



COMMONWEALTH of VIRGINIA

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March 14, 2018

Mr. Michael Liberati
DuPont Corporate Remediation Group
Chestnut Run Plaza 715-236
Wilmington, DE 19805

VIA ELECTRONIC MAIL

**Re: 100% Final Technical Execution Plan for the Allied Ready Mix Bank Management Areas
Former DuPont Waynesboro Plant, Area of Concern 4
Waynesboro, Virginia
EPA ID# VAD003114832**

Dear Mr. Liberati:

This letter acknowledges the receipt and review of the 100% Final Technical Execution Plan for the Allied Ready Mix Bank Management Areas, submitted to the Virginia Department of Environmental Quality, Office of Remediation Programs (Department) by AECOM on behalf of the E.I du Pont de Nemours and Company (DuPont).

The Department approves the design with no further comment at this time.

If you have any questions, you may contact me at 703-583-3825 or by email at Kurt.Kochan@deq.virginia.gov.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kurt W. Kochan".

Kurt W. Kochan
Corrective Action Project Manager
Office of Remediation Programs

cc: DuPont Waynesboro Correspondence File
Brett Fisher, Calvin Jordan, VDEQ-CO
Ceil Mancini, Josh Collins, Cameron Dixon, AECOM



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February 23, 2018

Kurt Kochan
Virginia Department of Environmental Quality
Office of Remediation
629 East Main Street
Richmond, Virginia 23219

**Technical Execution Plan
Allied Ready Mix Property Bank Management Areas
Area of Concern 4, Former DuPont Waynesboro Site, Waynesboro, Virginia**

Dear Mr. Kochan:

DuPont is submitting the attached 100% Final Technical Execution Plan (TEP) to present the rationale and technical implementation details for a portion of the Phase 1 interim measures for Area of Concern (AOC) 4 of the Former DuPont Waynesboro Site, located in Waynesboro, Virginia. The specific area addressed in this TEP is referred to as the Allied Ready Mix (ARM) Property Bank Management Areas (BMAs); the property is located on the right bank of the South River from Relative River Miles (RRMs) 1.33 to 1.59. As described in the Interim Measures Work Plan (IMWP) (Anchor QEA et al., 2015), the Phase 1 interim measures are being implemented as part of a larger remedial strategy to address historical releases of inorganic mercury (IHg) from the site, which migrated to the South River and a portion of the South Fork of the Shenandoah River.

This Final TEP is submitted as part of the Adaptive Management framework of the IMWP, to present the specific technical details for the ARM BMAs in the context of the overall program. This document incorporates revisions based upon comments received from VDEQ on the 90% Draft TEP, in an email dated February 6, 2018. In addition, DuPont is also submitting the response to comment matrix with the AECOM's responses for VDEQ concurrence.

To keep the remediation schedule moving, we will publish the public notice in the News Virginian advertising the availability of the 100% Design at the Waynesboro Public Library, located at 600 S. Wayne Ave, Waynesboro, VA 22980. The advertisement will run in two consecutive Sunday editions on February 25, 2018 and March 4, 2018. The Final Technical Execution Plan will be delivered to the Waynesboro Public Library on Friday, February 23, 2018 starting the public notice period, which will end on Friday, March 9, 2018. We plan to initiate construction activities soon after the public comment period ends with VDEQ concurrence.

Should you have any questions, please contact me at your convenience (302-598-9936).

Respectfully submitted,

Michael R. Liberati
Principal Project Director
DuPont Corporate Remediation Group

cc: Ralph Stahl, DuPont
Nancy Grosso, DuPont
Joshua Collins, AECOM
Cameron Dixon, AECOM

REVIEW COMMENTS and RESPONSES

DOCUMENT (DATE): 90% Draft Technical Execution Plan (TEP) – Allied Ready Mix (ARM) Property Bank Management Areas (BMAs)
PRINCIPAL AUTHOR (Name, Company): AECOM for E.I. du Pont de Nemours and Company
HDR Contract No.: EP2060743

HDR Reviewers: Patrick Blandford and Phil Werner
DEQ Reviewers: Kurt Kochan and Calvin Jordan

Item No.	Page No., Section, Para No.	HDR/DEQ Recommended Changes/Comment	Principal Author Response	HDR/DEQ Follow Up
1	General Comment	I appreciate the approach in lessening the size of the riprap and overall appearance of the rock toe. I hope we find it to be successful and reproducible in other locations.	Acknowledged.	
2	General Comment	What data, if any, prompted the removal of sediment located with the river channel?	The proposed excavation of fine-grained sediment located in the river channel was based on relatively high concentrations of THg detected in samples collected at the Short-Term Monitoring Transect G. THg concentrations in sediments within this deposit are delineated by lower concentration samples (Transect F and Transect G) that are representative of THg concentrations within this reach of the South River. Sediment data will be added to Figure 2-1. The portion of fine-grained sediment to be excavated is located directly adjacent to the Primary BMA A and will be removed as part of the excavation at the toe of slope.	
3	Pg 9, Section 3.3, Paragraph 1	The text states “No excavation in the Primary BMAs will be conducted below the water table, except in areas where a stone toe will be installed.” It’s unclear to me what the reference to water table means here as the Typical Primary A Restoration Cross Section on Sheet X-103 shows excavation to invert of the river, which would presumably be below the water table in the slope	The base of the excavation shown on the cross sections represents the top of the water table during its lowest expected elevation due to seasonally dry conditions. The actual elevations of the base of excavation for the Primary BMAs may vary based on the water table elevations at the time of excavation. Material removed from Primary BMAs will be directly loaded out for off-site disposal; therefore, it needs to be dry enough to pass the paint filter test. Material excavated from the Secondary BMA and for the stone toe may be excavated in the wet and will be placed in a lined stockpile area to drain and for sampling prior to re-use as subgrade backfill in the Primary BMAs.	
4	Pg 9, Section 3.3, Paragraph 2	The text states “Construction water generated during stockpiling of saturated impacted soil will be filtered through sediment filter bags and discharged directly to the surrounding river in accordance with AECOM’s Waste Management Plan.” It is unclear to me what is meant by construction water as this sounds like a dewatering process. Item 3.02 D in Section 02 60 00 of the Technical Specifications states “Liquids collected within the waste material staging area shall be collected and containerized for characterization prior to off-site disposition.” Please check your stormwater permit as discharging dewatered liquids may be considered a violation of the permit. This may require revision in Section 31 23 00 of Technical Specifications. Further, if the permit allows for the discharge of this water, should this water then be filtered through filter bags then a biochar “polish”?	Text has been added to Section 3.1 and Section 3.3 to clarify what material is being placed in the stockpile and what the source of water being discharged to the river is. The stormwater permit does not prohibit discharge of water collected from excavated materials, as long as it is kept separate from stormwater. The water that is collected in the stockpile area will be water that decants from soil taken from the Secondary BMA and from the excavation for the stone toe, which is waiting re-use. The water collected from the stockpile will have the same characteristics as water in the excavation in contact with existing bank soils; therefore, it will be handled in the same way. The stockpile itself will be covered to prevent stormwater from collecting inside the lined stockpile area. Mercury in the water that is being discharged is strongly bound to the solids in the water, which is removed by the filter bags. Adding bio-char would not add significant removal because of this and is not consistent with prior phases of work.	
5	Pg 9, Section 3.3, Paragraph 3	The text states “additional methods may be implemented” meaning they don’t have to be. Consider “shall”.	The referenced text has been revised to “additional methods shall be implemented.”.	

REVIEW COMMENTS and RESPONSES

DOCUMENT (DATE): 90% Draft Technical Execution Plan (TEP) – Allied Ready Mix (ARM) Property Bank Management Areas (BMAs)
PRINCIPAL AUTHOR (Name, Company): AECOM for E.I. du Pont de Nemours and Company
HDR Contract No.: EP2060743

Item No.	Page No., Section, Para No.	HDR/DEQ Recommended Changes/Comment	Principal Author Response	HDR/DEQ Follow Up
6	Pg 10, Section 3.4.1 Paragraph 2	Again it is mentioned that excavation will not happen below the water table but the typical excavation sections show excavation to the channel bottom. How are we certain they will not be below the water table and what does it matter if we are excavating in the wet? Is this a permit condition?	See response to Comment 3. Excavation will be conducted above the water except in areas to accommodate the stone toe because excavation below the water table could cause sloughing of bank sediments. Material excavated below the water table (wet material) will be stockpiled for reuse on site. Water generated from stockpiling wet material will be collected and handled according to the Waste Management Plan (see response to Comment 4).	
7	Pg 10, Section 3.4.1 Paragraph 7	What is the rationale in switching from 50% biochar used previously in BMAs to only 15% here?	The revision is based on a change in biochar products from Cowboy Charcoal, to a BioChar Now product with a smaller particle size (20mm for Cowboy Charcoal vs. 3mm for BioChar Now), which provides a larger surface area. Input from the SRST researchers, including capping simulations performed by Texas Tech and column studies conducted at the University of Waterloo also informed this decision.	
8	Pg 10, Section 3.4.1 Paragraph 7	The text states “The 6-inch biochar layer will extend 6 inches above the OHWM...” In the typical detail it appears that the biochar layer will extend to the top of the bank unless the detail is incorrect and should show limits of the biochar backfill separate from the sand.	The referenced text has been revised to “The 6-inch biochar layer will extend up to the 2-year storm elevation or to the top of bank termination, whichever is reached first.”	
9	Pg 10, Section 3.4.1 Paragraph 7	What is the rationale for incorporating biochar filled socks in this design?	Biochar mats have replaced biochar-filled socks in the restoration design. Biochar mats on the bank beneath the stone toe would provide treatment of water that exchanges with the river at this elevation range during storm events. The biochar-filled geocells and the biochar mats together provide water treatment over the full range of elevations where water exchange through the bank is likely to occur.	
10	Sheet X-101, 102	Label other excavated slopes as 1.5:1 or add note that all slopes shall be 1.5:1 unless otherwise noted.	The cross-sections have been revised to include labels indicating bank slopes.	
11	Sheet X-103	I like the idea of having a critical slope stabilization measure for use in the field.	Agreed; critical slope stabilization treatments will add to future stabilization projects with overly steep bank angles.	
12	Sheet D-201	Add note to Geotextile Installation Detail that states all excess geotextile shall be wrapped under other material, buried, or trimmed from sight where adequately covered.	The suggested note has been added to the Geotextile Installation Detail.	
13	Sheet D-201	Detail 2, which is the typical for a Primary BMA is to have a 2:1 slope accordingly to page 10 in the text. Revise to 2:1.	Detail 2 has been revised accordingly.	
14	Sheet D-201	The geocell at the bottom of the slope appears to butt up against the top of the stone toe, instead of being installed under the stone toe as was performed at the City Shops.	Details 1 and 2 have been revised to state that where geocell meets riprap, a minimum of two rows of geocell shall be buried under riprap stone toe, per manufacturer recommendations.	
15	Section 31 37 00-2 and 3, 2.01 B, 1 and 2	The riprap has been switched from Class II to Class I but the size range for the stone remains the same. Should it not change as well?	The current stone size specified is equivalent to Class I riprap.	
16	Section 31 37 00, 3.02, B	Should the procedure mention an excavation step for the toe prior to placement of the stone? The Contract Drawings are clear though. Also, what is to happen if they encounter rock and perform the excavation?	Text has been revised to reference excavation.	
17	Technical Specification	I did not see a specification for the biochar filled sock. I think one might be needed to include material composition, density of biochar fill, fasteners, etc. beyond the details included on sheet D-201.	Biochar mats have replaced biochar-filled socks in the restoration design. A specification for the biochar mats is being developed in coordination with biochar and geotextile manufacturers. This will be provided at least 4 weeks prior to installation of the specified material.	

