to the Personalty, Fixtures, Leases, Rents, Deposit Accounts, Property Agreements, Tax Refunds, Proceeds, Insurance and Condemnation Awards sent to Trustor at least fifteen (15) days prior to any action under the UCC shall constitute reasonable notice to Trustor.

Section 6.2 Financing Statements. Trustor shall prepare and deliver to Beneficiary such financing statements, and shall execute and deliver to Beneficiary such documents, instruments and further assurances, in each case in form and substance satisfactory to Beneficiary, as Beneficiary may, from time to time, reasonably consider necessary to create, perfect and preserve Beneficiary's security interest hereunder. Trustor hereby irrevocably authorizes Beneficiary to cause financing statements

(whether or not signed by Trustor) and any such documents, instruments and assurances to be recorded and filed, at such times and places as may be required or permitted by law to so create, perfect and preserve such security interest. Trustor's jurisdiction of organization is set forth in the introductory paragraph of this Deed of Trust. After the date of this Deed of Trust, Trustor shall not change its name, type of organization, organizational identification number (if any), jurisdiction of organization or location (within the meaning of the UCC) without giving at least thirty (30) days' prior written notice to Beneficiary.

Section 6.3 Fixture Filing. This Deed of Trust shall also constitute a "fixture filing" for the purposes of the UCC against all of the Mortgaged Property which is or is to become fixtures together with all proceeds and products thereof. The information provided in this Section 6.3 is provided so that this Deed of Trust shall comply with the requirements of the UCC for a Deed of Trust instrument to be filed as a financing statement. Trustor is the "Debtor" and its name and mailing address are set forth in the preamble of this Deed of Trust immediately preceding Article 1. Beneficiary is the "Secured Party" and its name and mailing address from which information concerning the security interest granted herein may be obtained are also set forth in the preamble of this Deed of Trust immediately preceding Article 1. A statement describing the portion of the Mortgaged Property comprising the fixtures hereby secured is set forth in Section 1.1(c) of this Deed of Trust. The record owner of the Mortgaged Property is Trustor. The employer identification number of Debtor (Trustor) and the organizational identification number of Debtor (Trustor) are set forth on the cover page hereof.

ARTICLE 7

MISCELLANEOUS

Section 7.1 Notices. Any notice required or permitted to be given under this Deed of Trust shall be given in accordance with Section 11.11 of the Credit Agreement.

Section 7.2 Covenants Running with the Land. All obligations of Trustor contained in this Deed of Trust are intended by Trustor and Beneficiary to be, and shall be construed as, covenants running with the Mortgaged Property. As used herein, "Trustor" shall refer to the party named in the first paragraph of this Deed of Trust and to any subsequent owner of all or any portion of the Mortgaged Property. All Persons who may have or acquire an interest in the Mortgaged Property shall be deemed to have notice of, and be bound by, the terms of the Credit Agreement and the other Loan Documents; however, no such party shall be entitled to any rights thereunder without the prior written consent of Beneficiary.

Section 7.3 Attorney-in-Fact. Trustor hereby irrevocably appoints Beneficiary and its successors and assigns, as its attorney-in-fact, which agency is coupled with an interest and with full power of substitution, (a) to execute and/or record any notices of completion, cessation of labor or any other notices that Beneficiary deems appropriate to protect Beneficiary's interest, if Trustor shall fail to do so within fifteen (15) days after written request by Beneficiary, (b) upon the issuance of a deed pursuant to the foreclosure of this Deed of Trust or the delivery of a deed in lieu of foreclosure, to execute all instruments of assignment, conveyance or further assurance with respect to the Leases, Rents, Deposit Accounts, Property Agreements, Tax Refunds, Proceeds, Insurance and Condemnation Awards in favor of the grantee of any such deed and as may be necessary or desirable for such purpose, (c) to prepare and file or record financing statements and continuation statements, and to prepare, execute and file or record applications for registration and like papers necessary to create, perfect or preserve Beneficiary's security interests and rights in or to any of the Mortgaged Property, and (d) after the occurrence and during the continuance of any Event of Default, to perform any obligation of Trustor hereunder, however: (1) Beneficiary shall not under any circumstances be obligated to perform any obligation of Trustor; (2) any

sums advanced by Beneficiary in such performance shall be added to and included in the Indebtedness and shall bear interest at the highest rate at which interest is then computed on any portion of the Indebtedness; (3) Beneficiary as such attorney-in-fact shall only be accountable for such funds as are actually received by Beneficiary; and (4) Beneficiary shall not be liable to Trustor or any other person or entity for any failure to take any action which it is empowered to take under this Section 7.3.

Section 7.4 Time of Essence. Unless otherwise provided in the Credit Agreement, time is of the essence in this Deed of Trust.

Section 7.5 Successors and Assigns. This Deed of Trust shall be binding upon and inure to the benefit of Beneficiary, the Secured Parties, Trustee, Trustor and their respective successors and assigns. Except as permitted under the Credit Agreement, Trustor shall not, without the prior written consent of Beneficiary, assign any rights, duties or obligations hereunder.

Section 7.6 No Waiver. Any failure by Beneficiary or the Secured Parties to insist upon strict performance of any of the terms, provisions or conditions of the Loan Documents shall not be deemed to be a waiver of same, and Beneficiary and the Secured Parties shall each have the right at any time to insist upon strict performance of all of such terms, provisions and conditions.

Section 7.7 Credit Agreement. If any conflict or inconsistency exists between this Deed of Trust and the Credit Agreement, the Credit Agreement shall govern.

Section 7.8 Release or Reconveyance. Upon payment and performance in full of the Indebtedness or upon a sale or other disposition of the Mortgaged Property permitted by the Credit Agreement, Beneficiary, at Trustor's request and expense or as otherwise required by applicable Requirements of Law, shall release the liens and security interests created by this Deed of Trust.

Section 7.9 Waiver of Stay, Moratorium and Similar Rights. Trustor agrees, to the full extent that it may lawfully do so, that it will not at any time insist upon or plead or in any way take advantage of any stay, marshalling of assets, extension, redemption or moratorium law including, without limitation, all rights that Trustor may have under N.C.G.S. Section 26.7 et seq. now or hereafter in force and effect so as to prevent or hinder the enforcement of the provisions of this Deed of Trust or the Indebtedness secured hereby, or any agreement between Trustor and Beneficiary or any rights or remedies of Beneficiary, or the Secured Parties.

Section 7.10 Applicable Law. The provisions of this Deed of Trust regarding the creation, perfection and enforcement of the liens and security interests herein granted shall be governed by and construed under the laws of the State. All other provisions of this Deed of Trust shall be governed by the laws of the State of New York (including, without limitation, Section 5-1401 of the General Obligations Law of the State of New York).

Section 7.11 Headings. The Article, Section and Subsection titles hereof are inserted for convenience of reference only and shall in no way alter, modify or define, or be used in construing, the text of such Articles, Sections or Subsections.

Section 7.12 Severability. If any provision of this Deed of Trust shall be held by any court of competent jurisdiction to be unlawful, void or unenforceable for any reason, such provision shall be deemed severable from and shall in no way effect the enforceability and validity of the remaining provisions of this Deed of Trust.

Section 7.13 Entire Agreement. This Deed of Trust and the other Loan Documents embody the entire agreement and understanding between Trustor and Beneficiary and supersede all prior agreements and understandings between such parties relating to the subject matter hereof and thereof. Accordingly, the Loan Documents may not be contradicted by evidence of prior, contemporaneous or subsequent oral agreements of the parties. There are no unwritten oral agreements between the parties.

Section 7.14 Beneficiary as Agent: Successor Agents.

(a) Agent has been appointed to act as Agent hereunder by the Secured Parties. Agent shall have the right hereunder to make demands, to give notices, to exercise or refrain from exercising any rights, and to take or refrain from taking any action (including, without limitation, the release or substitution of the Mortgaged Property) in accordance with the terms of the Credit Agreement, and this Deed of Trust. Trustor and all other persons shall be entitled to rely on releases, waivers, consents, approvals, notifications and other acts of Agent, without inquiry into the existence of required consents or approvals of the Secured Parties therefor.

(b) Beneficiary shall at all times be the same Person that is the Administrative Agent under the Credit Agreement. Written notice of resignation by Agent pursuant to the Credit Agreement shall also constitute notice of resignation as Agent under this Deed of Trust. Removal of Agent pursuant to any provision of the Credit Agreement shall also constitute removal as Agent under this Deed of Trust. Appointment of a successor Agent pursuant to the Credit Agreement shall also constitute appointment of a successor Agent under this Deed of Trust. Upon the acceptance of any appointment as Agent by a successor Agent under the Credit Agreement, that successor Agent shall thereupon succeed to and become vested with all the rights, powers, privileges and duties of the retiring or removed Agent as the Beneficiary under this Deed of Trust, and the retiring or removed Agent shall promptly (i) assign and transfer to such successor Agent all of its right, title and interest in and to this Deed of Trust and the Mortgaged Property, and (ii) execute and deliver to such successor Agent such assignments and amendments and take such other actions, as may be necessary or appropriate in connection with the assignment to such successor Agent of the liens and security interests created hereunder, whereupon such retiring or removed Agent shall be discharged from its duties and obligations under this Deed of Trust. After any retiring or removed Agent's resignation or removal hereunder as Agent, the provisions of this Deed of Trust and the Credit Agreement shall inure to its benefit as to any actions taken or omitted to be taken by it under this Deed of Trust while it was the Administrative Agent hereunder.

Section 7.15 No Oral Change. No modification, amendment, extension, discharge, termination or waiver of any provision of this Deed of Trust, nor consent by Beneficiary to any departure therefrom, shall in any event be effective unless the same shall be in a writing signed by the party against whom enforcement is sought, and then such waiver or consent shall be effective only in the specific instance, and for the purpose, for which given. Except as otherwise expressly provided herein, no notice to or demand on Trustor shall entitle Trustor to any other or future notice or demand in the same, similar or other circumstances.

Section 7.16 Waiver of Jury Trial. TO THE EXTENT PERMITTED BY APPLICABLE LAW, EACH OF THE BENEFICIARY AND TRUSTOR IRREVOCABLY WAIVES TRIAL BY JURY IN ANY ACTION OR PROCEEDING WITH RESPECT TO THIS DEED OF TRUST OR ANY OTHER CREDIT DOCUMENT.

ARTICLE 8

TRUSTEE

Section 8.1 Trustee's Powers and Liabilities.

(a) Trustee, by acceptance hereof, covenants faithfully to perform and fulfill the trusts herein created, being liable, however, only for gross negligence, bad faith or willful misconduct, and hereby waives any statutory fee and agrees to accept reasonable compensation, in lieu thereof, for any services rendered by it in accordance with the terms hereof for all partial and total foreclosure sales regardless of whether such sales are completed. All authorities, powers and discretions given in this Deed of Trust to Trustee and/or, Beneficiary may be exercised by either, without the other, with the same effect as if exercised jointly.