100% Final Technical Execution Plan (TEP) – Allied Ready Mix (ARM) Property Bank Management Areas (BMAs)

Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Submitted on behalf of:
E.I. du Pont de Nemours and Company

Submitted by:
AECOM
625 West Ridge Pike
Suite E-100
Conshohocken, PA 19428

Project Number: 60552472
Date: February 2018

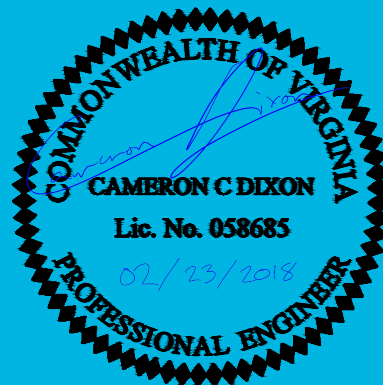


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Acronym List

Acronym	Explanation
AOC	Area of Concern
ARM	Allied Ready Mix
BMA	Bank Management Area
BMP	Best Management Practice
BODR	Basis of Design Report
DuPont	E.I. du Pont de Nemours and Company
DSR	DuPont Site Representative
EPA	U.S. Environmental Protection Agency
ERP	Emergency Response Plan
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
H	Horizontal
H&H	Hydrologic and Hydraulic
HDPE	High-Density Polyethylene
HEC-RAS	Hydrologic Engineering Center River Analysis System
IHg	Inorganic Mercury
IMWP	Interim Measures Work Plan
LiDAR	Light Detection and Ranging
mg/kg	Milligrams Per Kilogram
NTU	Nephelometric Turbidity Unit
NWP	Nationwide Permit
OHWM	Ordinary High Water Mark
ppm	Parts Per Million
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RRM	Relative River Mile
RTE	Rare, Threatened, Endangered
SPCP	Spill Prevention and Control Plan
SWPPP	Stormwater Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Procedure
TEP	Technical Execution Plan
THg	Total Mercury
UECA	Uniform Environmental Covenants Act, § 10.1-1238 et seq. of the Code of Virginia
USACE	United States Army Corps of Engineers
V	Vertical
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDOT	Virginia Department of Transportation

1.0 Introduction

AECOM has prepared this Technical Execution Plan (TEP) on behalf of E.I. du Pont de Nemours and Company (DuPont) to present the rationale and technical implementation details for a portion of the Phase 1 interim measures for Area of Concern (AOC) 4 of the Former DuPont Waynesboro Site, located in Waynesboro, Virginia (the site, see Figure 1-1). The specific area addressed in this TEP is referred to as the Allied Ready Mix (ARM) Property Bank Management Areas (BMAs); the property is located on the right bank of the South River from Relative River Miles (RRMs) 1.33 to 1.59 as shown in Figure 1-2. As described in the Interim Measures Work Plan (IMWP) (Anchor QEA et al., 2015), the Phase 1 interim measures are being implemented as part of a larger remedial strategy to address historical releases of inorganic mercury (IHg) from the site, which migrated to the South River and a portion of the South Fork of the Shenandoah River.

As described in the IMWP, Phase 1 interim measures target BMAs within portions of the South River directly adjacent to the site (RRMs 0 to 2) that contribute disproportionately to IHg loading in the South River (Anchor QEA et al., 2015).

Interim measures will include a combination of bank soil removal with off-site disposal, bank soil leaching treatment control, and stabilization (structural and vegetative).

1.1 TEP Scope

This section summarizes the scope of this TEP on a section-by-section basis. Section 1.2 of this TEP describes the purpose and objectives of the TEP and the interim measures at the ARM BMAs. Section 1.3 provides background information on the Hazardous Waste Permit for Corrective Action (Permit) issued for the site by the United States Environmental Protection Agency (EPA). Section 1.4 summarizes the Phase 1 BMAs work plan (Anchor QEA et al., 2015).

Section 2.0 summarizes the pre-design activities conducted to support the proposed interim measures at the ARM BMAs, including base mapping (Section 2.1), soil sampling (Section 2.2), hydrologic and hydraulic (H&H) modeling studies (Section 2.3), site access and landowner agreements (Section 2.4), and permitting (Section 2.5).

Section 3.0 describes the interim measures to be implemented within the ARM BMAs, including site preparation and erosion control (Section 3.1), clearing and grubbing (Section 3.2), water management (Section 3.3), remedial measures (Section 3.4), and waste management (Section 3.5).

Section 4.0 presents the schedule for interim measures at the ARM BMAs, and Section 5.0 lists the references cited in this plan.

Appendix A contains the final construction drawings (100% design). Appendix B contains the relevant analytical data. Appendix C provides the technical specifications.

Appendix D presents the results of the tree survey conducted within the project area.

Appendix E presents the results of the utility survey conducted within the ARM BMAs.

1.2 Purpose and Objectives

The purpose of this TEP is to describe the approach for implementing interim measures to address IHg loading from the ARM BMAs. As described in the *Basis of Design Report, Phase 1A Bank Management Areas, South River Area of Concern 4 (BODR)* (Anchor QEA et al., 2016b), the objectives of the Phase 1 interim measures are as follows:

- Reduce mercury loading to the South River from bank erosion.
- Reduce mercury loading to the South River from leaching of bank soils, as practicable.
- Decrease the impact of shear stress on bank areas with high erosion potential.

The short-term and long-term Remedial Action Objectives (RAOs) are described in detail in the *Area of Concern (AOC) 4 Remediation Selection Process, Former DuPont Waynesboro Site, Virginia* (AECOM, 2017).

Short-term and long-term monitoring efforts are being conducted to evaluate the effectiveness of the Phase 1 interim measures. The scope of the short-term monitoring is described in the *Final AOC 4 Short-Term Monitoring Plan – Relative River Mile 0-2 of the South River, Virginia* (URS, 2015a) and as part of the *Final Interim Measures Design, Implementation, and Monitoring Work Plan, Phase 1 – South River Area of Concern 4 (Phase 1 IMWP)* (Anchor QEA et al., 2015). The long-term monitoring plan is described in the *Final AOC 4 Long-Term Monitoring Plan, South River and a Segment of the South Fork of the Shenandoah River, Virginia* (URS, 2015b) and as part of the Phase 1 IMWP (Anchor QEA et al., 2015).

1.3 RCRA Permit

The EPA issued the Permit for on-site areas of the site under the Resource Conservation and Recovery Act (RCRA) in September 1998. A revised Permit (VAD003114832) was approved by the Virginia Department of Environmental Quality (VDEQ) – Office of Waste Permitting and Compliance on September 24, 2009 (VDEQ, 2009). VDEQ signed a modification of the existing on-site RCRA permit in February 2014 to include the off-site area, designated as AOC 4. AOC 4 includes the aquatic and terrestrial systems of parts of the South River downstream of the site and parts of the South Fork Shenandoah River, Virginia (see Figure 1-1).

1.4 Interim Measures Work Plan

The Phase 1 IMWP, which was approved in March 2015 (Anchor QEA et al., 2015), outlined the rationale for remediating riverbanks in the South River, within an adaptive management framework. In addition, the IMWP described the process of design and permit actions required to address IHg loading within RRM 0 to 2.

The BODR, which was developed subsequent to approval of the IMWP, described the key design elements of the interim measures to be implemented within the Phase 1A BMAs; it presented the implementation plan, schedule, and sequencing (Anchor QEA et al., 2016b). The Phase 1A areas described in the BODR included BMAs on DuPont and city-owned properties, while Phase 1B areas included city-owned and non-city-owned properties. This TEP has been prepared to present the rationale and strategy for implementing interim measures specific to the ARM BMAs; these interim measures have been refined since issuance of the BODR based on recently generated soil analytical data and detailed survey information.

The IMWP and BODR also discussed the concept of Primary and Secondary BMAs. Primary BMAs consist of sections of the bank where impacted soils are excavated, and the bank is reconstructed in a stable configuration. Secondary BMAs are sections of the bank where enhanced vegetative stabilization measures are applied to the existing soils to prevent erosion in the future. The ARM BMAs have both Primary and Secondary BMAs.

2.0 Pre-Design Support Activities

The ARM BMAs are located on the right bank of the South River from RRM 1.33 to 1.59. There are three separate BMAs at the site: a Primary BMA (BMA A) from RRM 1.42 to 1.46, a second Primary BMA (BMA B) from RRM 1.57 to 1.59, and a Secondary BMA from RRM 1.33 to 1.42. Pre-design investigations specific to the ARM BMAs conducted in the summer of 2017 to support the remedial design are discussed below and documented in Appendices B, D, and E.

2.1 Base Mapping

Pre-design mapping efforts consisted of a topographic and property boundary survey, supplemental bank soil sampling, a tree survey, and a subsurface utility survey.

The topographic survey of the project area was conducted by AECOM on July 10-14, 2017, and the results are incorporated into the 100% design construction drawings (see Appendix A). An additional survey will be conducted in the spring of 2018 prior to construction to fill in data gaps. Surveying efforts will be conducted in accordance with Specification Section 01 73 23 – Field Engineering.

A tree survey was conducted by AECOM during the week of June 26, 2017 to identify the extent of mature riparian forest or trees to be protected in the ARM BMAs to minimize disturbance to the extent possible during remediation. Results of the tree survey are provided in Appendix D.

A utility survey using ground penetrating radar was conducted by AECOM on July 11-12, 2017 to identify underground utilities that may be present within the work area. Results of the utility survey are presented in Appendix E.

The ARM BMA banks are generally heavily wooded, with slopes ranging from steeper than 1 Horizontal (H) to 1 Vertical (V) to 4H:1V; most of the banks have slopes of 2H:1V. In the Secondary BMA, there is a section of bank where some armor stone has been placed and vegetation has been cleared to accommodate utilities crossing the river and a 36-inch concrete outfall.

The banks are generally 6 to 8 feet high. From the top of bank, there is a flat area that extends to the base of the embankment for the former Belt Line Railroad right of way, which is approximately 8 feet higher than the elevations at the top of the bank.

A small area of fine-grained sediment was identified at the base of the bank largely contiguous with the Primary BMA A from RRM 1.42 to 1.46. The fine-grained sediment is approximately 6 feet wide and 6 to 12 inches thick.

2.2 Soil Analytical Data

Bank soils from the South River watershed have been evaluated by the South River Science Team for more than 10 years to better understand the fundamental dynamics of geomorphology and mercury fate and transport within the system. Supplemental bank soil assessment has been performed since 2012 to more fully characterize the distribution and concentration of total mercury (THg) in South River bank soils from RRM 0 to 5. Soils were typically sampled along riverbank transects, positioned within selected bank segments. Over the course of the supplemental bank soil sampling program, phased sampling has been conducted to collect composite surficial (0 to 2-inch depth interval) soil samples along the bank face as well as close-interval vertical core

(subsurface) soil samples to delineate the three-dimensional spatial extent of THg in the bank soils. Soil sample locations collected within the ARM BMAs are shown in Figure 2-1.

Table 2-1 presents a summary of THg data for the ARM BMAs. Complete analytical results are provided in Appendix B. Average THg concentrations in the surficial bank soils ranged from 0.60 milligrams per kilogram (mg/kg) to 236 mg/kg (see Table 2-1); the maximum detected THg concentration in surficial bank soils (817 mg/kg) was observed at transect RB03-4 (see Appendix B). Average THg concentrations in the subsurface bank soils collected along the ARM BMAs ranged from 0.73 mg/kg to 883 mg/kg (see Table 2-1); the maximum detected THg concentration in subsurface bank soils (2,470 mg/kg) was observed in the 2- to 3-foot depth interval at boring RBH13-206B (see Table 2-1 and Appendix B). Bank soil with elevated THg concentrations, which contributes to disproportionately high mercury loading of the river, is targeted for removal (see Section 3.0 for details).

2.3 Hydrologic and Hydraulic Modeling

Hydraulic models will be prepared to compare the existing condition and the proposed condition, using the ARM BMA interim measures design layout to assess the potential hydraulic impact of the proposed remediation project on side-gradient and downgradient banks and structures. Model geometry data will be derived from the previous modeling efforts by Anchor QEA updated with additional survey data, updated bridge plans, and Light Detection and Ranging (LiDAR) data. The base flood (100-year, 24-hour design storm) elevations between the proposed and existing conditions will be compared to assess the potential impact of the proposed ARM BMA interim measures design on the South River base flood elevations.

The H&H modeling studies conducted for the South River to date (URS, 2007; Anchor QEA et al., 2016a) comply with the data collection and modeling standards and procedures set forth by the Federal Emergency Management Agency (FEMA). The limit of the current studies extends approximately from Hopeman Parkway to West Main Street. Focused study for the Constitution Park remediation area included modifications associated with the Main Street Bridge project (Anchor QEA et al., 2016a). More recent modifications associated with the Broad Street Bridge project will be included in H&H study revisions to be performed as part of this ARM BMAs design project.

Table 2-2 displays the peak flows at Hopeman Parkway determined by the Flood Insurance Study (FIS), U.S. Geological Survey StreamStats web utility, and Log Pearson III methods. The Log Pearson III analysis of the gauge data generally yielded the highest peak flows; whereas, the StreamStats peak flows and the FIS flows are relatively comparable.

The hydraulic analysis to be performed as part of the ARM BMA studies will use the United States Army Corps of Engineers' (USACE's) Hydrologic Engineering Center River Analysis System (HEC-RAS) (Version 5.0.0). The study limit includes three additional bridges at East Broad Street, CSXT Railroad, and 2nd Street. West Main Street is approximately 1,700 feet downstream of the former DuPont facility. This segment of South River is located within FEMA's Zone AE according to the Flood Insurance Rate Map (FEMA, 2007).

Across the river from the ARM BMAs is the City Shops BMAs, which involve excavation, backfill, and riprap placement along the bank as described in the BODR (Anchor QEA et al., 2016b). The hydraulic modeling completed by Anchor QEA in support of this work

predicts that there will be a maximum rise of 0.12 feet associated with the City Shops BMAs work. The HEC-RAS model for the ARM BMAs will include the as-built conditions for the City Shop BMAs to provide the most accurate predictions for the combined work. The modeling results will be provided as an addendum to this report following the completion of the City Shops work and prior to the start of in-water work at the ARM BMAs.

2.4 Site Access and Landowner Agreements

All properties affected by the site work are owned by Eagle Corporation. DuPont has obtained an access agreement from the site owner to perform the remedial activities described in this TEP. DuPont will work with VDEQ and the property owner to execute an Environmental Covenant in accordance with the Virginia Uniform Environmental Covenants Act, § 10.1-1238 et seq. of the Code of Virginia (UECA) following the completion of the project. A Maintenance Agreement for post-construction maintenance of the remediated banks will also be executed.

2.5 Permitting Approach

This section summarizes the anticipated federal, state, and local permits and authorizations that may be needed for implementation of Phase 1 interim measures. As part of the permitting process, the potential presence of rare, threatened, and endangered (RTE) species and their habitat have been assessed. In addition, cultural and historic resource assessments were performed within the Phase 1 ARM BMA areas. Table 2-3 summarizes the submittal, responsible agency, authorization, applicability, duration, fees, and associated assumptions.

2.5.1 Identification of Permits

Based on a review of federal, state, and local permitting requirements, it is anticipated that the following permits and approvals may be required for implementation of the ARM BMA interim measures (see Table 2-3):

- Section 404 Permit – Nationwide Permit (NWP) 13 (for bank stabilization activities) and/or a NWP 38 (for cleanup of hazardous and toxic waste)
- Section 401 Water Quality Certification
- Virginia Water Protection Program General Permit
- Virginia Marine Resources Commission Permit for Sub-Aqueous Encroachment
- Land Disturbance Permit/Erosion and Sediment Control Plan Approval
- Virginia Pollutant Discharge Elimination System General Permit for Discharges of Stormwater from Construction Activities (VAR10)
- Stormwater Management Permit
- City of Waynesboro Site Development Permit (including the Entrance Permit)

The Joint Permit Application for the section 404, Section 401, Virginia Water Protection Program General Permit, and the Virginia Marine Resources Commission Permit for Sub-Aqueous Encroachment was submitted on December 14, 2017. Applications for the remaining permits will be submitted subsequent to issuance of this document for stakeholder review.

2.5.2 Endangered, Rare, and Sensitive Species and Areas Assessments

The Endangered Species Act (16 USC 1536 [a] – [d]; 50 CFR Part 402) grants authority to, and imposes requirements upon federal agencies regarding endangered or threatened species of fish, wildlife, or plants (listed species) and habitat of such species that have been designated as critical. Federal agencies must confer on any action that may jeopardize the continued existence of a species, or result in the destruction or adverse modification of critical habitat, and may include modification to the action (e.g., under the Clean Water Act permit or equivalent) to avoid the likelihood of adverse effects to listed species or their critical habitat.

The Virginia Natural Heritage Data Explorer, maintained by the Virginia Department of Conservation and Recreation, was queried to identify potential threatened or endangered species in the South River. The query revealed that several threatened or endangered vascular plant, crustacean, mussel, amphibian, reptile, mammal, and bird species may potentially be present in the South River AOC 4 watershed. Additional consultation with U.S. Fish and Wildlife Service to assess federal RTE species was conducted as part of the permitting process, and it was confirmed that no RTE species or critical habitat were present within the project area. The Virginia Department of Game and Inland Fisheries evaluates state RTE species as part of the permit review process, which is ongoing at this time. However, based upon previous projects on the opposite riverbank (i.e., City Shops), no adverse impacts to potential state RTE species are expected. After construction, habitats on the BMAs will be restored to the extent practicable.

2.5.3 Cultural and Historic Resources Assessments

As part of the federal and state permit process, the responsible agency must consult with the State Historic Preservation Officer and the federal Advisory Council on Historic Preservation to determine if the project has the potential to affect historic structures or archaeological resources listed on, or eligible for listing on, the National Register of Historic Places. The Virginia Department of Historic Resources archives were queried using the online Data Sharing System to identify previously identified historic structures and archaeological resources within the project area. No archaeological resources were found within or adjacent to the ARM BMA area.

3.0 Interim Measures

Interim measures to be conducted at the ARM BMAs consist of excavation and off-site disposal of mercury-impacted soils from the Primary BMAs, re-shaping of banks steeper than 1H:1V in the Secondary BMA, and bank stabilization at all BMAs to reduce erosion of mercury-impacted soils in the future.

This section summarizes the approach for implementing the interim measures within the ARM BMAs. Some elements of the implementation approach will be defined by the Contractor as part of the bidding process (BODR; Anchor QEA et al., 2016b). Prior to the start of work, the Contractor will be required to provide a detailed work plan that will specify the means and methods for the remediation and restoration activities. The Contractor will conduct all remedial activities in accordance with the quality control requirements presented in Section Specification 01 40 00 – Quality Requirements.

3.1 Site Preparation and Erosion Control

Site preparation activities will include, but are not limited to, installation of temporary fencing and construction trailers, construction of access points, access roads, parking areas, staging and storage areas, and installation of temporary erosion and sediment controls. The site preparation plan is provided on Drawing C-101 – Site Preparation and Erosion Control Plan, and details are provided on Drawings D-101 through D-105 – Site Preparation and Erosion Control Details and Notes (see Appendix A). Additional details are provided in Specification Section 01 50 00 – Temporary Facilities and Controls.

Prior to the start of work, a temporary construction fence will be constructed to secure the work area from the public (Drawings C-101 and D-101 through D-105). Erosion and sediment controls measures will be installed prior to the start of intrusive activities and include measures such as hay bales, silt fences, and temporary construction entrances (Drawings C-101 and D-101 through D-105).

The Contractor will decontaminate equipment when transitioning from exclusion zones to support zones and prior to leaving the site in accordance with Specification Section 02 51 00 – Equipment Decontamination and Screening. The decontamination area location will be determined by the Contractor during construction.

The contractor will build a lined stockpile in the location shown on Drawing C-101. This stockpile will take potential re-use soils removed from the Secondary BMA from critical slope reduction or stone toe excavation. The stockpile will be covered when not in use to prevent stormwater from accumulating in the stockpile.

AECOM will prepare a Stormwater Pollution Prevention Plan (SWPPP) outlining specific best management practices (BMPs) to be employed prior to and during construction. The Contractor will prepare an Emergency Response Plan (ERP) or a Spill Prevention and Control Plan (SPCP) to prevent adverse discharges to surface water. The SWPPP and ERP/SPCP are subject to review and approval by the DuPont Site Representative (DSR) and the City of Waynesboro. BMPs in the Contractor-prepared SPCP will include methods for controlling dust and preventing contaminated soil/sediment from exiting the work area via construction vehicles and equipment.

3.2 Clearing and Grubbing

Following site preparation activities and installation of temporary erosion and sediment controls, clearing and grubbing of ground cover and select shrubs and trees within the work area will be conducted. Larger, healthy trees that provide protection against erosion will be protected by the Contractor during construction to the extent possible. Trees to be preserved are identified on Drawing C-101. Additional details on selective clearing and grubbing are provided in Specification Section 31 12 00 – Selective Clearing.

All debris generated during clearing and grubbing operations will be disposed of in accordance with AECOM's Waste Management Plan to be prepared prior to the start of work and will be subject to review and approval by the DSR and in accordance with Specification Section 02 60 00 – Contaminated Site Material Removal.