(b) Trustee may resign at any time upon giving 30 days' notice in writing to Beneficiary, at which time Beneficiary shall appoint a substitute trustee by written instrument duly recorded in the county where the Premises is located.

(c) Beneficiary may remove Trustee at any time or from time to time and select a successor trustee. In the event of the death, removal, resignation, refusal to act, inability to act or absence of Trustee from the state in which the Premises is located, or in its sole discretion for any reason whatsoever, Beneficiary may, upon notice to Trustor and without specifying the reason therefore and without applying to any court, select and appoint a successor trustee, and all powers, rights, duties and authority of the former Trustee, as aforesaid, shall thereupon become vested in successor. Such substitute trustee shall not be required to give bond for the faithful performance of his duties unless required by Beneficiary. Such substitute trustee shall be appointed by written instrument duly recorded in the county where the Premises is located. Trustor hereby ratifies and confirms all acts which the herein named Trustee, or his successor or successors in this trust, shall do lawfully by virtue hereof. Trustor hereby agrees, on behalf of itself and its heirs, executors, administrators and assigns, that the recitals contained in any deed or deeds executed in due form by any trustee or substitute trustee, acting under the provisions of this instrument, shall be prima facie evidence of the facts recited, and that it shall not be necessary to prove in any court, otherwise than by such recitals, the existence of the facts essential to authorize the execution and delivery of such deed or deeds and the passing of title thereby.

(d) Trustee shall not be required to see that this Deed of Trust is recorded, nor liable for its validity or its priority as a first deed of trust, or otherwise, nor shall Trustee be answerable or responsible for performance or observance of the agreements imposed upon Trustor or Beneficiary by this Deed of Trust or any other agreement. Trustee, as well as Beneficiary, shall have authority in their respective discretion to employ agents and attorneys in the execution of this trust and to protect the interest of Beneficiary hereunder, and they shall be compensated and all expenses relating to the employment of such agents and/or attorneys, including expenses of litigation, shall be paid out of the proceeds of the sale be had, but if no such sale be had, all sums so paid out shall be paid by Trustor including, without limitation, attorneys' fees, all expenses incident to advertisement or notice of any foreclosure sale, all court costs, and all expenses incident to the administration of the Trustee's obligations hereunder, any foreclosure proceedings brought under this Deed of Trust, or otherwise in connection with such sale, and the Trustee's commission.

(e) At any time, or from time to time, without liability therefor and with 10 days' prior written notice to Trustor, upon written request of Beneficiary and without affecting the effect of this Deed of Trust upon the remainder of the Mortgaged Property, Trustee may (i) reconvey any part of the Mortgaged Property, (ii) consent in writing to the making of any map or plat thereof, so long as Trustor has consented thereto, (iii) join in granting any easement thereon, so long as Trustor has consented thereto or (iv) join in any extension agreement or any agreement subordinating the Lien or charge hereof.

ARTICLE 9

FUTURE ADVANCES

9.1 Future Advances. It is the intention of the parties hereto that this Deed of Trust is made and executed to comply with the provisions of N.C.G.S. Section 45-67 et seq., and shall secure any and all present and future Indebtedness which Trustor now or may hereafter owe (but in no event incurred more than fifteen (15) years after the date hereof), including without limitation, any future loans and advances made pursuant to the Loan Documents, up to a maximum aggregate amount of principal indebtedness outstanding at any one time of $200,000,000. The amount of present Indebtedness of Trustor secured hereby is in the sum of $200,000,000 as of the date hereof, and the amount of all present and future Indebtedness of Trustor secured hereby is in the sum of $200,000,000 plus interest, costs and advances made by Beneficiary or any of the Lenders to protect or preserve the Mortgaged Property or the lien hereof on the Mortgaged Property, or for taxes, assessments or insurance premiums as herein provided. Pursuant to N.C.G.S. Section 45-68(2), Trustor agrees that at the time each Indebtedness is incurred, it shall not be necessary for each such Indebtedness to be evidenced by the Loan Documents or any other written instrument or notation signed by Trustor and stipulating that such Indebtedness is secured by this Deed of Trust.

Trustor hereby acknowledges receipt of a true copy of this Deed of Trust.

[The remainder of this page has been intentionally left blank]

IN WITNESS WHEREOF, Trustor has on the date set forth in the acknowledgement hereto, effective as of the date first above written, caused this instrument to be duly EXECUTED AND DELIVERED by authority duly given.

TRUSTOR:

IAC OLD FORT II, LLC,
a Delaware limited liability company

By: _____
Name: JEFFREY VANNESTE
Title: VICE PRESIDENT
(a manager as contemplated by NCGS Section 57C-3-25(c))

State of Michigan

Wayne County

I certify that the following person(s) personally appeared before me this day, each acknowledging to me that he or she signed the foregoing document: Jeffrey Connestee

_____. (name)

Date: 3/14/08

Susan M Brey

Print Name: SUSAN M. BREY

Notary Public

(Official Seal)

My Commission expires: 12/24/13

SUSAN M BREY
Notary Public - Michigan
Wayne County
My Commission Expires Dec 24, 2013
Acting in the County of _____

EXHIBIT A

DESCRIPTION OF THE OWNED LAND

[See Attached Page(s) For Legal Description]

Filed: 15th day of March, 1996
@ 1:42 AM/PM
Patricia A. Reel
Register of Deeds
McDowell County, N.C.

505 923

(Excise Tax) (Recording Time, Book and Page)

NORTH CAROLINA EASEMENT DEED

Mail after recording to:

This instrument was prepared by: DAMERON & BURGIN, Attorneys at Law, Marion, NC

THIS EASEMENT DEED made this 28th day of February, 1996, by and between COLLINS & AIKMAN PRODUCTS, CO., a Delaware Corporation; GRANTOR and the TOWN OF OLD FORT; GRANTEE.

The designation of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, unto the Grantee an easement in the City of Old Fort, Old Fort Township, McDowell County, North Carolina and more particularly described as follows:

The perpetual right and easement of ingress, egress and regress (including the right to cross said easement with heavy equipment and machinery and the right to maintain said easement) over and upon the course of a sixteen-foot wide paved roadway which presently exists upon the lands of the Grantor described in Deed Book 104, Page 512, of the McDowell County Public Registry. Said roadway, as it presently exists, is the Westernmost paved access road located on the Grantor's tract referred to above. Said roadway intersects with the paved surface of U.S. Highway 70 near the North Westernmost corner of the Grantor's tract referred to above, and extends from said intersection, along the Western side and around the rear (or Southern) side of Grantor's plant building, a distance of approximately .6 mile to the Town of Old Fort's Wastewater Treatment Plant, which Water Treatment Plant is located on a tract described in Deed Book 289, Page 811 (Tracts One, Two and Three); Deed Book 196, Page 33; and Deed Book 332, Page 280, of the McDowell County Public Registry.

PROVIDED HOWEVER, that the Grantee, by its acceptance of this Deed, agrees to repair any portion of the roadway or property of the Grantor which is damaged by Grantee or its agents.

PROVIDED FURTHER, that if the Grantor finds it necessary to relocate all or a portion of the roadway as it currently exists, the Grantor shall relocate the roadway and Grantee shall have the right to use the road in its relocated state and course. The Grantor shall relocate the roadway in such a course as the roadway shall continue to provide access to the wastewater treatment facilities.

***

TO HAVE AND TO HOLD the rights and easements hereby granted to the respective Grantees and their successors in title forever; it being agreed that the rights and easement hereby granted are for the common use of, are appurtenant to and run with the property currently owned by Grantees, which land is adjacent to and borders property currently owned by Grantors and which land is more particularly described in Deed Book 289 Page 811, tracts 1, 2, and 3; Deed Book 196, Page 33; and Deed Book 332, Page 280, McDowell County Public Registry, and which descriptions are hereby incorporated by reference as if fully set forth herein.

***PROVIDED FURTHER, that if the Grantee ceases to use its above-described tracts for the purpose of municipal wells or municipal wastewater treatment, the rights granted in this Easement Deed shall terminate and the easement herein described shall immediately revert to and revest in the Grantor, its successors or assigns.

505 324

And the Grantor covenants with the Grantee, that Grantor is seized of the premises in fee simple, has the right to convey this easement, that title is marketable and free and clear of all encumbrances, and that Grantor will warrant and defend the title against the lawful claims of all persons whomsoever except for the exceptions hereinafter stated. Title to the property hereinabove described is subject to the following exceptions:

IN WITNESS WHEREOF, the Grantor has hereunto set his hand and seal, or if corporate, has caused this instrument to be signed in its corporate name by its duly authorized officers and its seal to be hereunto affixed by authority of its Board of Directors, the day and year first above written.

COLLINS & AIKMAN PRODUCTS, CO., a Delawart Corporation _____ _____(Seal)
(Corporate Name)

By: Ronald T. [illegible] _____(Seal)
Vice President

_____(Seal)

ATTEST: Bradley D. Murchison _____(Seal)
Asst. Secretary

(Corporate Seal)

STATE OF NORTH CAROLINA
COUNTY OF MECKLENBURG

I, Karen M. Allen, a notary public, certify that Bradley D. Murchison, personally came before me this day and acknowledged that (s)he is Asst. Secretary, of COLLINS & AIKMAN PRODUCTS, CO., a Delaware corporation, and that by authority duly given and as the act of the Corporation, the foregoing instrument was signed in its name by its Vice President, sealed with its corporate seal, and attested by him/her as its Asst. Secretary.

Witness my hand and notarial seal, this the 8 day of March, 1996.

My Commission Expires: Jan 31 1998

Karen M. Allen
Notary Public

The foregoing certificate(s) of Karen M. Allen, Notary Public

is/are certified to be correct. This instrument and this certificate are duly registered at the date and time and in the Book and Page shown on the first page hereof.

Patricia A. Beal REGISTER OF DEEDS FOR McDowell COUNTY
~~Deputy/Assistant Register of Deeds~~

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STATE OF NORTH CAROLINA

EASEMENT DEED

COUNTY OF MCDOWELL

KNOW BY ALL MEN THESE PRESENTS, That **COLLINS & AIKMAN PRODUCTS CO.**, hereinafter called "Grantor", in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, does hereby grant unto **TOWN OF OLD FORT, A MUNICIPAL CORPORATION**, and its successors and assigns (hereinafter called "Grantee"), the right, privilege and easement to go in and upon a portion of that certain land of Grantor ("hereinafter premises") situated in McDowell County, North Carolina which is specifically described in Deed Book 424, Page 66, of the McDowell County Public Registry, and which description is specifically incorporated by reference as if fully set forth herein, provided that all such access rights shall be limited to the Easement boundaries and purposes described herein.

The easement herein conveyed is for the following purposes: to erect, construct, reconstruct, repair, replace, operate, and maintain on the premises an underground sewer pipeline system which shall serve to provide sewer service to the premises and other premises. Further rights included in this conveyance include, but are not limited to, the right to go upon the premises whenever necessary for the purpose of inspecting, maintaining, and repairing the sewer line service (provided that in constructing and repairing the sewer line service the Grantee shall remove all surplus earth, make level the surface of the ground above the sewer line and interfere as little as is reasonably possible with any plants, fences or other improvements upon the premises).

Grantee agrees that after the laying, installing, and constructing of said sewer pipeline, it will restore the surface of the ground above the same to the same condition it was prior to excavation and it will maintain and keep the surface in good condition free from any objectionable or unsightly growth or vegetation.

The PERMANENT easement granted hereby is an extension of the existing Easement, which existing Easement is described on the Easement Agreement which is dated March 16, 1967 and which Easement Agreement is attached hereto and incorporated by reference as if fully set forth herein (the "Original Sewer Easement"). The PERMANENT easement granted herein extends the Northern boundary line of the Original Sewer Easement, in a Northerly direction, an additional 7 and ½ feet and moves the Southern boundary line of the Original Sewer Easement in a Northerly direction by 7 and ½ feet. Thus, the PERMANENT easement granted in total is an easement which shall extend in a Northerly direction 15 feet from the centerline of the sewer pipe line referenced in the Original Sewer Easement. All terms and conditions in the Original Sewer Easement shall apply to the aforementioned 7 and ½ foot wide extension

The TEMPORARY easement granted hereby shall be 25 feet wide and shall extend in a Northerly direction from the centerline of the sewer pipe line referenced in the Original Sewer Easment.

The TEMPORARY easement granted shall be capable of use by Grantee herein from the date of this Agreement until the installing, laying, and constructing of the new sewer pipe line system is completed, but in no event later than June 1, 2000, after which time, this TEMPORARY easement shall terminate.

Grantor will not erect or maintain any structure within the boundary of the PERMANENT EASEMENT, except upon receiving prior written agreement by the Grantee, its successors and assigns, which Agreement shall not be unreasonably withheld. Further the Grantor shall not excavate, grade or fill any portion of the land within the boundary of the Permanent Easement, except in accordance with good engineering practice, and said excavation, grade or fill shall not endanger the Grantee's pipelines, structures or foundations.

It is understood that Grantee may do any act or thing within the boundary of the Permanent Easement necessary to remove or eliminate any condition which endangers, threatens to endanger, or interferes with the operation and maintenance of said sewer line system.

The undersigned Grantor covenants that it is the owner of the above described land and has the right to convey this Easement.

TO HAVE AND TO HOLD said right and easement to the Grantee its successors in title and assigns forever; it being agreed that the right and easement hereby granted is appurtenant to and runs with the waste treatment and sewage disposal facilities owned by Grantee in Old Fort, McDowell County, North Carolina.

IN TESTIMONY WHEREOF, said Grantor has hereunto caused this document to be signed in its corporate name by its duly authorized officers and its seal to be hereunto affixed by authority of its Board of Directors, ~~the day and year first above written~~ AS OF APRIL 20, 1999.

COLLINS & AIKMAN PRODUCTS CO.

By: _____ (Seal)
Vice President

ATTEST:

_____
Secretary

CORP. SEAL

FILED NO

MAY 25 12 28 PM '99

PATRICIA A REEL
REGISTER OF DEEDS
MCDOWELL COUNTY, NC

BK 0589 PG 0663

589 663

STATE OF NORTH CAROLINA
COUNTY OF Mecklenburg

I, Karen M. Allen, a notary public, certify that Bradley D. Murchison personally came before me this day and acknowledged that (s)he is Assistant Secretary, of COLLINS & AIKMAN PRODUCTS CO., a North Carolina corporation, and that by authority duly given and as the act of the Corporation, the foregoing instrument was signed in its name by its Vice President, sealed with its corporate seal, and attested by Gina as its Assistant Secretary.

Witness my hand and notarial seal, this the 28 day of April, 1999.

My Commission Expires: Jan 31, 2003

Karen M. Allen
Notary Public

NORTH CAROLINA
McDOWELL COUNTY

The foregoing certificate of KAREN M. ALLEN, NOTARY PUBLIC is certified to be correct. Filed for registration at 12:28 P.M., this 25th day of May, 1999 in Book 589 Page 661.

PATRICIA A. REEL
REGISTER OF DEEDS

By: Jane B. McGee
DEPUTY

Issued May 14 2001
$31.00 McDowell County
State of North Carolina
Real Estate Excise Tax
Issued May 14 2001
$1.00 McDowell County
State of North Carolina
Real Estate Excise Tax

(Excise Tax) $32.00

FILED in McDowell County, NC
on May 14 2001 at 02:48:04 PM
by: PATRICIA A. REEL
Register of Deeds
BOOK 644 PAGE 346

NORTH CAROLINA SPECIAL WARRANTY DEED

APPROVED TO RECORD
TAX DEPARTMENT
5-14-01

APPROVED BY CRA

Mail after recording to:

This instrument was prepared by: DAMERON, BURGIN AND PARKER, P.A., Attorneys at Law, Marion, NC/bjr

THIS DEED made this 4 day of May, 2001, by and between **COLLINS & AIKMAN PRODUCTS CO., a Delaware Corporation, (successor by merger to COLLINS & AIKMAN LEASE CO.), GRANTOR and THE TOWN OF OLD FORT, NORTH CAROLINA, A MUNICIPAL CORPORATION, GRANTEE:**

The designation of Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in the Town of Old Fort, Old Fort Township, McDowell County, North Carolina and more particularly described as follows:

BEING A PARCEL CONTAINING 12.19 ACRES according to that certain unrecorded plat of survey (the "Survey") prepared by R.L. Greene Surveying and Mapping, which Survey is dated November 15, 2000 and which Survey has a map file reference number of MM-233 and from which Survey the following metes and bounds description is taken:

BEGINNING AT A three quarter inch solid iron pin set, the twenty seventh corner of Deed Book 424, Page 661, McDowell County Public Registry and which BEGINNING point is located North 89 degrees 07 minutes 50 seconds West 96.55 meters (also calculated as 316.81 feet) from U.S.C.G. Monument which has published coordinates for coast and geodetic benchmark K 140 of N=214067.776 meters and E= 323658.825 meters, NAD 83, and which U.S.C.G. monument is located South 89 degrees 02 minutes 08 seconds West 314.275 meters from N.C.G.S. monument "Texaco" which has NAD 83 grid coordinates of N=214073.066 meters and E=323973.055 meters, and which Beginning point is located at a corner common with property now or formerly owned by the Town of Old Fort, see Deed Book 196, Page 33, McDowell County Public Registry; thence from said Beginning Point and crossing the Mackeys Creek, North 70 degrees 20 minutes 25 seconds East 414.94 feet to an existing iron pin which is a corner common with the aforementioned Town of Old Fort property and lands now or formerly owned by William Lloyd Porter et ux, see Deed Book 537, Page 245, tract three; thence with the line of the aforementioned Porter tract, South 02 degrees 13 minutes 24 seconds West 107.41 feet (passing a three quarter inch iron pin set at 50 feet) to a railroad spike set in a cross tie; thence with the centerline of the Southern Railway - Main Track, South 70 degrees 18 minutes 47 seconds West 1233.60 feet, crossing the Mackeys Creek, to an unmarked point; thence continuing with the centerline of the railroad track, the following courses and distances, all to unmarked points: South 70 degrees 05 minutes 30 seconds West 100 feet; South 69 degrees 18 minutes 04 seconds West 100 feet; South 68 degrees 20 minutes 41 seconds West 100 feet; South 67 degrees 23 minutes 33 seconds West 100 feet; South 66 degrees 23 minutes 28 seconds West 100 feet; thence South 67 degrees 17 minutes 03 seconds West 26.25 feet to a pknail set in the centerline of a road which runs perpendicular to the centerline of the railroad right of way and track; thence with the centerline of the aforementioned road and with a new line, the following courses and distances: North 26 degrees 07 minutes 37 seconds West 47.51 feet to an unmarked point; North 30 degrees 11

12.19 Ac

utes 43 seconds West 51.87 feet to a railroad spike set; thence North 30 degrees 11 minutes 43 seconds West 20.12 feet to an unmarked point; thence North 31 degrees 22 minutes 17 seconds West 107.46 feet to an unmarked point; thence North 34 degrees 03 minutes 09 seconds West 64.35 feet to an unmarked point; thence North 32 degrees 25 minutes 08 seconds West 37.06 feet to an unmarked point; thence leaving the centerline of the road, and with a new line, North 70 degrees 21 minutes 58 seconds East 1190.46 feet (passing a three quarter inch solid iron pin set at 30 feet) to a three quarter inch solid iron pin set located in the center of a sixty eight foot wide right of way; thence with the centerline of a sixty eight foot wide right of way and with a new line, North 21 degrees 10 minutes 33 seconds West 349.27 feet to a three quarter inch solid iron pin set; thence leaving the centerline of the right of way and with a new line, North 70 degrees 21 minutes 58 seconds East 112.38 feet to an existing iron pin which is identified as the twentieth corner of Deed Book 424, Page 661, Plant Location Tract, and which is located South 89 degrees 01 minutes 18 seconds West 117.04 feet from an existing iron pipe which is identified as the nineteenth corner of Deed Book 424, Page 661, Plant Location Tract, McDowell County Public Registry; thence with the Eastern edge of an asphalt road and with the line of the aforementioned Town of Old Fort tract, the following courses and distances: South 35 degrees 54 minutes 16 seconds East 24.41 feet to an unmarked point; thence South 36 degrees 12 minutes 31 seconds East 150.90 feet to an existing iron pipe; thence South 37 degrees 05 minutes 41 seconds East 53.54 feet to a three quarter inch solid iron pin set; thence South 34 degrees 53 minutes 14 seconds East 101.23 feet to an existing railroad spike; thence, South 40 degrees 00 minutes 56 seconds East 32.64 feet to an existing railroad spike; thence leaving the edge of the asphalt road, South 40 degrees 28 minutes 31 seconds East 148.28 feet to an existing iron pipe which is situated close to the centerline of the sewer line right of way; thence South 19 degrees 37 minutes 59 seconds East 70.68 feet to the point and place of BEGINNING.

SUBJECT TO, HOWEVER, the rights of others in and to the use of the roadway which extends in a North-South direction along the Western boundary line of the above described 12.19 acre parcel.