3.3 Water Management

In Primary and Secondary BMAs, a temporary cofferdam will be erected around the base of the stone toe excavation to isolate the work area and protect upland areas from rising water in the event of potential storm events during construction. No excavation in Primary BMAs will be conducted below the water table, except in areas where a stone toe will be installed. Excavation required to accommodate construction of the stone toe in both Primary and Secondary BMAs will be conducted in the wet.

Water within the cofferdam area will be pumped prior to excavation in both Primary and Secondary BMAs, filtered through sediment filter bags, and discharged directly to the surrounding river in accordance with AECOM's Waste Management Plan. Construction water generated during stockpiling of saturated impacted soil will be handled in a similar manner; it will be filtered through sediment filter bags and discharged directly to the surrounding river in accordance with AECOM's Waste Management Plan.

Any standing water will be pumped out of the temporary cofferdam area prior to deconstruction of the cofferdam. If the turbidity of the standing water is less than 50 Nephelometric Turbidity Units (NTUs) above the turbidity of the surrounding river, the standing water will be discharged to the surrounding river. If the standing water is 50 NTUs or greater above the turbidity of the surrounding river, additional methods shall be implemented to reduce turbidity such as settling, filtering through sediment filter bags, or applying biodegradable flocculants. Following clarification, the standing water will be filtered through sediment filter bags and discharged directly to the surrounding river in accordance with AECOM's Waste Management Plan.

The Contractor will submit a Water Control and Emergency Action Plan for approval by the DSR prior to mobilization. Refer to Specification Section 31 52 00 – Temporary Cofferdams for additional details.

3.4 BMA Remedial Measures

As presented in Figure 2-1, two separate remedial approaches will be implemented within the ARM BMAs. Primary BMAs with elevated THg concentrations will be excavated from RRM 1.42 to 1.46 and RRM 1.57 to 1.59; these areas will then be addressed with a combination of bank leaching control and in-situ bank stabilization. The Secondary BMA from RRM 1.33 to 1.42 will be addressed with in-situ bank stabilization, coupled with bank leaching control. Within the Secondary BMA, a Critical Slope Reduction Area has been designated based on the presence of bank slopes

steeper than 1H:1V. Excavation within the Secondary BMA is required prior to the installation of bank leaching treatment control and structural stabilization measures within the Critical Slope Reduction Area to achieve final slopes of 1H:1V. The remedial approaches to be implemented within the ARM BMAs are discussed in detail in Sections 3.4.1 and 3.4.2.

3.4.1 Primary BMAs: RRM 1.42 to 1.46 and RRM 1.57 to 1.59

Bank Soil Removal and Off-Site Disposal

In the Primary BMAs, soil that has been identified as having elevated THg concentrations relative to the Secondary BMA has been targeted for removal. As shown on Drawing C-201 – Excavation Plan, Drawing C-301 – Final Grading Plan, and Drawings X-101 through X-102 – Excavation Cross Sections, soil removal activities will generally extend horizontally from the base of the bank for 2 to 10 feet, and then slope at 1.5H:1V until the top of the bank is reached.

Excavation of bank soils will be conducted mechanically and above the water table. Therefore, excavation of bank soils will be conducted in the dry. Refer to Section 3.3 for details on the construction of a temporary cofferdam and water management within the excavation area.

Excavation will be conducted from the top of the bank unless other means are proposed by the Contractor and approved by the DSR. Additional details are provided in Specification Section 31 23 00 – Earthwork and Fill. The Contractor will prepare a Remedial Action Work Plan, which will contain measures that allow the Contractor to excavate slopes in a safe manner.

Soil will be excavated and loaded directly into dump trucks or similar equipment and hauled directly to the disposal facility. Alternatively, the Contractor may elect to stockpile material in a previously identified suitable area, subject to approval by the DSR and the City of Waynesboro, Virginia (the City). Stockpiling at the Jones Hollow Property staging area will not be permitted. Additional details are provided in Specification Section 02 60 00 – Contaminated Site Material.

Excavated materials will be pre-characterized prior to disposal. Refer to Section 3.5 for additional details on waste management procedures.

Post-excavation samples will be collected at the base of the excavation area and analyzed for THg to document post-remedial conditions. Post-excavation sampling results will not be used to revise excavation limits in the field. Post-excavation sampling results will be included as part of relevant construction completion reports. Post-excavation samples will be collected in accordance with the programmatic Quality Assurance Project Plan (URS, 2015c).

Bank Leaching Treatment Control

Immediately following excavation and prior to backfilling, a layer of biochar, mixed with 85% subgrade fill, will be placed within a 6-inch, high-density, polyethylene (HDPE) geocell in Primary BMA A. Additional details are provided in Specification Section 31 23 00 – Earthwork and Fill, Specification Section 31 05 19 – Geosynthetics, and Specification Section 31 35 00 – Slope Protection. The geocell will provide structure so that the biochar mixture remains in place on the slope prior to backfilling. The 6-inch biochar layer will extend up to the 2-year storm elevation or to the top of bank termination, whichever is reached first (Drawing C-401 – Restoration Plan,

Drawing X-103 – Stabilization and Restoration Cross Sections, and Drawings D-201 through D-202 – Restoration Details). To provide leaching treatment below the geocell area, a biochar mat will be placed from the 6-inch geocell termination to the bottom of bank elevation, as shown on Drawings D-201. Geocell material will be secured according to manufacturer's recommendations (Drawing D-202).

Backfilling

Subgrade backfill will be installed in Primary BMA A (RRM 1.42 to 1.46) following biochar application using mechanical methods. Backfill will be placed at a stable slope configuration with a maximum slope of 2H:1V and will be placed in loose lifts and compacted to a minimum of 90% relative density for long-term stability. Twelve inches of topsoil will be placed on the finished slope to provide an appropriate substrate for vegetation establishment. Additional details on backfilling are provided on Drawings C-301, D-201, and X-103. Subgrade backfill will not be installed in Primary BMA B (RRM 1.57 to 1.59); instead, a 12-inch geocell will be placed directly on the excavation surface.

Subgrade backfill materials will be imported from DuPont's Jones Hollow Property located on Delphine Avenue in Waynesboro. For topsoil material, the Jones Hollow Property material will be amended so that the composition is an appropriate substrate for planned plant species. Topsoil will be covered with biodegradable erosion-control fabric to provide temporary protection from erosion while vegetation becomes established. Additional details on backfill and topsoil material are provided in Specification Section 31 23 00 – Earthwork and Fill.

Structural Stabilization

Following placement of backfill material, a stone toe armor layer will be constructed to provide protection against potential future erosion, including ice scour and bank undercutting (Drawings C-401 – Restoration Plan, X-103, and D-201). A trench will be excavated to accommodate the stone toe. Excavation required to accommodate the stone toe will be conducted in the wet. Material excavated for the stone toe will be stockpiled for re-use as subgrade backfill. The stone toe will be constructed of Virginia Department of Transportation (VDOT) Class I stone (or similar) placed at the base of the stone toe trench up to 6 inches above the ordinary high water mark (OHWM; Drawings C-401, X-103, and D-201).

Prior to installation of the toe armor, a non-woven geotextile filter with a minimum tensile strength of 150 pounds per foot, will be installed over the biochar mat and native substrate exposed at the base of the cut or bank face to cover the area where armor stone is to be installed (Drawings X-103 and D-201). The geotextile will be secured using stakes and installed in accordance with Specification Section 31 05 19 – Geosynthetics. Armor stone will be installed over the geotextile and over biochar where applicable.

Enhanced Vegetative Stabilization

Enhanced vegetative stabilization will be implemented by seeding and replanting native trees and shrubs. Hydroseeding will be conducted following placement of topsoil, and will include a mixture of native seeds and tackifier. Native seeds will be hand-broadcast over exposed topsoil areas following installation of trees and shrubs.

Native trees and shrubs will be planted by hand. Larger trees will be supported by a 2-inch-by-2-inch stake installed on the upwind side of the tree. Five-foot tree tubes will be

installed with each tree and shrub at the time of planting. The tubes will be staked into the ground with a 6-foot-tall wooden stake. Additional details on seeding and replanting are provided on Drawings C-501 through C-502 – Planting Plan, X-103, and D-301 – Planting Details, and in Specification Section 32 90 00 – Planting and Habitat Restoration.

3.4.2 Secondary BMA: RRM 1.33 to 1.42

Bank Leaching Treatment Control and Structural Stabilization

Within the Secondary BMA, excavation will be conducted within the Critical Slope Reduction Area to achieve a maximum slope of 1H:1V prior to the installation of bank leaching treatment control and structural stabilization measures. Excavation of bank soils in Critical Slope Reduction Areas will be conducted mechanically and above the water table. Therefore, excavation of bank soils will be conducted in the dry. Refer to Section 3.3 for details on the construction of a temporary cofferdam and water management within the excavation area.

Excavation will be conducted from the top of the bank unless other means are proposed by the Contractor and approved by the DSR. Additional details are provided in Specification Section 31 23 00 – Earthwork and Fill. The Contractor will prepare a Remedial Action Work Plan, which will contain measures that allow the Contractor to excavate slopes in a safe manner.

The excavated material may be used as backfill material in the Primary BMAs if deemed suitable. The Contractor will stockpile the excavated material in a previously identified suitable area, subject to approval by the DSR and the City. The excavated material will be characterized to determine the suitability for use as backfill material in Primary BMAs and for disposal purposes. If it is determined that the material is not suitable for use as backfill material on-site, the material will be disposed of in accordance with the Waste Management Plan. Refer to Section 3.5 for additional details on waste management procedures.

A 12-inch HDPE geocell will be placed on the constructed bank surface (Critical Slope Reduction Area) and on the existing bank surface (non-Critical Slope Reduction Area) to the top of bank (Drawings X-103 and D-201). A 6-inch layer of biochar, mixed with 85% planting substrate, will be placed within the geocell. The remainder of the geocell will be filled with 6 inches of planting substrate. Planting substrate will be covered with biodegradable erosion-control fabric to provide temporary protection from erosion while vegetation becomes established. Additional details on backfill and topsoil material are provided in Specification Section 31 23 00 – Earthwork and Fill. To provide leaching treatment below the geocell area, a biochar mat will be installed from the end of geocell to the bottom of bank elevation, as shown on Drawing D-201.

To provide further stabilization, a stone toe will be constructed at the foot of the geocell, except where exposed bedrock and tree roots provide sufficient erosion protection. A trench will be excavated to accommodate the stone toe. Excavation required to accommodate the stone toe will be conducted in the wet. Material excavated for the stone toe will be stockpiled for re-use as subgrade backfill. The stone toe will be constructed of VDOT Class I stone (or similar) and placed at the base of the stone toe trench up to 6 inches above the OHWM (Drawings C-401, X-103, and D-201).

Prior to installation of the toe armor, a non-woven geotextile filter with a minimum tensile strength of 150 pounds per foot will be installed over the biochar mat and native

substrate exposed at the base of the cut or bank face to cover the area where armor stone is to be installed (Drawings X-103 and D-201). The geotextile will be secured using stakes and installed in accordance with Specification Section 31 05 19 – Geosynthetics. Armor stone will be installed over the geotextile and over biochar where applicable. Additional details are provided in Specification Section 31 23 00 – Earthwork and Fill, Specification Section 31 05 19 – Geosynthetics, and Specification Section 31 35 00 – Slope Protection.