GRANTOR RESERVES unto itself and its successors and assigns the right to use that certain road or roadway, which is in existence, currently in use, laid out and visible on the ground; which roadway or road follows and runs with the western boundary line of the above-described 12.19 acre parcel; which roadway or road crosses the Southern Railway - Main Track and the 68" Duke Power Right-of-Way, all as shown on the Survey. Further the GRANTOR RESERVES unto itself and its successors and assigns a roadway right of way and easement which shall extend thirty feet (30') easterly from the aforementioned western boundary of said 12.19 acre parcel (hereinafter referred to as the "Roadway Reservation"). These rights and easements are perpetual in nature and shall run with the [illegible] to the lands affected.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And the Grantor covenants with the Grantee, that Grantor has done nothing to impair such title as Grantor received, and Grantor will warrant and defend the title against the lawful claims of all persons claiming by, under or through Grantor, except for the exceptions hereinafter stated. Title to the property hereinabove described is subject to the following exceptions: **however, it is not the intent of the Grantor or Grantee to impose or reimpose any encumbrances that are not encumbrances on said property on the date of execution and delivery of this deed.**

1. **McDowell County ad valorem and real property taxes and assessments for the year 2002 and subsequent years, which Grantee by acceptance of this deed expressly agrees to assume and to pay.**

2. **All covenants, conditions, restrictions, encumbrances, easements, utility easements and other matters of record.**

3. **All rights of ways, including, without limitation, the railroad right-of-way.**

4. **The Roadway Reservation (as defined above).**

5. **Leases to Duke Power Company for substations and transmission lines recorded in Book 186, page 49 and Book 263, page 568, McDowell County Registry, and as shown on the survey referenced in exception No. 11 below.**

6. **Easement Agreement with the Town of Old Fort for a sewage outfall line recorded in Book 196, page 565, McDowell County Registry, and as shown on the survey referenced below in exception no. 11.**

7. **Easement Agreement to the Town of Old Fort for water mains recorded in Book 263, page 733, McDowell County Registry, and as shown on the survey referenced below in exception no. 11.**

8. Easement Agreement to the Town of Old Fort for a sewer line recorded in Book 385, page 786, McDowell County Registry, and as shown on the survey referenced below in exception no. 11.

9. Sewer Line Easement contained in deed recorded in Book 192, page 52, McDowell County Registry, and as shown on the survey referenced below in exception no. 11.

10. Easement(s) to Duke Power Company recorded in Book 140, page 63, McDowell County Registry.

11. Survey of Kenneth D. Suttles, R.S. dated May 17, 1991, last revised June 13, 1991, reveals the following:

    a. Southern Railroad right of way with track and Curtis Creek trestle.
    b. 68-foot Duke Power Company easement.
    c. power poles and utility service lines, pursuant to general utility easement.
    d. right of way of Red Town Road and SR 1279.
    e. railroad spur tracks.
    f. 15-foot sewer line easement.
    g. fire hydrants.
    h. storage tanks.
    i. Duke Power Company substations.
    j. 35-foot sewer line easement.
    k. catch basins.
    l. sanitary sewer manholes.
    m. 20-foot sanitary sewer easement and sewer line.
    n. water main easement.
    o. encroachment of asphalt drive and parking area into 35-foot sewer easement and into 68-foot Duke Power Company easement.

12. Riparian rights of others in and to Curtis Creek and the branches as shown on the survey referenced above in exception no. 11.

13. Rights of others in and to the asphalt drives entering the above-referenced 12.19 acre parcel from the east.

IN WITNESS WHEREOF, the Grantor has hereunto set his hand and seal, or if corporate, has caused this instrument to be signed in its corporate name by its duly authorized officers and its seal to be hereunto affixed by authority of its Board of Directors, the day and year first above written.

Collins & Aikman Products Co. (successor by merger to Collins & Aikman Lease Co.)

By: Ronald T. Lindsay
Senior Vice President,
Title: General Counsel and Secretary

STATE OF NORTH CAROLINA
Mecklenburg COUNTY

I, Patricia Jane Mont, Notary Public, certify that Ronald T. Lindsay personally came before me this day and acknowledged that he/she is Senior Vice President of Collins & Aikman Products Co. (successor by merger to Collins & Aikman Lease Co., a North Carolina, corporation, and that he/she, as Senior Vice President being authorized to do so, executed the foregoing on behalf of the corporation.

Witness my hand and official seal, this the 4th day of May, 2001.

Patricia Jane Mont
NOTARY PUBLIC

Commission Expires:

~~MY COMMISSION EXPIRES FEB 2, 2003~~

The foregoing certificate(s) of Patricia Jane Monte, Notary Public

is/are certified to be correct. This instrument and this certificate are duly registered at the date and time and in the Book and Page shown on the first page hereof.

By: Patricia A Reed REGISTER OF DEEDS FOR MCDOWELL COUNTY, NORTH CAROLINA

By: _____ ~~Deputy/Assistant Register of Deeds~~

F:\RE\FORM\DEEDFORM\Old Fort C&A

Return to:
Blanco Tackabery
Combs & Matamoros, P.A.
P.O. Drawer 25008
Winston-Salem, N.C. 27114-5008
Attn: GEH

Stamps: $13,614

BK 0665 PG 0485

FILED in McDowell County, NC on Dec 03 2001 at 10:28:50 AM by PATRICIA A. REEL Register of Deeds
BOOK 665 PAGE 485

Issued Dec 03 2001 $9,999.00 McDowell County State of North Carolina Real Estate Excise Tax

Excise Tax

Recording Time, Book and Page

Tax Lot No.: ______ Parcel Identifier No. 10100002001, pin 076000134673

Verified by ______ County on the ____ day of ______, 20__ by ______

~~Mail after recording to:~~ Ruth Perfido
Reed Smith, LLP
375 Park Avenue, 17th Floor
New York, NY 10152

Issued Dec 03 2001 $3,615.00 McDowell County State of North Carolina Real Estate Excise Tax

This instrument was prepared by: Athy A. Mobilia
Cahill Gordon & Reindel
80 Pine St.
New York, NY 10005

Brief Description For The Index: All of that land and parcel described on Exhibit A attached hereto.

NORTH CAROLINA SPECIAL WARRANTY DEED

THIS DEED made this 5th day of ~~September~~ October, 2001, by and between

GRANTOR	GRANTEE
Collins & Aikman Products Co. 5755 New King Court Troy, MI 48098 a Delaware corporation	Fabric (DE) GP 50 Rockefeller Plaza, 2nd Floor New York, NY 10020 a Delaware general partnership

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that Grantor, for a valuable consideration paid by Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto Grantee in fee simple, all that certain lot or parcel of land situated Town of Old Fort, Old Fort Township, McDowell County, North Carolina and more particularly described on Exhibit A attached hereto.

The property hereinabove described was acquired by Grantor by instrument recorded in Plat Book 424, Page 661, McDowell County Public Registry.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And Grantor covenants with the Grantee, that Grantor has done nothing to impair such title as Grantor received, and Grantor will warrant and defend the title against the lawful claims of all persons claiming by, under or through Grantor, except for the exceptions hereinafter stated.

-7

APPROVED TO RECORD TAX DEPARTMENT MD 12-3-01

APPROVED BY CRA

132.312 Ac

Exhibit A

Lying and being in Old Fort Township, McDowell County, North Carolina, and being more particularly described as follows:

BEGINNING at a concrete monument set at the intersection of the southerly margin of the right-of-way (60 feet wide) of U.S. Highway 70 and the westerly margin of the right-of-way (60 feet wide) of State Road 1246, commonly known as Greenlee Road, which monument is also located North 54-40-42 East 402.62 feet from the northeast corner of the concrete bridge of U.S. Highway 70 over Curtis Creek; thence, running with the westerly right-of-way margin of State Road 1246 (Greenlee Road), the following nine (9) courses and distances:

1. South 30-40-36 East 1,071.87 feet to a 3/4" iron pipe set;
2. South 29-21-52 East 153.92 feet to a 3/4" iron pipe set;
3. South 26-37-27 East 44.10 feet to a 3/4" iron pipe set;
4. South 21-38-19 East 75.20 feet to a 3/4" iron pipe set;
5. South 16-49-39 East 46.81 feet to a 3/4" iron pipe set;
6. South 12-45-19 East 35.42 feet to a 3/4" iron pipe set;
7. South 08-21-58 East 46.87 feet to a 3/4" iron pipe set;
8. South 06-30-13 East 170.55 feet to a 3/4" iron pipe set;
9. South 05-09-36 East 226.23 feet to a 3/4" iron pipe set;

thence, leaving said right-of-way margin, South 04-57-18 West 218.93 feet to a 3/4" iron pipe set, which iron pipe is located North 85-02-28 West 58.85 feet from an existing railroad spike found on the westerly edge of the pavement of State Road 1246; thence, with the property line of the Town of Old Fort (now or formerly), North 85-02-28 West 555.54 feet to a 3/4" existing iron rod, which rod is located North 44-03-55 West 1,059.74 feet from N.C. Geodetic Station Monument "TEXACO", with N.A.D. 83 coordinates N=702338.05, and E=1062901.60; thence, continuing with the property lines of the Town of Old Fort, the following eighteen (18) courses and distances:

1. North 00-50-07 West 200.61 feet to a 3/4" iron pipe set;
2. North 85-02-28 West 200.00 feet to a 3/4" iron pipe set;
3. South 00-50-07 East 200.61 feet to a 3/4" iron pipe set;
4. South 85-02-28 East 4.54 feet to a ½" existing rebar;
5. South 01-50-33 West 126.51 feet to a 3/4" existing rebar;
6. South 89-01-03 West 632.99 feet to a 3/4" iron pipe set (within a sanitary sewer line easement, said easement being 20' in width and particularly described in Deed Book 385, Page 786);
7. South 00-58-57 East 180.00 feet to a nail set;
8. South 89-01-03 West 84.73 feet to a point within the aforesaid sanitary sewer easement;
9. South 89-01-03 West 32.30 feet to a 3/4" iron pipe set on the eastern margin of a 16 foot wide paved drive;
10. thence, crossing said paved drive South 70-31-23 West 112.38 feet to a 1/2" existing iron pipe located near the centerline of a 68' wide Duke Power easement as recorded in Deed Book 186, Page 49;
11. South 21-09-58 East 349.36 feet to a 1/2" existing iron rod near the centerline of said Duke Power easement;