Enhanced Vegetative Stabilization

Enhanced vegetative stabilization will be implemented by seeding and replanting native trees and shrubs. Hydroseeding will be conducted following placement of topsoil and will include a mixture of native seeds and tackifier. Native seeds will be hand-broadcast over topsoil areas following installation of trees and shrubs.

Native trees and shrubs will be planted by hand. Larger trees will be supported by a 2-inch-by-2-inch stake installed on the upwind side of the tree. Five-foot tree tubes will be installed with each tree and shrub at the time of planting. The tubes will be staked into the ground with a 6-foot wooden stake. Additional details on seeding and replanting are provided in Specification Section 32 90 00 – Planting and Habitat Restoration.

3.5 Waste Management

AECOM will prepare a site-specific Waste Management Plan prior to the start of work for approval by the DSR. Pre-characterization of soil to be excavated will be conducted in accordance with AECOM's Waste Management Plan and in accordance with Specification Section 02 60 00 – Contaminated Site Material Removal.

Excavated soil will be characterized for THg and for leachable mercury by the RCRA toxicity characteristic leaching procedure (TCLP). Additional waste characterization may be performed if required by the disposal facility.

4.0 Schedule

Construction of the ARM BMA interim measures is anticipated to start in the spring of 2018 after completion of the City Shops BMA (RRMs 1.33 to 1.38 and 1.48 to 1.50) located across the river. The City Shops BMA is also referred to Wastewater Treatment Plant BMAs A and B. Depending on the completion date of the City Shops BMAs work, the start of the ARM BMA excavation work may be delayed until the summer of 2018 to allow the late spring high water flows to recede.

5.0 References

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- URS. 2015c. *RCRA Quality Assurance Project Plan (QAPP), Former DuPont Waynesboro Site Area of Concern (AOC) 4: South River and a Segment of the South Fork Shenandoah River, Virginia*. Updated March 2015.
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- VDEQ. 2009. *Virginia Department of Environmental Quality Permit Modification No. VAD003114832*. September 24, 2009. Modified February 2014.

Tables

Table 2-1
Summary of Total Mercury in Bank Soils
Technical Execution Plan – Allied Ready Mix BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Location ID	Number of Samples	Units	Minimum THg	Maximum THg	Arithmetic Average THg ¹
Surficial²					
ORBH-6-A	5	mg/kg	1.10	26.5	8.61
RB03-4	5	mg/kg	12.4	817	181
RB04-1	6	mg/kg	2.64	5.16	3.65
RB05-1	6	mg/kg	2.10	8.15	4.57
RB05-2	5	mg/kg	1.55	3.04	2.36
RBH-12-100	5	mg/kg	5.79	15.1	10.2
RBH-12-101	6	mg/kg	8.82	75.3	43.3
RBH-12-A	5	mg/kg	11.2	119	52.4
RBH-12-B	5	mg/kg	4.16	74.9	27.0
RBH-12-C	5	mg/kg	2.75	46.0	14.0
RBH-13-100	5	mg/kg	2.14	172	43.5
RBH-13-101	5	mg/kg	67.3	275	148
RBH-13-102	10	mg/kg	3.46	21.1	7.03
RBH-13-103	5	mg/kg	2.34	6.33	4.62
RBH-14-100	4	mg/kg	9.35	18.5	14.9
RBH-14-101	5	mg/kg	98.0	494	236
RBH-15-A	5	mg/kg	0.577	2.37	1.13
RBH-15-B	5	mg/kg	0.027	1.61	0.599
Subsurface³					
RB03-4	3	mg/kg	13.6	259	107
RB04-1	1	mg/kg	3.01	3.01	3.01
RB05-2	1	mg/kg	5.14	5.14	5.14
RBH-12-100	3	mg/kg	44.1	144	99.7
RBH-12-B	4	mg/kg	39.3	231	151
RBH-13-100	4	mg/kg	1.64	405	179
RBH-13-103	2	mg/kg	4.39	10.5	7.45
RBH-14-101	1	mg/kg	280	280	280
RBH-15-A	3	mg/kg	0.133	13.2	5.30
RBH13-200A	3	mg/kg	8.26	44.0	31.0
RBH13-200B	2	mg/kg	48.1	61.1	54.6
RBH13-200C	2	mg/kg	37.2	42.6	39.9
RBH13-201A	4	mg/kg	0.011	247	115
RBH13-201B	2	mg/kg	9.74	56.5	33.1
RBH13-201C	1	mg/kg	8.72	8.72	8.72
RBH13-202A	3	mg/kg	11.3	295	150
RBH13-202B	3	mg/kg	15.3	251	132
RBH13-202C	3	mg/kg	5.27	18.1	10.1
RBH13-203A	4	mg/kg	1.44	88.8	27.2
RBH13-203B	1	mg/kg	57.2	57.2	57.2
RBH13-203C	1	mg/kg	10.8	10.8	10.8
RBH13-204A	4	mg/kg	1.58	80.0	42.6
RBH13-204B	2	mg/kg	7.32	15.3	11.3
RBH13-204C	1	mg/kg	140	140	140

Table 2-1
Summary of Total Mercury in Bank Soils
Technical Execution Plan – Allied Ready Mix BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Location ID	Number of Samples	Units	Minimum THg	Maximum THg	Arithmetic Average THg ¹
RBH13-205A	4	mg/kg	0.027	709	212
RBH13-205B	4	mg/kg	16.1	906	398
RBH13-206A	4	mg/kg	21.5	1080	576
RBH13-206B	3	mg/kg	16.5	2470	883
RBH13-206C	1	mg/kg	862	862	862
RBH13-207A	3	mg/kg	27.6	1570	646
RBH13-207B	3	mg/kg	8.80	270	98.8
RBH13-207C	1	mg/kg	10.0	10.0	10.0
RBH14-200A	3	mg/kg	3.48	24.5	14.6
RBH14-200B	1	mg/kg	23.7	23.7	23.7
RBH14-200C	1	mg/kg	7.82	7.82	7.82
RBH14-201A	2	mg/kg	170	261	216
RBH14-201B	1	mg/kg	371	371	371
RBH14-201C	1	mg/kg	231	231	231
RBH14-202A	4	mg/kg	0.739	3.07	1.48
RBH14-202B	3	mg/kg	0.280	2.20	1.18
RBH14-202C	1	mg/kg	0.728	0.728	0.728
RBH13-208A	1	mg/kg	5.89	5.89	5.89
RBH13-208B	2	mg/kg	4.96	9.67	7.32
RBH13-208C	2	mg/kg	5.73	8.43	7.08
RBH13-209A	2	mg/kg	4.85	8.81	6.83
RBH13-209B	3	mg/kg	7.06	17.4	11.7
RBH13-209C	2	mg/kg	6.56	10.5	8.53

Notes:

1, Surficial soil arithmetic average is based on all samples collected in a single sample transect along the bank face; subsurface soil arithmetic average is based on all samples collected vertically, below the soil surface, at a given sample location.

2, Surficial soil samples were collected as composited samples (0-2"depth) along a transect from the top of the bank down to the wetted edge of the bank along the surficial bank face.

3, Subsurface soil samples were collected as vertical cores; sample depth intervals start from the soil surface [zero (0)] and continue down vertically.

BMAs - Bank Management Areas

mg/kg - milligrams per kilograms

THg - Total Mercury

Table 2-2
Peak Flows at Hopeman Parkway (July 2017)
Technical Execution Plan – Allied Ready Mix BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Method	Drainage Area Size (Sq Mi)	Peak Flows (CFS)			
		10-Yr (10%)	50-Yr (2%)	100-Yr (1%)	500-Yr (0.2%)
Federal Emergency Management Agency Flood Insurance Study	148.32	8,600	*	19,080	28,600
U.S. Geological Survey StreamStats Web Utility - Regional Regression	148	10,000	16,600	19,800	*
Log Pearson Type III Distribution	148	9,305	20,233	26,948	49,190

Notes:

BMAs - Bank Management Areas

CFS - cubic feet per second

SqMi - Square Miles

* - value not calculated

Table 2-3
Anticipated Permits and Approvals for Phase 1 Interim Measures
Technical Execution Plan – Allied Ready Mix BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Submittal	Agency	Authorization	Applicability	Timing	Fees	Notes/Assumptions
Joint Permit Application	USACE	Section 404 NWP 13 – Bank Stabilization	Waters and wetlands	45 days	None	Post Construction Notification required Mitigation not likely required
		Section 404 NWP 27 – Aquatic Habitat Restoration, Establishment, and Enhancement Activities Preferred option	Waters and wetlands	45 days	None	Post Construction Notification required Mitigation not likely required
		Section 404 NWP 38 – Cleanup of Hazardous and Toxic Waste	Waters and wetlands	46 days	None	Post Construction Notification required Mitigation required if impacts are greater than 1/10 acre; mitigation requirement may be waived
		Section 404 Individual Permit	Waters and wetlands	At least 3 or 4 months		Not anticipated for this project May require public notice
		Section 10 of the Rivers and Harbors Act	Certain navigable waters	N/A	N/A	N/A - South River is not a designated navigable water
		Section 401 Water Quality Certification	Any activity that may result in a discharge to navigable waters	N/A	N/A	Issued with NWP 38 Issued conditionally with NWP 27
	VDEQ (Northern Region administers VWPP)	VWPP Permit	Impacts to surface waters	General Permit: 60 days Individual Permit: 225 days	\$2,400 plus \$220 for each 0.1 acre (or portion thereof) of incremental impact over 2 acres (\$60,000 maximum)	General Permit 1 = less than 0.5 acre impacts Not required with a NWP 38 An individual permit is not anticipated, but may be required depending on the final remedial design
	VMRC	Permit for Sub-aqueous Encroachment	Sub-aqueous or bottomland encroachment (submerged lands that begin at the mean low water mark)	60 to 90 days	\$25 (\$100 for projects over \$10,000) Royalty fees may also be assessed	VMRC acts as a clearinghouse and sends a copy of the Joint Permit Application to the other local, state, or federal agencies that have applicable regulatory jurisdiction. Hearing required if an objection is filed that cannot be resolved and/or project is \$500,000 or more; there is no guarantee that a hearing, if required, will be scheduled within this timeframe and could result in an additional 30 days added to the schedule