Exhibit A - Continued

12. South 70-22-33 West 1190.46 feet to a point in the centerline of State Road 1279, a 16' wide gravel drive also known as Red Town Road, thence, continuing with the Town of Old Fort property and with the centerline of State Road 1279 the following six (6) courses and distances;
13. South 32-24-33 East 37.06 feet to a point;
14. South 34-02-34 East 64.35 feet to a point;
15. South 31-21-42 East 107.46 feet to a point;
16. South 30-11-08-East 26.12 feet to a point in the northern margin of the 200' right of way claimed by Southern Railroad;
17. South 30-11-08 East 51.87 feet to a point;
18. South 26-07-02 East 48.68 feet to a nail found in the centerline of the Southern Railroad track, thence continuing with the centerline of the Southern Railroad track the following nine (9) courses and distances:

1. South 65-22-03 West 73.75 feet to a nail set;
2. South 64-21-51 West 100.00 feet to a nail set;
3. South 63-19-34 West 100.00 feet to a nail set;
4. South 62-17-43 West 100.00 feet to a nail set;
5. South 61-19-41 West 100.00 feet to a nail set;
6. South 60-36-37 West 100.00 feet to a nail set;
7. South 60-11-49 West 100.00 feet to a nail set;
8. South 59-59-22 West 200.00 feet to a nail set; and
9. South 60-02-22 West 14.15 feet to a nail set in the centerline of the Southern Railroad right-of-way and the centerline of a culvert located under said railroad.

thence, leaving the centerline of Southern Railroad and running with the property line of Ethan Allen, Inc. (now or formerly), North 32-06-03 West 100.03 feet to an iron pipe set on the northern right-of-way margin of Southern Railroad; thence, continuing with the Ethan Allen line, North 32-06-03 West 1,276.16 feet to an iron pipe set on the southern right-of-way margin of U.S. Highway 70; thence, running with said right-of-way margin, North 52-36-58 East 2,635.75 feet to a 1/2" existing iron pipe, the fourth corner of the property of County of McDowell described in Deed Book 647, Page 606; thence, leaving said right-of-way margin running with the property lines of the County of McDowell, the following three (3) courses and distances:

1. South 29-56-59 East 209.98 feet to a 1/2" existing iron pipe;
2. North 52-36-58 East 209.21 feet to a 1/2" existing iron pipe;
3. North 29-56-59 West 209.98 feet to a 1/2" existing iron pipe in the southern right-of-way margin (60 ' wide) of U.S. Highway 70.

Thence running with said right-of-way margin of North 52-36-58 East 534.95 feet to a point in the centerline of aforesaid 20 foot wide sanitary sewer easement, described in Deed Book 385, Page 786; thence, continuing with said right-of-way margin North 52-36-58 East 675.62 feet to the point and place of BEGINNING; and containing 132.312 acres, more or less, as shown on that survey for Collins & Aikman Corporation, Old Fort Property, dated May 6, 1991, last revised November 5, 2001, prepared by Kenneth D. Suttles, P.L.S.

IN WITNESS WHEREOF, the Grantor has caused this instrument to be signed in its corporate name by its duly authorized officer, the day and year first above written.

Collins & Aikman Products Co., a Delaware corporation, successor by merger to Collins & Aikman Lease Co., a Delaware corporation

By: Charles G. Nichols

Name: Charles G. Nichols

Title: Treasurer

STATE OF MICHIGAN
COUNTY OF OAKLAND

I, the undersigned, a Notary Public for the above State and County, hereby certify that Charles G. Nichols personally came before me this day and acknowledged that she/he is Treasurer of Collins & Aikman Products Co., a Delaware corporation, successor by merger to Collins & Aikman Lease Co., a Delaware corporation and that she/he, in that capacity, being authorized to do so, executed the foregoing on behalf of the corporation.

WITNESS my hand and official seal, this the 26th day of September, 2001.

Phyllis Marie Sleight
Notary Public

September 24, 2003
My Commission Expires

[NOTARY SEAL]

The foregoing Certificate(s) of Phyllis Marie Sleight, Notary Public is/are certified to be correct. This instrument and this certificate are duly registered at the date and time and in the Book and Page shown on the first page hereof.

Patricia A. Reed REGISTER OF DEEDS FOR McDonald COUNTY

By Betty A. Fender Deputy/Assistant - Register of Deeds

Excise Tax-	FILED In McDowell County, NC on Jun 15 2001 at 11:26:57 AM by PATRICIA A. REEL Register of Deeds BOOK 647 PAGE 606 Recording Time, Book and Page

Tax Lot No.: a portion of 0760-00-13-4673 Parcel Identifier No.: _____
Verified by _____ County on the ____ day of _____, 19__ by _____

Mail after recording to: Grantee

This instrument was prepared by: Parker Poe Adams & Bernstein L.L.P. (AGW) (PPAB File #30670)

Brief Description For The Index:

1 acre on U.S. Hwy 70

NORTH CAROLINA SPECIAL WARRANTY DEED

THIS DEED made this 30th day of May, 2001, by and between

GRANTOR	GRANTEE
COLLINS & AIKMAN PRODUCTS CO. (successor by merger to Collins & Aikman Lease Co.), a Delaware corporation	COUNTY OF MCDOWELL, a political subdivision of the State of North Carolina Address: East Court Street Marion, North Carolina 28752

Enter in appropriate block for each party: name, address, and, if appropriate, character of entity, e.g. corporation or partnership.

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that Grantor, for a valuable consideration paid by Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto Grantee in fee simple, all that certain lot or parcel of land situated in the City of _____, Old Fort Township, McDowell County, North Carolina and more particularly described as follows:

*See **EXHIBIT A**, attached hereto and incorporated herein by this reference (the "Property").*

The Property and all improvements thereon shall be deemed to be conveyed to Grantee by Grantor in "as is, where is" condition with all faults and defects, known and unknown. Grantee shall be deemed to have assumed all risks and defects of any kind or nature associated with the Property and all improvements thereon, and to have released Grantor, its successors, assigns, and affiliates from any and all claims, losses, liabilities or damages related thereto.

CLT:526548.1

APPROVED TO RECORD
TAX DEPARTMENT
OA 6/15/01

APPROVED BY CRA

1 Ac

EXHIBIT A

LEGAL DESCRIPTION

BEGINNING on a 3/4 inch Iron Pipe Set in Front Boundary Line of Collins & Aikman, in the southerly margin of the Right of Way of U.S. Hwy 70 and in the fenceline along U.S. Hwy 70, said Iron Pipe Set being located South 52°37'00" West 1210.47 feet from that Concrete Monument Set Flush with ground in place of Beginning corner of Deed Book 184 at page 512 of which this tract is a part of, (see previous Suttles map #11085-C) and runs thence South 29°56'59" East 209.98 feet to a 3/4 inch Iron Pipe Set in open field, said iron pipe being located South 34°30'02" West 716.12 feet from the Southwest corner of the bridge over Curtis Creek and located on U.S. Hwy 70, and said iron pin also being located North 89°47'44" West 1403.87 feet from a 3/4 inch iron pipe, (see previous Suttles map #11085-C); and runs thence South 52°36'58" West 209.21 feet to a 3/4 inch iron pipe set in fenceline, said iron pipe being located North 50°44'44" West 2486.71 feet from station Texaco, NAD 83, Latitude 35 38 19.93909, Longitude 082 09 15.95057, SPC 83 Northing = 214073.066 Meters, Easting = 323973.055 Meters, NAD 27 = Latitude 35 38 19.50955, SPC 27 = North (y) = 702277.450 feet, Longitude = 82 9 16.53247, East (x) = 1062830.182 feet, (see Suttles map # 11085-D for further "Horizontal Grid Monument Information"); thence runs North 29°56'59" West 209.98 feet to a 3/4 inch iron pipe set in Front Boundary line of Collins & Aikman, the southerly margin of the right of way for U.S. Hwy 70 and in the fenceline along U.S. Hwy 70; thence runs along the southerly margin of the right of way of U.S. Hwy 70, North 52°36'59" East 209.21 feet to the BEGINNING containing 1.00 acres more or less and being a portion of that property described in Deed Book 184 atpage 512. This description was taken from that survey map entitled "Survey for The McDowell County Board of Commissioners" drawn by J. Douglas Suttles of Suttles Surveying, P.A., Marion, NC # L-3728, dated September 25, 2000, Map # 11085-D.

SUBJECT, However, to the right of way for U.S. Hwy 70, that 10 feet wide easement along the Northern boundary of this tract for Southern Bell Telephone and for such other utilities serving or crossing this tract.

The property hereinabove described was acquired by Grantor by instrument recorded in Book 184, Page 512, McDowell County Public Registry.

A map showing the above described property is recorded in Plat Book _____ page _____.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And Grantor covenants with the Grantee, that Grantor has done nothing to impair such title as Grantor received, and Grantor will warrant and defend the title against the lawful claims of all persons claiming by, under or through Grantor, except for the exceptions hereinafter stated.

Title to the property is subject to the following exceptions:

*See **EXHIBIT B**, attached hereto and incorporated herein by this reference.*

IN WITNESS WHEREOF, the Grantor has caused this instrument to be signed in its corporate name by its duly authorized officer and by authority of its Board of Directors, the day and year first above written.

GRANTOR:

COLLINS & AIKMAN PRODUCTS CO. (successor by merger to Collins & Aikman Lease Co.), a Delaware corporation

By: Ronald T. Lindsay

Title: Vice President

STATE OF North Carolina
COUNTY OF Mecklenburg

I, Patricia Jane Monte, a Notary Public of Lincoln County, State of North Carolina, certify that Ronald T. Lindsay, personally came before me this day and acknowledged that he/she is Vice President of COLLINS & AIKMAN PRODUCTS CO. (successor by merger to Collins & Aikman Lease Co.), a Delaware corporation, and that he/she, as Vice President, being authorized to do so, executed the foregoing on behalf of the corporation.

Witness my hand and official stamp or seal this 4th day of May, 2001.

Patricia Jane Monte
Notary Public
Print Name: Patricia Jane Monte

[Note: Notary Public must sign exactly as on notarial seal]

My Commission Expires: MY COMMISSION EXPIRES FEB 2, 2005

[NOTARY STAMP/SEAL] →

CLT:526548.1

EXHIBIT B

PERMITTED EXCEPTIONS

1. Rights-of-way of streets, public utility easements and other rights-of-way.
2. Zoning and building laws or ordinances.
3. Ad valorem taxes and assessments for any year not yet due and payable.
4. All restrictive covenants, conditions, encumbrances and other matters of record.
5. Any matter shown on an accurate survey or by a visual inspection of the Property.

Mc Dowell Co., NC
The foregoing certificate of Patricia Jane Monte, Notary Public, is certified to be correct.
Filed for registration this June 15, 2001.
By: Patricia A. Reel,
Register of Deeds

APPENDIX E

EROSION AND SEDIMENT CONTROL PLAN CHECKLIST

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
LAND QUALITY SECTION
EROSION and SEDIMENTATION CONTROL PLAN PRELIMINARY REVIEW CHECKLIST

The following items shall be incorporated with respect to specific site conditions, in an erosion & sedimentation control plan:

LOCATION INFORMATION

- ✓ Project location & labeled vicinity map (roads, streets, landmarks)
  - ✓ North arrow and scale
- ✓ Identify River Basin.
- NA Provide a copy of site located on applicable USGS quadrangle and NRCS Soils maps if it is in a River Basin with Riparian Buffer requirements.

GENERAL SITE FEATURES (Plan elements)

- ✓ Property lines & ownership ID for adjoining properties
- ✓ Existing contours (topographic lines)
- ✓ Proposed contours
- ✓ Limits of disturbed area (provide acreage total, delineate limits, and label). Be sure to include all access to measures, lots that will be disturbed, and utilities that may extend offsite.
- NA Planned and existing building locations and elevations
- ✓ Planned & existing road locations & elevations, including temporary access roads
- NA Lot and/or building numbers
- ✓ Hydrogeologic features: rock outcrops, seeps, springs, wetland and their limits, streams, lakes, ponds, dams, etc. (include all required local or state buffer zones and any DWQ Riparian Buffer determinations)
- NA Easements and drainageways, particularly required for offsite affected areas. Include copies of any recorded easements and/or agreements with adjoining property owners.
- NA Profiles of streets, utilities, ditch lines, etc.
- ✓ Stockpiled topsoil or subsoil locations
- NA If the same person conducts the land-disturbing activity & any related borrow or waste activity, the related borrow or waste activity shall constitute part of the land-disturbing activity unless the borrow or waste activity is regulated under the Mining Act of 1971, or is a landfill regulated by the Division of Waste Management. If the land-disturbing activity and any related borrow or waste activity are not conducted by the same person, they shall be considered separate land-disturbing activities and must be permitted either through the Sedimentation Pollution Control Act as a one-use borrow site or through the Mining Act.
- NA Location and details associated with any onsite stone crushing or other processing of material excavated. If the affected area associated with excavation, processing, stockpiles and transport of such materials will comprise 1 or more acres, and materials will be leaving the development tract, a mining permit will be required.
- NA Required Army Corps 404 permit and Water Quality 401 certification (e.g. stream disturbances over 150 linear feet)

EROSION & SEDIMENT CONTROL MEASURES (on plan)

- ✓ Legend (provide appropriate symbols for all measures and reference them to the construction details)
- ✓ Location of temporary measures
- ✓ Location of permanent measures
- ✓ Construction drawings and details for temporary and permanent measures. Show measures to scale on plan and include proposed contours where necessary. Ensure design storage requirements are maintained through all phases of construction.
- ✓ Maintenance requirements for measures
- ✓ Contact person responsible for maintenance

SITE DRAINAGE FEATURES

- ✓ Existing and planned drainage patterns (include off-site areas that drain through project and address temporary and permanent conveyance of stormwater over graded slopes)
- ✓ Method used to determine acreage of land being disturbed and drainage areas to all proposed measures (e.g. delineation map)
- ✓ Size, pipe material and location of culverts and sewers
- ✓ Soil information: type, special characteristics
- ✓ Soil information below culvert storm outlets
- ✓ Name and classification of receiving water course or name of municipal operator (only where stormwater discharges are to occur)

STORMWATER CALCULATIONS

- ✓ Pre-construction runoff calculations for each outlet from the site (at peak discharge points). Be sure to provide all supporting data for the computation methods used (rainfall data for required storm events, time of concentration/storm duration, and runoff coefficients).
- ✓ Design calculations for peak discharges of runoff (including the construction phase & the final runoff coefficients for the site)
- ✓ Design calcs for culverts and storm sewers (include HW, TW and outlet velocities)
- ✓ Discharge and velocity calculations for open channel and ditch flows (easement & rights-of-way)
- ✓ Design calcs for cross sections and method of stabilization for existing and planned channels (include temporary linings). Include appropriate permissible velocity and/or shear stress data.
- ✓ Design calcs and construction details for energy dissipaters below culvert and storm sewer outlets (include stone/material specs & apron dimensions). Avoid discharges on fill slopes.
- ✓ Design calcs and dimension of sediment basins (note current surface area and dewatering standards as well as diversion of runoff to the basins). Be sure that all surface drains, including ditches and berms, will have positive drainage to the basins.

VEGETATIVE STABILIZATION

- ✓ Area & acreage to be stabilized with vegetation
- ✓ Method of soil preparation
- ✓ Seed type & rates (temporary & permanent)
- ✓ Fertilizer type and rates
- ✓ Mulch type and rates (include mulch anchoring methods to be used)

NOTE: Plan should include provisions for groundcover on exposed slopes within 21 calendar days following completion of any phase of grading; permanent groundcover for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development.

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM

- ✓ Completed, signed & notarized FR/O Form
- ✓ Accurate application fee payable to NCDENR ($65.00 per acre rounded up the next acre with no ceiling amount)
- ✓ Certificate of assumed name, if the owner is a partnership
- ✓ Name of Registered Agent (if applicable)
- ✓ Copy of the most current Deed for the site. Please make sure the deed(s) and ownership information are consistent between the plan sheets, local records and this form.
- ✓ Provide latitude & longitude (in decimal degrees) at the project entrance.

NOTE: For the Express Permitting Option, inquire at the local Regional Office for availability.

NARRATIVE AND CONSTRUCTION SEQUENCE

- ✓ Narrative describing the nature & purpose of the construction activity
- ✓ Construction sequence related to erosion and sediment control (including installation of critical measures prior to the initiation of the land-disturbing activity & removal of measures after areas they serve are permanently stabilized). Address all phases of construction and necessary practices associated with temporary stream bypasses and/or crossings.
- ✓ Bid specifications related only to erosion control

APPENDIX F

EROSION AND SEDIMENTATION CONTROL DRAWINGS


30" CMP
18" CMP
18" CMP
SEDIMENT BASIN
36" CMP
LANDFILL LIMITS
SEDIMENT TRAP
PHASE 1
EXISTING PHASE
24" CMP
PREVIOUS PROPERTY LINE
SPRING HEAD (APPROXIMATE)
LANDFILL LIMITS
PHASE 2

PROPOSE NORTH CHANNEL DETENTION BASIN APPROXIMATE DIMENSION: 120'Lx60'Wx4'D 12" OULET RISER, 6" ORIFICE, 8' WEIR LENGTH

PROPOSED PHASE 3 DETENTION BASIN APPROXIMATE DIMENSION: 120'Lx65'Wx4'D 12" OUTLET RISER, 6" ORIFICE, 8' WEIR LENGTH

NOTE: PROPOSED CONTOURS IN EXISTING BORROW AREA ARE APPROXIMATE.

EXISTING BORROW STOCKPILE AREA DISTURBED AREA: 4.74AC

EXISTING PHASE 3 DISTURBED AREA: 3.19 APPROX. FILL DEPTH: 2'

PROPOSED PHASE 3 GRASS LINED CHANNEL DIMENSION: TRAPEZOIDAL SHAPED BOTTOM WIDTH 8' TOP WIDTH 12' DEPTH 1'

PROPOSED PERIMETER DRAIN

PROPOSED PHASE 2 DETENTION BASIN APPROXIMATE DIMENSION: 63'Lx20'Wx2.8'D 12" OULET RISER, 4" ORIFICE, 2' WEIR LENGTH

EXISTING PHASE 2 DISTURBED AREA: 2.6AC APPROX. FILL DEPTH: 2'

PROPOSED PHASE 2 GRASS LINED CHANNEL DIMENSION: TRAPEZOIDAL SHAPED BOTTOM WIDTH 3' TOP WIDTH 5' DEPTH 0.5'

200 FT. BUFFER

N

SCALE: 1" = 60'

MAINTENANCE REQUIREMENTS FOR EACH MEASURE ARE OUTLINED IN THE SOIL EROSION AND SEDIMENTATION CONTROL PLAN (MAY 2012)

MAINTENANCE CONTACT
STEPHEN DAVIS
PLANT ENGINEER
AC GROUP NORTH AMERICA
1506 E MAIN STREET
OLD FORT, NC 28762
P: (828) 668-3342
F: (828) 668-3254
E: sdavis@acng.com

6.02 LAND GRADING
6.03 SURFACE ROUGHENING
6.04 TOPSOILING
6.06 TEMP. GRAVEL CONTS. ENTER/EXIT
6.11 PERMANENT SEEDING
6.14 MULCHING
6.15 RIPRAP
6.21 PERMANENT DIVERSIONS
6.30 GRASS-LINED CHANNELS
6.31 RIPRAP-LINED CHANNELS
6.41 OUTLET STABILIZATION STRUCTURE
6.55 ROCK PIPE INLET PROTECTION
6.61 SEDIMENT BASIN
6.62 SEDIMENT FENCE
6.63 ROCK DAM
6.83 CHECK DAM
6.84 DUST CONTROL
PROPOSED CONTOURS
EXISTING CONTOURS

SITE CHARACTERISTICS
OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA
LOCATED IN CATAWBA RIVER BASIN
TOTAL AREA OF SITE: 85.25 AC (COUNTY GIS)
TOTAL AREA OF DISTURBANCE: 10.53 AC (COUNTY GIS)
SITE DRAINAGE OUTLET: BREVARD CREEK
MAJOR RECEIVING WATERS: CATAWBA RIVER, LAKE TAHOMA

SOILS FOUND ONSITE
EVARD-COWEE COMPLEX, HAYESVILLE CLAY LOAM
(DETAILS IN SESC REPORT, MAY 2012)

NO.	MARK	REVISIONS	DATE

OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

SOIL MAP

Spicer group
ST. JOHNS OFFICE
1400 Zeeb Drive
St. Johns, MI 48879
Tel. 989-224-2355
Fax. 989-224-2357
www.SpicerGroup.com

DES. BY	DWN. BY	CHK. BY	APP. BY
JEB			

119793SG2012

SHEET 2 OF 4

DATE: MAY, 2012

AS SIGNED

IDP 2264.02

OLD FORT LANDFILL

OLD FORT TOWNSHIP, McDOWELL COUNTY, NORTH CAROLINA

PLAN INDEX		
FILE NO.	DESCRIPTION	NO.
JDR-2264-01	OVERALL LOCATION	1
JDR-2264-02	SOIL MAP	2
JDR-2264-03	DETAIL SHEET	3

N

0 50 100 200

SCALE: 1" = 100'

BY	MARK	REVISIONS	DATE

THE WORK REPRESENTED BY THIS DRAWING WAS DESIGNED BY THE ENGINEER FOR THIS SPECIFIC APPLICATION AND SPECIFIC LOCATION DESCRIBED HEREON IN ACCORDANCE WITH THE CONDITIONS PREVALENT AT THE TIME THE DESIGN WAS DONE. THE ENGINEER DOES NOT GUARANTEE AND WILL NOT BE LIABLE FOR ANY OTHER LOCATION, CONDITION, DESIGN OR PURPOSE.

OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

OVERALL LOCATION

Spicer group

ST. JOHNS OFFICE
1400 Zeeb Drive
St. Johns, MI 48879
Tel. 989-224-2355
Fax. 989-224-2357
www.SpicerGroup.com

DE. BY: DR. BY: JEB	CH. BY: APP. BY:	PROJECT NO. 119793SG2012
STDS.	SHEET 1 OF 3	
DATE MAY, 2012 SCALE AS SHOWN	FILE NO. JDR-2264-01	

PROPOSE NORTH CHANNEL DETENTION BASIN APPROXIMATE DIMENSION: 120'Lx60'Wx4'D 12" OULET RISER, 6" ORIFICE, 8' WEIR LENGTH

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DISTURBED AREA: 4.74AC

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200 FT. BUFFER

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E. sdavis@acgrp.com

N

SCALE: 1" = 60'

- 6.02 LAND GRADING
- 6.03 SURFACE ROUGHENING
- 6.04 TOPSOILING
- 6.06 TEMP. GRAVEL CONTS. ENTER/EXIT
- 6.11 PERMANENT SEEDING (PS)
- 6.14 MULCHING (M)
- 6.15 RIPRAP (RR)
- 6.21 PERMANENT DIVERSIONS (PD)
- 6.30 GRASS-LINED CHANNELS (GL)
- 6.31 RIPRAP-LINED CHANNELS
- 6.41 OUTLET STABILIZATION STRUCTURE
- 6.55 ROCK PIPE INLET PROTECTION
- 6.61 SEDIMENT BASIN
- 6.62 SEDIMENT FENCE
- 6.63 ROCK DAM
- 6.83 CHECK DAM
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- PROPOSED CONTOURS
- EXISTING CONTOURS

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McDOWELL COUNTY, NORTH CAROLINA
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SOILS FOUND ONSITE
EVARD-COWEE COMPLEX, HAYESVILLE CLAY LOAM
(DETAILS IN SESC REPORT, MAY 2012)

BY	MARK	REVISIONS	DATE

OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

SOIL MAP

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www.SpicerGroup.com

DR. BY	CH. BY	PROJECT NO.
JEB		119793SG2012
DATE	SHEET	OF
MAY, 2012	2	4
SCALE	DRAWING NO.	
AS SHOWN	JDR-2264-02	

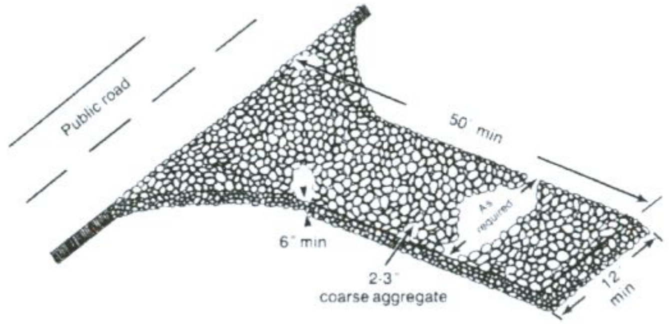


Figure 6.06a Gravel entrance/exit keeps sediment from leaving the construction site (modified from Va SWCC)

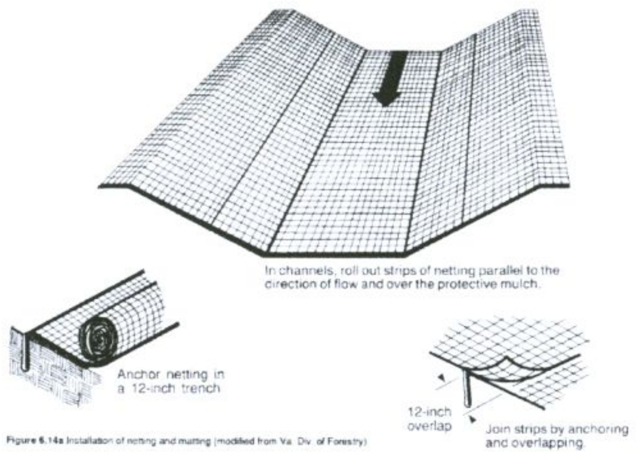
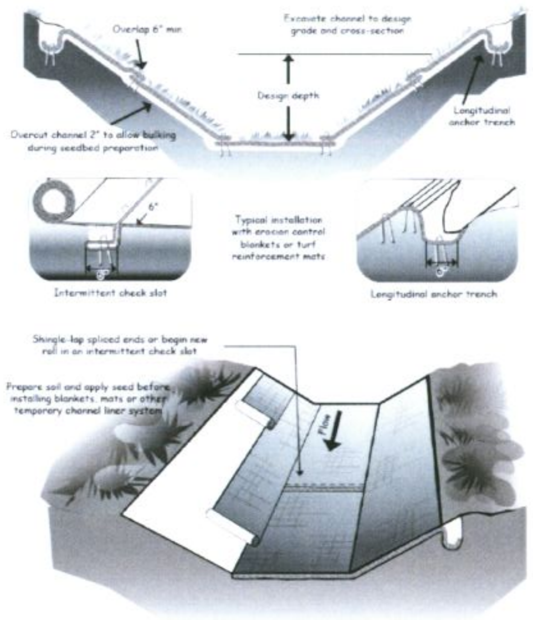


Figure 6.14a Installation of netting and matting (modified from Va. Div. of Forestry)

Figure 6.17d Temporary Channel Liners, Washington State Department of Ecology



NOTES
1. Design velocities exceeding 2 ft/sec require temporary blankets, mats or similar liners to protect seed and soil until vegetation becomes established.
2. Grass-lined channels with design velocities exceeding 6 ft/sec should include turf reinforcement mats.

Figure 6.17e Channel Installation and Slope Installation, Washington State Ecology Department

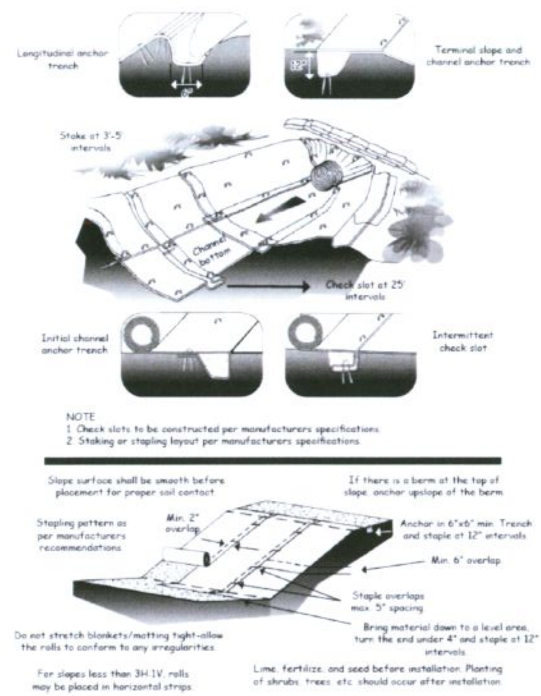
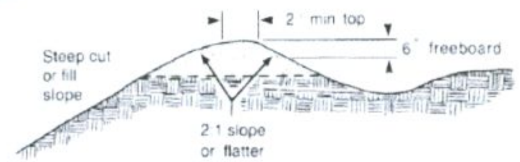
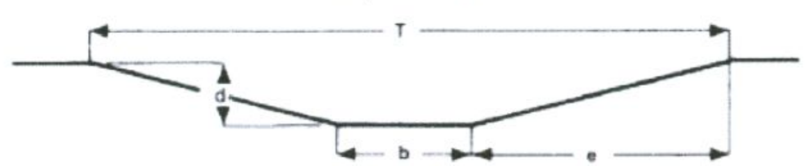


Figure 6.21b Permanent diversion located above a slope



Trapezoidal



x-section area (A) = $bd + Zd^2$

top width (T) = $b + 2dz$

$Z = \frac{e}{d}$

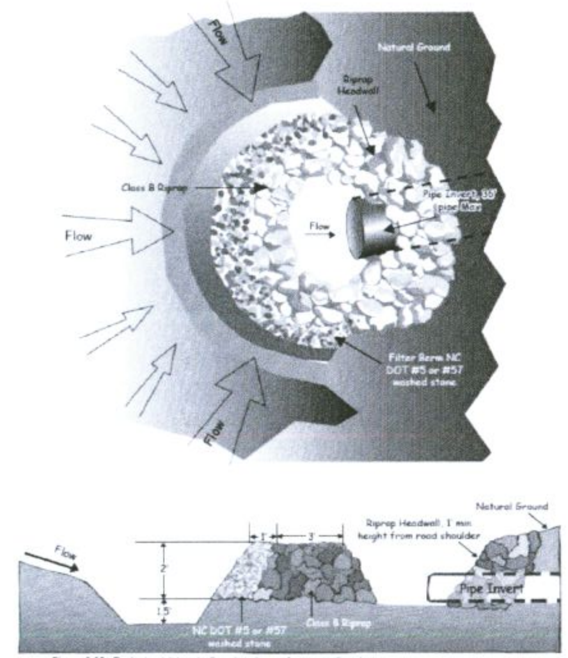


Figure 6.55a Rock pipe inlet protection plan view and cross-section view

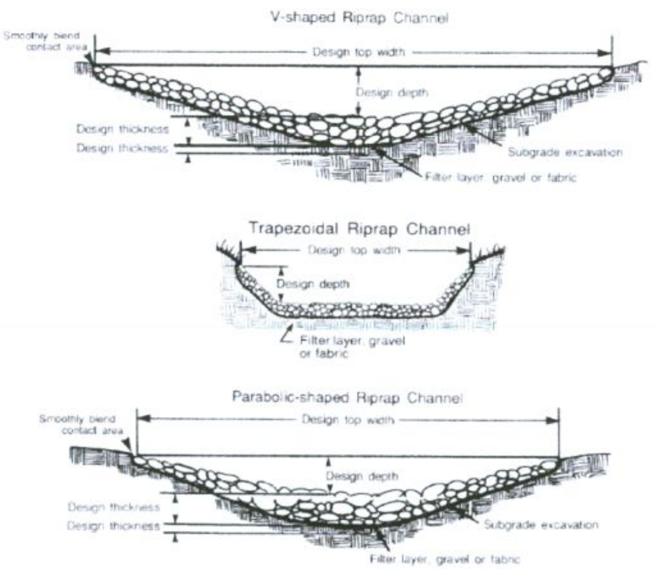
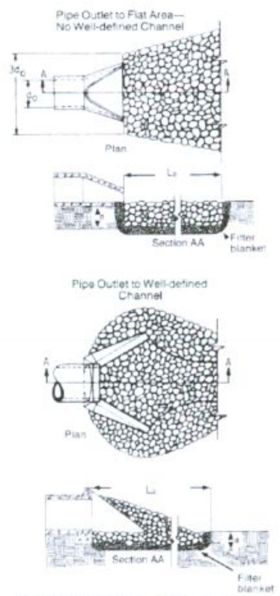


Figure 6.31a Construction detail of riprap channel cross sections



Notes
1. L_a is the length of the riprap apron.
2. d = 1.5 times the maximum stone diameter but not less than 6".
3. In a well-defined channel extend the apron up the channel banks to an elevation of 6" above the maximum tailwater depth or to the top of the bank, whichever is less.
4. A filter blanket or filter fabric should be installed between the riprap and soil foundation.