Table 2-3
Anticipated Permits and Approvals for Phase 1 Interim Measures
Technical Execution Plan – Allied Ready Mix BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Submittal	Agency	Authorization	Applicability	Timing	Fees	Notes/Assumptions
Land Disturbance Permit Application/ E&S Control Application	City of Waynesboro	Land Disturbance Permit/ E&S Control Plan Approval	Land disturbance greater than 10,000 square feet	Varies; 60 days to review, comment, and approve if typical	Plan review: \$400+\$40/ac Inspection: \$400+\$75/ac	Pre-application meeting with the agencies is highly recommended to identify project classification and review considerations
	Augusta/Rockingham Counties				Varies based upon disturbance and/or project classification	E&S Application Coordination with Stormwater Permitting and Approval
	VDEQ				Varies based upon disturbance and/or project classification	Performance Bond required by County Typically submitted with General Permit for Discharges of Stormwater from Construction Activities (VAR10) Application
General Permit for Discharges of Stormwater from Construction Activities (VAR10) Application	VDEQ	General Permit for Discharges of Stormwater from Construction Activities (VAR10)	Land disturbance greater than 1 acre	Varies; 60 days to review, comment, and approve if typical	Varies based upon project type	Pre-application meeting with the agencies is highly recommended to identify project classification and review considerations
	City of Waynesboro	Stormwater Management Permit			Plan review: \$500+\$40/ac	Typically submitted with Land Disturbance Permit Application Requires preparation of a Stormwater Pollution Prevention Plan
Entrance Permit Application	City of Waynesboro	Entrance Permit	New access points to roadways	30 days	Unknown	Construction vehicle access to project sites Existing road grades and sight distances need to be maintained
Coordination	USFWS	Clearance	Federal RTE species	30 days	N/A	Review time does not include time for field studies and reporting
Coordination	VDGIF	Clearance	State RTE species	30 days	N/A	Review time does not include time for field studies and reporting
Coordination	VDCR	Clearance	Natural heritage resources	30 days	\$90 review fee + \$35 or \$60 depending on the number of occurrences	Review time does not include time for field studies and reporting
Coordination	Virginia DHR	Clearance	Architectural and archeological resources	10 to 20 days for archives search 30 days for project review	Archives search: \$75 review fee + \$5 per resource within the Area of Potential Effects	Review time does not include time for field studies and reporting Virginia DHR has 30 days to review any project submissions including detailed survey reports

Notes:

Depending on the remedial design approach, other permits may be required, including National Pollutant Discharge Elimination System permit, temporary dewatering permit, and a treatment works approval. These authorizations/approvals are typically through VDEQ; however, it is not anticipated that they will be required for this project.

Coordination with the Chesapeake Bay Commission and the Interstate Commission on the Potomac River Basin may be required to identify water quality requirements and for other considerations.

Ordinance review and coordination regarding utilities, railroad, and other easements will be performed throughout the project, and may require additional submittals and limits on work execution and restoration.

BMAs - Bank Management Areas

DHR - Department of Historic Resource

E&S - Erosion and Sediment

N/A - Not Applicable

NWP - Nationwide Permit

RRM - Relative River Mile

RTE - Rare, Threatened, and Endangered

USACE - U.S. Army Corps of Engineers

USFWS - U.S. Fish and Wildlife Service

VDEQ - Virginia Department of Environmental Quality

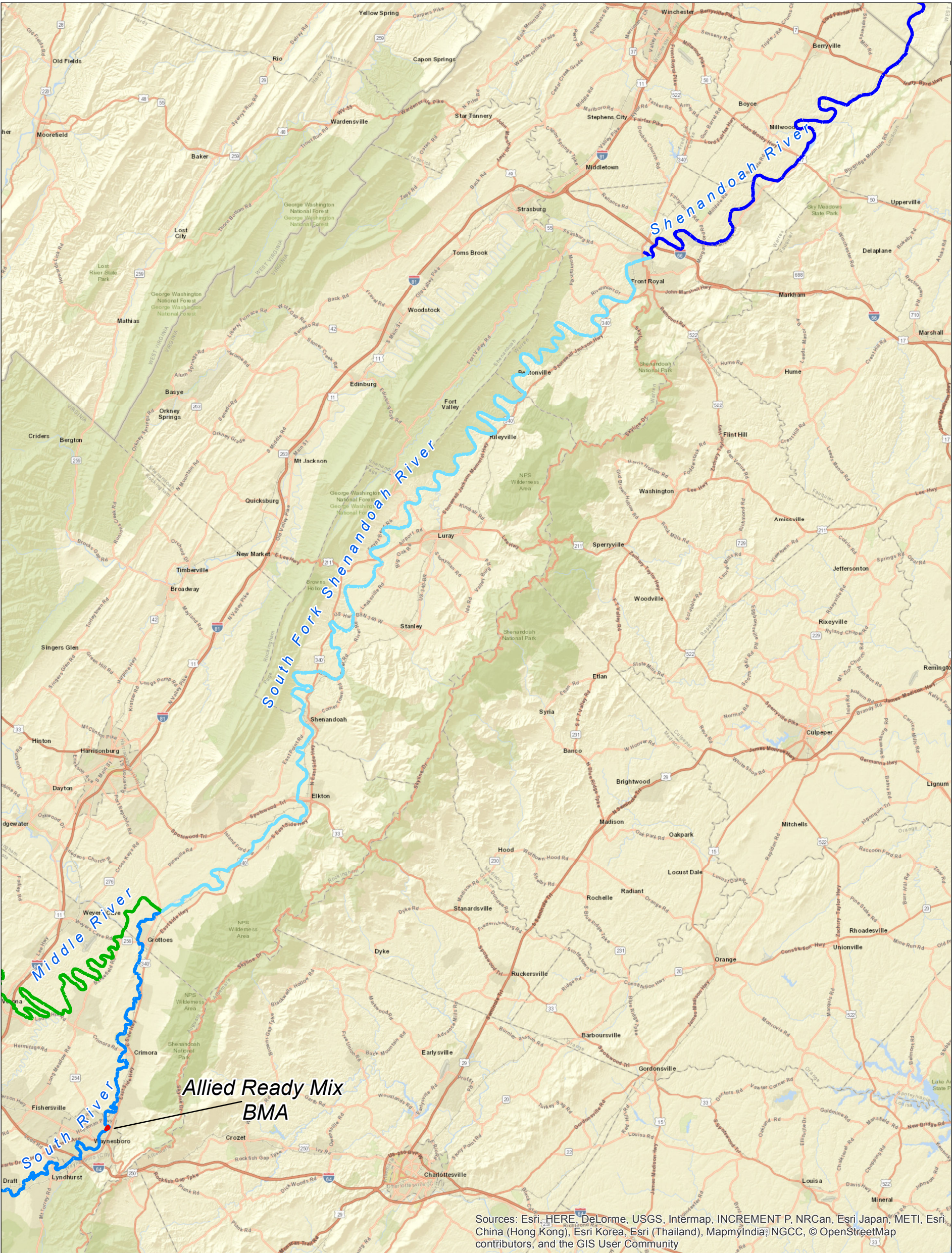
VDCR - Virginia Department of Conservation and Recreation

VDGIF - Virginia Department of Game and Inland Fisheries

VMRC - Virginia Marine Resources Commission

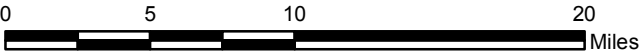
VWPP - Virginia Water Protection Program

Figures



Legend

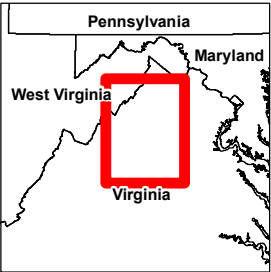
- Middle River
- South River
- South Fork Shenandoah River
- Shenandoah River
- BMA Project Location



Reference:
ESRI Streets

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US

Note:
RRM - Relative River Mile
BMA's - Bank Management Areas
AOC - Area of Concern



625 West Ridge Pike, Suite E-100
Conshohocken, PA 19428
Phone: (610) 832-3500 Fax: (610) 832-3501

Job: 6039038

Prepared by: CDW

Checked by: BR

Date: 9/14/2017

Figure 1-1
South River Location
Technical Execution Plan
Allied Ready Mix BMAs, RRM 1.33-1.59
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia



Legend

- RRM Intervals 10th Mile

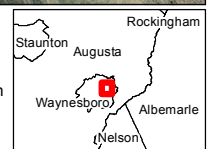
0 1,000 2,000 Feet



Note:
RRM - Relative River Mile
BMA's - Bank Management Areas
AOC - Area of Concern

Reference:
VBMP 2007 Aerial Imagery

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US



AECOM

625 West Ridge Pike, Suite E-100
Conshohocken, PA 19428
Phone: (610) 832-3500 Fax: (610) 832-3501

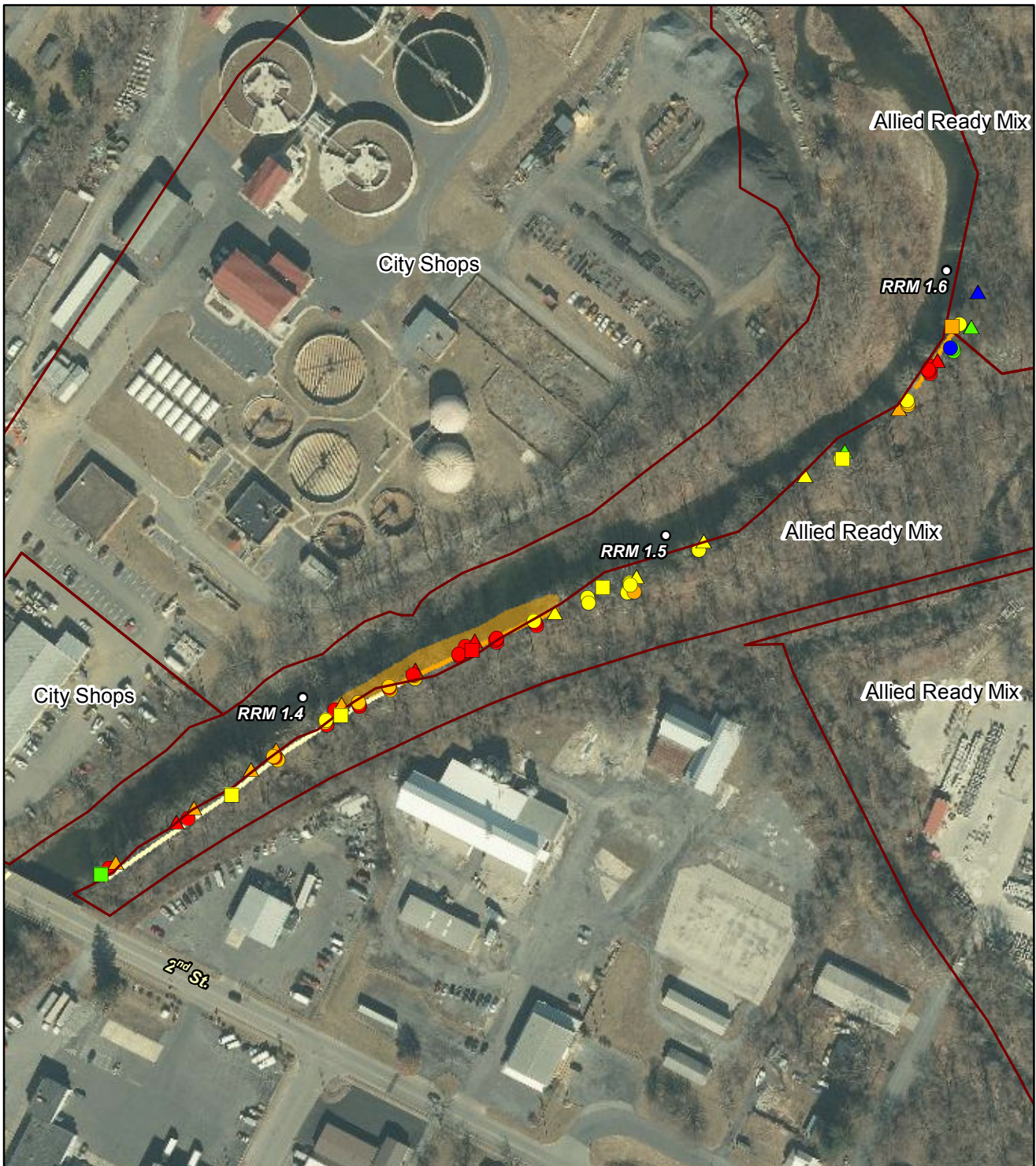
Job: 60390328

Prepared by: CDW

Checked by: BR

Date: 9/14/2017

Figure 1-2
Allied Ready Mix BMAs
Technical Execution Plan
Allied Ready Mix BMAs, RRM 1.33 - 1.59
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia



Legend

- Primary BMA
- Secondary BMA
- Mapped Substrate Type
- 1.) Clays and Silts
- 2.) Fine Sands
- RRM Intervals 10th Mile
- Parcels

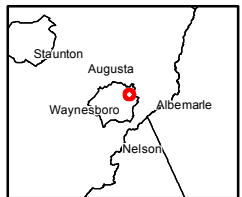
- Surface Sample: Avg THg (mg/kg)
- 0 - 1
 - 1.1 - 2.5
 - 2.51 - 10
 - 10.1 - 50
 - 50.1 - 360

- Supplemental Core Sample: Avg. THg (mg/kg)
- 0.376 - 1
 - 1.1 - 2.5
 - 2.51 - 10
 - 10.1 - 50
 - 50.1 - 882.83

- Sediment Sample: Avg THg (mg/kg)
- 1.1 - 2.5
 - 2.51 - 10
 - 10.1 - 50
 - 50.1 - 131.925

Reference:
City of Waynesboro
VBMP Most Recent Imagery
Parcel Dataset (Waynesboro)

Note:
RRM - Relative River Mile
BMA's - Bank Management Areas
AOC - Area of Concern



625 West Ridge Pike, Suite E-100
Conshohocken, PA 19428
Phone: (610) 832-3500 Fax: (610) 832-3501

0 100 200 Feet

Job: 60390328

Prepared by: CDW

Checked by: BR

Date: 2/15/2018

Figure 2-1
Bank Soil Sample Locations
Technical Execution Plan
Allied Ready Mix BMAs, RRM 1.33 - 1.59
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Appendices

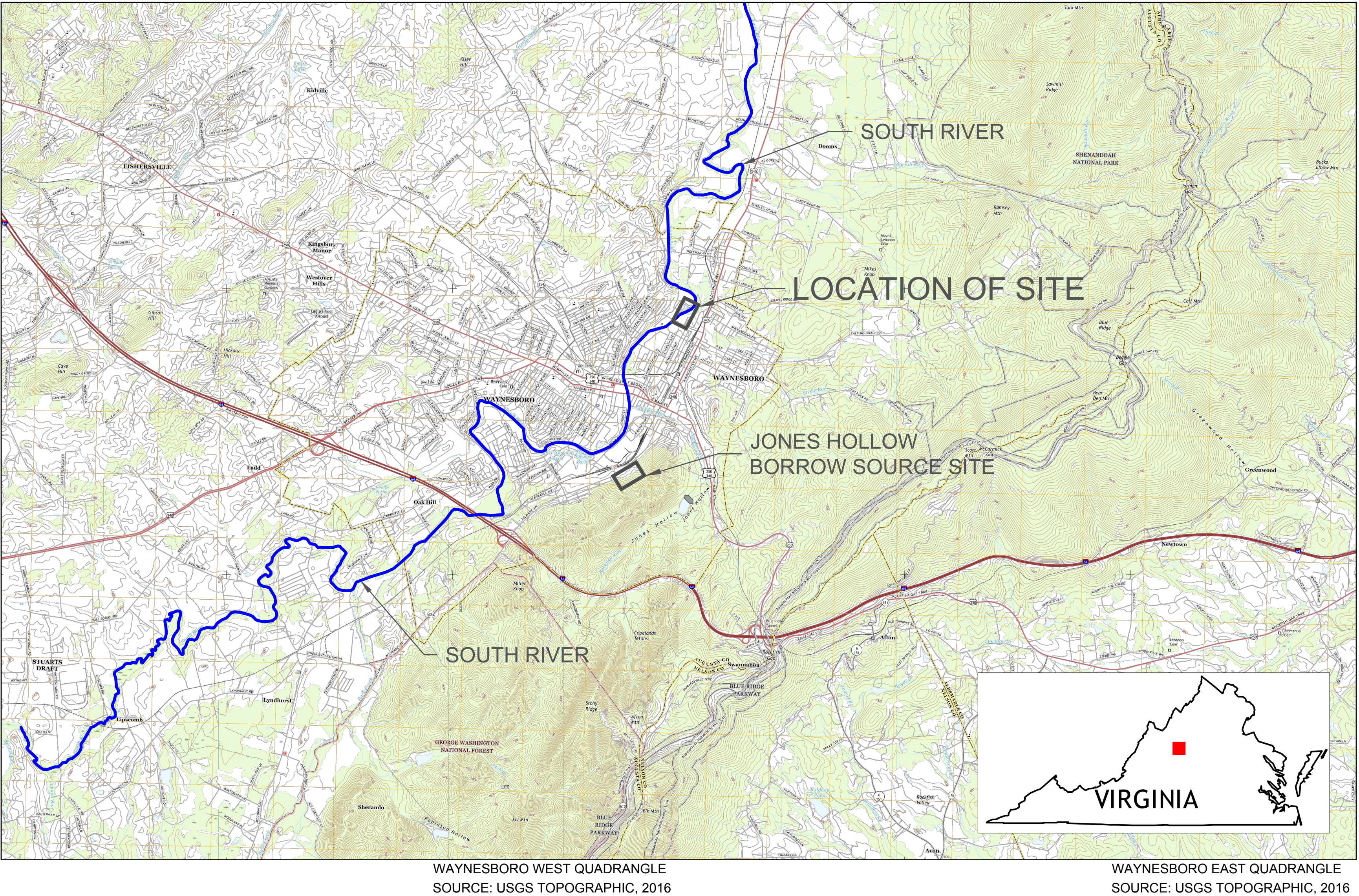
Appendix A

100% Design Construction Drawings

ALLIED READY MIX PROPERTY BMAS
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - INTERIM REMEDIAL MEASURES
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VIRGINIA
100% DESIGN DRAWING SET

SITE LOCATION MAP

DRAWING INDEX			
SHEET	SHEET TITLE	REV	DATE
T-101	TITLE SHEET	0	02-23-2018
G-101	LEGEND, KEY, AND GENERAL NOTES	0	02-23-2018
V-101	EXISTING CONDITIONS PLAN	0	02-23-2018
C-101	SITE PREP AND EROSION CONTROL PLAN	0	02-23-2018
C-201	EXCAVATION PLAN	0	02-23-2018
C-301	FINAL GRADING PLAN	0	02-23-2018
C-401	RESTORATION PLAN	0	02-23-2018
C-501	PLANTING PLAN	0	02-23-2018
C-502	PLANTING PLAN	0	02-23-2018
X-101	EXCAVATION CROSS SECTIONS	0	02-23-2018
X-102	EXCAVATION CROSS SECTIONS	0	02-23-2018
X-103	STABILIZATION AND RESTORATION CROSS SECTIONS	0	02-23-2018
D-101	SITE PREP AND EROSION CONTROL DETAILS	0	02-23-2018
D-102	SITE PREP AND EROSION CONTROL DETAILS	0	02-23-2018
D-103	SITE PREP AND EROSION CONTROL DETAILS	0	02-23-2018
D-104	SITE PREP AND EROSION CONTROL NOTES	0	02-23-2018
D-105	SITE PREP AND EROSION CONTROL NOTES	0	02-23-2018
D-201	RESTORATION DETAILS	0	02-23-2018
D-202	RESTORATION DETAILS	0	02-23-2018
D-301	PLANTING DETAILS	0	02-23-2018



PROJECT

ALLIED READY MIX
PROPERTY BMAS

SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

CLIENT

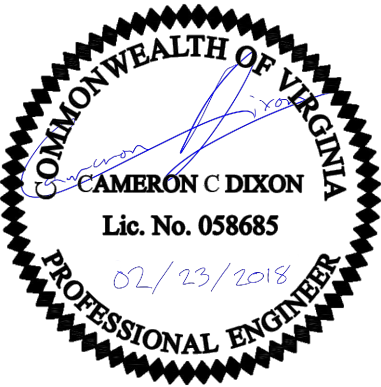
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CHESTNUT RUN PLAZA 730
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REGISTRATION



ISSUE/REVISION

0	02-23-2018	100% DESIGN
I/R	DATE	DESCRIPTION

KEY PLAN

PROJECT NUMBER

60552472

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-101

ALLIED READY MIX PROPERTY BMAS			
IMPACT DESCRIPTION	BANK STABILIZATION (~STATIONS 70+00 TO 75+00) (RRMS 1.33 TO 1.42)	BANK EXCAVATION AND RESTORATION (~STATIONS 75+00 TO 77+50) (RRMS 1.42 TO 1.46)	BANK EXCAVATION AND RESTORATION (~STATIONS 82+75 TO 83+75) (RRMS 1.57 TO 1.59)
WETLAND/WATERS IMPACT AREA	WATERS : 0.08 ACRES	WATERS: 0.10 ACRES	WATERS: 0.04 ACRES
DUNE/BEACHES IMPACT AREA	N/A		
STREAM DIMENSIONS AT IMPACT SITE	LENGTH: 495 FT WIDTH : APPROX. 90 FT	LENGTH: 240 FT WIDTH: APPROX. 90 FT	LENGTH: 65 FT WIDTH: APPROX. 45 FT
VOLUME OF FILL BELOW ORDINARY HIGH WATER	85 CY	60 CY	20 CY
COWARDIN CLASSIFICATION OF IMPACTED WETLAND/ WATER OR GEOMORPHOLOGICAL CLASSIFICATION OF STREAM	R3UB1		
AVERAGE STREAM FLOW AT SITE (UNDER NORMAL RAINFALL CONDITIONS)	UPSTREAM: USGS 01626500 SOUTH RIVER AT WAYNESBORO,VA 148 CFS DOWNSTREAM: USGS 01626850 SOUTH RIVER NEAR DOOMS, VA: 213 CFS		
CONTRIBUTING DRAINAGE AREA	148 SQ. MI.	148 SQ. MI.	148 SQ. MI.
DEQ CLASSIFICATION OF IMPACTED RESOURCES	STOCKABLE TROUT WATERS CLASS V		