Figure 6.41c Riprap outlet protection (modified from Va SWCC)

BY	MARK	REVISIONS	DATE

OLD FORT LANDFILL
McDOWELL COUNTY, NORTH CAROLINA

DETAILS

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DE. BY:
DR. BY: JEB
CH. BY:
APP. BY:
PROJECT NO. 119793SG2012
STDS:
SHEET 3 OF 3
DATE: MAY, 2012
SCALE: AS SHOWN
FILE NO. JDR-2264-03

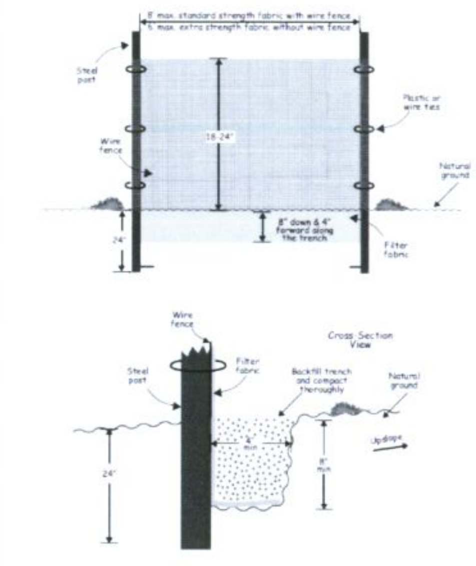
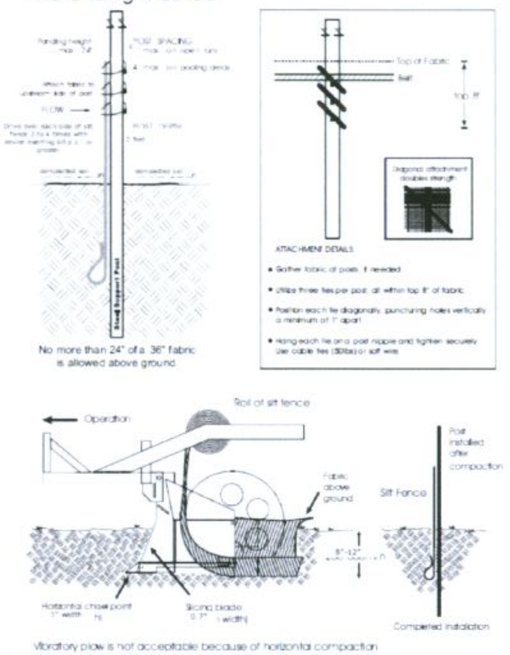


Figure 6.62a Installation detail of a sediment fence

The Slicing Method



Vibratory plow is not acceptable because of horizontal compaction

Figure 6.62b Schematics for using the slicing method to install a sediment fence. Adapted from *Silt Fence that Works*

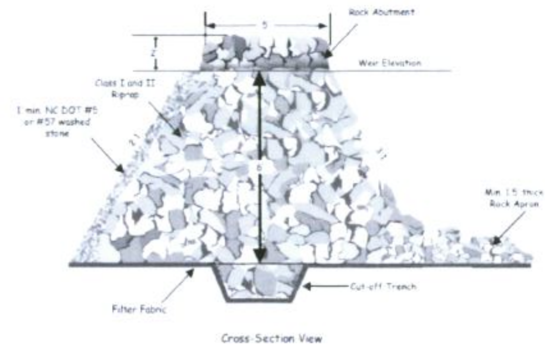
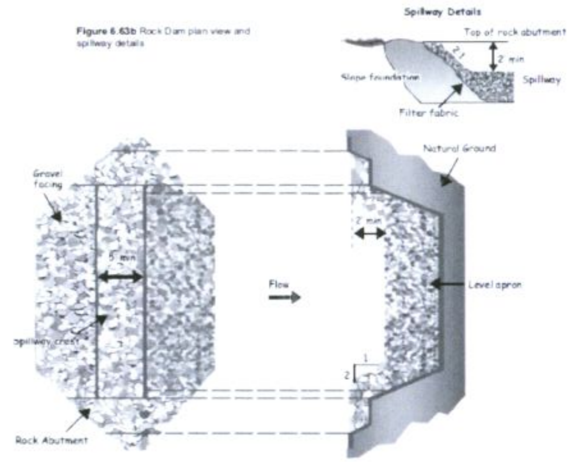


Figure 6.83a Rock Dam cross section

L = The distance such that points A and B are of equal elevation

Figure 6.83a Space check dams in a channel so that the crest of downstream dam is at elevation of the toe of upstream dam

Figure 6.83b Rock Dam plan view and spillway details



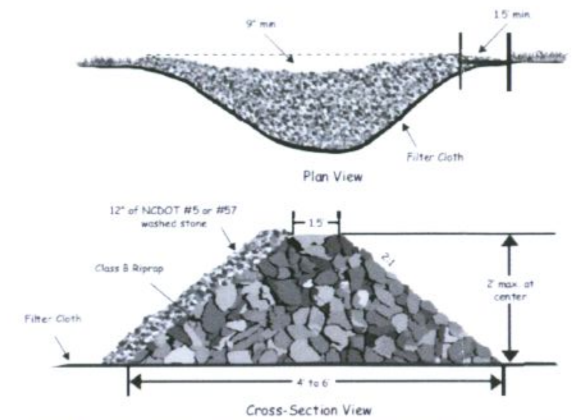
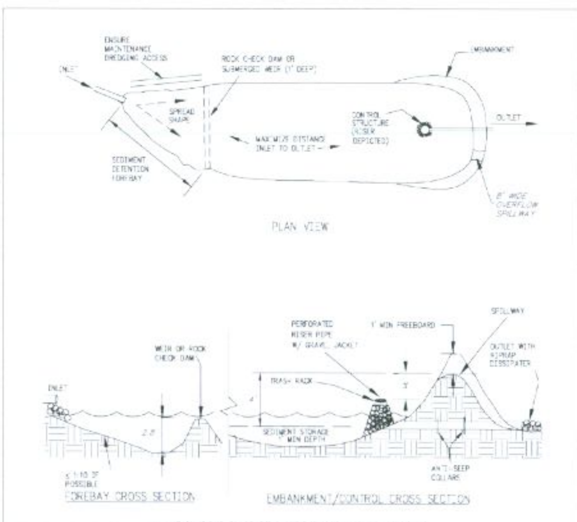


Figure 6.83b Stone check dam stone should be placed over the channel banks to keep water from cutting around the dam



BY	MARK	REVISIONS	DATE

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PROJECT NO. 119793SG2012
STDS.
SHEET 4 OF 4
DATE: MAY, 2012
SCALE: AS SHOWN
FILE NO. JDR-2264-04

APPENDIX G

SUPPLEMENTAL INFORMATION

Soil Map—McDowell County, North Carolina
(Old Fort Land Fill)

Map Scale: 1:10,100 if printed on A size (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 350 700 1,400 2,100

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:10,100 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 17N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: McDowell County, North Carolina
Survey Area Data: Version 11, Jul 21, 2009

Date(s) aerial images were photographed: 7/1/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

McDowell County, North Carolina (NC111)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BmA	Biltmore loamy fine sand, 0 to 3 percent slopes, occasionally flooded	4.2	0.8%
BrB2	Braddock clay loam, 2 to 6 percent slopes, eroded	15.6	3.1%
BrC2	Braddock clay loam, 6 to 15 percent slopes, eroded	3.8	0.7%
EvD	Evard loam, 10 to 25 percent slopes	3.1	0.6%
EwE	Evard-Cowee complex, 25 to 60 percent slopes	250.1	49.0%
HcC2	Hayesville clay loam, 6 to 15 percent slopes, eroded	126.3	24.8%
HeD	Hayesville-Evard complex, 15 to 25 percent slopes	74.2	14.6%
RoA	Rosman loam, 0 to 3 percent slopes, occasionally flooded	31.5	6.2%
W	Water	1.1	0.2%
Totals for Area of Interest		**509.9**	**100.0%**

McDowell County, North Carolina

EwE—Evard-Cowee complex, 25 to 60 percent slopes

Map Unit Setting

Elevation: 2,200 to 3,600 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 124 to 176 days

Map Unit Composition

Evard, stony, and similar soils: 55 percent
Cowee, stony, and similar soils: 25 percent

Description of Evard, Stony

Setting

Landform: Mountain slopes, ridges
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Upper third of mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Affected by soil creep in the upper solum over residuum weathered from igneous and metamorphic rock

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.2 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 5 inches: Loam
5 to 32 inches: Clay loam
32 to 45 inches: Loam
45 to 80 inches: Sandy loam

Description of Cowee, Stony

Setting

Landform: Mountain slopes, ridges
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Upper third of mountainflank, side slope

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Affected by soil creep in the upper solum over residuum weathered from igneous and metamorphic rock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.8 inches)

Interpretive groups

Land capability (nonirrigated): 6e

Typical profile

0 to 5 inches: Sandy loam
5 to 38 inches: Clay loam
38 to 80 inches: Weathered bedrock

Data Source Information

Soil Survey Area: McDowell County, North Carolina
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McDowell County, North Carolina

HcC2—Hayesville clay loam, 6 to 15 percent slopes, eroded

Map Unit Setting

Elevation: 1,700 to 2,500 feet
Mean annual precipitation: 45 to 65 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 180 days

Map Unit Composition

Hayesville, moderately eroded, and similar soils: 80 percent

Description of Hayesville, Moderately Eroded

Setting

Landform: Mountain slopes, ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountaintop, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from igneous and metamorphic rock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.7 inches)

Interpretive groups

Land capability (nonirrigated): 3e

Typical profile

0 to 6 inches: Clay loam
6 to 33 inches: Clay loam
33 to 45 inches: Loam
45 to 80 inches: Fine sandy loam

Data Source Information

Soil Survey Area: McDowell County, North Carolina
Survey Area Data: Version 11, Jul 21, 2009