LEGEND

GN	GN	GN	EXISTING NATURAL GAS LINE
E	E	E	EXISTING ELECTRIC POWER LINE
EOH	EOH	EOH	EXISTING ELECTRIC OVERHEAD LINE
SS	SS	SS	EXISTING SANITARY SEWER LINE
SD	SD	SD	EXISTING STORM DRAIN
UNK	UNK	UNK	EXISTING UNKNOWN UTILITY
1261			EXISTING GRADE 1' CONTOUR
1265			EXISTING GRADE 5' CONTOUR
			EXISTING FENCE
			EXISTING GRAVEL ROAD
			FINE GRAINED SEDIMENT
			ORDINARY HIGH WATER
			PROPERTY LINE
			SOUTH RIVER CENTERLINE
			SURVEY EDGE OF WATER
			EXCAVATION CUT LINE
			NON-WOVEN GEOTEXTILE
			PROJECT AREA
1261			PROPOSED 1' CONTOUR
1265			PROPOSED 5' CONTOUR
			TEMPORARY COFFERDAM
			UTILITY BARRIER
			BANK EXCAVATION
			BIOCHAR FILL
			GEOCELL LAYER
			RIPARIAN LIVE STAKES AND SHRUBS
			PLANTING SUBSTRATE
			STOCKPILE AREA
			SUBGRADE FILL
			UPLAND TREE PLANTING AREA
			EXISTING SITE VEGETATION
			MANHOLE
			SITE VEGETATION TO BE REMOVED
			SURVEY CONTROL BENCHMARK

EROSION AND SEDIMENT CONTROL PRACTICES LEGEND (VIRGINIA UNIFORM CODING SYSTEM)				
VESCH STD AND SPEC NO.	TITLE/DESCRIPTION	KEY	SYMBOL	DETAIL DRAWING REFERENCE
3.01	TEMPORARY CONSTRUCTION FENCE	SAF	— 0 — 0 —	SHEET D-101 DETAIL 4
3.02	CONSTRUCTION ENTRANCE	CE		SHEET D-101 DETAIL 1
3.03	TEMPORARY CONSTRUCTION ACCESS ROAD	CRS		SHEET D-101 DETAIL 2
3.05	SILT FENCE	SF	— x — x — x —	SHEET D-101 DETAIL 3
3.10	TEMPORARY FILL DIVERSION	FD	→ → → →	SHEET D-101 DETAIL 5
3.19	RIPRAP STONE TOE	RR		SHEET D-201 DETAILS 1 AND 2
3.26	DEWATERING STRUCTURE / SUMP	DS		SHEET D-102 DETAIL 9
3.29	SURFACE ROUGHENING	SR	← SR →	SHEET D-102 DETAIL 6
3.30	TOPSOILING	TO	← TO →	NOT APPLICABLE
3.31	TEMPORARY SEEDING	TS	← TS →	SHEET D-103 DETAIL 11
3.32	PERMANENT SEEDING	PS	← PS →	SHEET D-103 DETAIL 12
3.35	MULCHING	MU	← MU →	SHEET D-103 DETAIL 13
3.36	SOIL STABILIZATION BLANKETS AND MATTING	BM		SHEET D-202 DETAIL 4
3.37	TREES, SHRUBS, VINES, AND GROUND COVERS	VEG	← VEG →	SHEET D-301 DETAILS 1 TO 3
3.38	TREE PRESERVATION AND PROTECTION	TP	← TP →	SHEET D-103 DETAIL 14
3.39	DUST CONTROL	DC	← DC →	NOT APPLICABLE

SURVEY NOTES:

- HORIZONTAL DATUM: VIRGINIA STATE PLANE, NORTH ZONE, NAD 83, U.S. FEET.
- VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM (NAVD 88).
- A TOPOGRAPHIC SURVEY WAS CONDUCTED ON JULY 10-14, 2017 AND THE BANK AND OVERBANK TOPOGRAPHY WERE OBTAINED FROM THIS SURVEY USING A TOTAL MONITORING STATION.
- UTILITY LOCATIONS WERE OBTAINED THROUGH GEOPHYSICAL SURVEY METHODS PERFORMED BY AECOM ON JULY 11-12, 2017. SEE APPENDIX E OF THE TECHNICAL EXECUTION PLAN (TEP) - ALLIED READY MIX PROPERTY (AECOM, 2018) FOR A COMPLETE DESCRIPTION OF THE UTILITY SURVEY.
- TREE SURVEY WAS PERFORMED BY AECOM USING GPS DURING THE WEEK OF JUNE 26, 2017 TO OBTAIN APPROXIMATE POSITIONS, TREE HEIGHT, DIAMETER AT BREAST HEIGHT (DBH), CRITICAL ROOT ZONE (CRZ), AND SPECIES. SEE APPENDIX D OF THE TEP FOR A COMPLETE DESCRIPTION OF THE TREE SURVEY.
- ORDINARY HIGH WATER (OHW) WAS IDENTIFIED IN THE FIELD USING BANK CHARACTERISTICS.
- EDGE OF WATER (EW) WAS IDENTIFIED IN THE FIELD USING THE WATER SURFACE ELEVATION AT THE TIME THAT THE TOPOGRAPHIC SURVEY WAS CONDUCTED.

ACRONYMS:

ARM - ALLIED READY MIX
BMAS - BANK MANAGEMENT AREAS
DSR - DUPONT SITE REPRESENTATIVE
RRMS - RELATIVE RIVE MILES

GENERAL NOTES:

- ALL WORK SHALL BE IN CONFORMANCE WITH EXISTING LABOR LAWS, SAFETY REQUIREMENTS, PERMIT CONDITIONS, AND OTHER REGULATIONS, AS REQUIRED BY THE CITY OF WAYNESBORO, THE STATE OF VIRGINIA, AND THE FEDERAL GOVERNMENT. THE CONTRACTOR SHOULD ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL PROVIDE ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER PRACTICES NEEDED TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF THE WORK COVERED BY THE CONTRACT,
- EXCEPT AS OTHERWISE NOTED HEREIN, ALL MATERIAL AND WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, CITY OF WAYNESBORO STANDARDS, THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) "ROAD AND BRIDGE SPECIFICATIONS" (LATEST EDITION), OTHER APPLICABLE STANDARDS, AND ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- THE CONTRACTOR SHALL HAVE COPIES OF THE APPROVED CONTRACT DOCUMENTS, PERMITS, AND THE VDOT "ROAD AND BRIDGE SPECIFICATIONS" (LATEST EDITION) ON THE JOB AT ALL TIMES.
- THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO CONSTRUCTION AND SHALL BE RESPONSIBLE FOR VERIFYING FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THESE DRAWINGS. ANY DISCREPANCIES BETWEEN EXISTING FIELD CONDITIONS AND DIMENSIONS SHOWN ON THE CONTRACT DOCUMENTS AND THOSE OBSERVED BY THE CONTRACTOR SHALL BE BROUGHT TO THE ATTENTION OF THE DUPONT SITE REPRESENTATIVE (DSR) PRIOR TO PROCEEDING WITH CONSTRUCTION.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK INCLUDED IN THE CONTRACT DOCUMENTS.
- A PRE-CONSTRUCTION MEETING BETWEEN THE CONTRACTOR, DSR, AND THE CITY'S REPRESENTATIVE SHALL BE REQUIRED PRIOR TO ANY ON-SITE WORK.
- THE CONTRACTOR SHALL MAKE ALL NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, ROADWAYS, DRAINAGE WAYS, CULVERTS, AND VEGETATION UNTIL SUCH ITEMS ARE TO BE DISTURBED OR REMOVED AS INDICATED ON THE CONTRACT DOCUMENTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF PROPERTY IN AND AROUND THE PROJECT AREA. ITEMS AFFECTED BY CONSTRUCTION ACTIVITIES SHALL BE REPAIRED OR REPLACED FOLLOWING CONSTRUCTION.
- THE CONTRACTOR SHALL RECEIVE, IN WRITING FROM DUPONT, AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
- THE NOTES, DETAILS, AND SPECIFICATIONS ON THE CONTRACT DOCUMENT SHALL TAKE PRECEDENCE OVER THESE GENERAL NOTES.
- DIMENSION CALL-OUTS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL MAINTAIN HAND DRAWN RED LINES, FIELD NOTES, AND PHOTOGRAPHS ("FIELD DOCUMENTATION") OF ALL IMPROVEMENTS OR VARIATIONS AS THE WORK PROGRESSES. THE CONTRACTOR'S FIELD DOCUMENTATION SHALL BE MAINTAINED ON-SITE AND SHALL BE AVAILABLE FOR REVIEW BY THE DSR AT ALL TIMES.
- THE PROJECT SHALL BE CONSTRUCTED TO MEET ALL PROVISIONS OF APPLICABLE PERMITS.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY CUT SLOPES AND TEMPORARY SHORING AS NECESSARY TO COMPLETE THE WORK. THE STABILITY OF ALL TEMPORARY SLOPE AND SHORING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- THE CONTRACTOR SHALL KEEP THE WORK AREAS IN A CLEAN AND NEAT CONDITION AND FREE OF DEBRIS AND CLUTTER FOR THE DURATION OF THE PROJECT.

UTILITY NOTES:

- THE LOCATION OF THE EXISTING UTILITIES SHOWN ON THESE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD LOCATING ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR MUST CALL MISS UTILITY OF VIRGINIA AT 1-900-562-7001 (OR 811) FOR UTILITY LOCATIONS AND ALLOW THE REQUIRED TIME FOR MARKING BEFORE THE SCHEDULED DATE FOR EXCAVATION OR EARTHWORK THAT MAY IMPACT EXISTING UTILITIES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE CONDITION OF ALL ABANDONED UTILITIES THAT INTERFERE WITH THE WORK PRIOR TO DISTURBANCE OR MODIFICATION. THE CONTRACTOR SHALL WORK WITH THE UTILITY OWNER TO CONFIRM THAT UTILITIES HAVE BEEN ABANDONED AND TO DETERMINE WHAT ACTION SHOULD BE TAKEN.
- THE SIZE AND TYPE OF BURIED UTILITIES EXPOSED OR MODIFIED BY THE CONTRACTOR SHALL BE ACCURATELY NOTED AND SHOWN ON THE CONTRACTOR'S FIELD DOCUMENTATION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ALL EXISTING UTILITIES THROUGHOUT CONSTRUCTION.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROMPTLY NOTIFY THE DSR OF ANY CONFLICT WITH EXISTING UTILITIES.
- ALL EXISTING FACILITIES, LANDSCAPE IMPROVEMENTS, AND UTILITIES NOT SPECIFICALLY IDENTIFIED FOR REMOVAL SHALL BE PROTECTED THROUGHOUT CONSTRUCTION OR RESTORED AT COMPLETION OF THE WORK.

CONSTRUCTION ACCESS/ TRAFFIC CONTROL NOTES:

- THE CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN TO THE DSR FOR REVIEW. CONSTRUCTION SHALL NOT COMMENCE UNTIL THE DSR HAS APPROVED THE TRAFFIC CONTROL PLAN. UPON APPROVAL THE CONTRACTOR IS SOLELY RESPONSIBLE FOR IMPLEMENTING REQUIRED TRAFFIC CONTROL AS REVIEWED AND APPROVED BY THE DSR.
- THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING ANY REQUIRED TRAFFIC CONTROL INCLUDING, BUT NOT LIMITED TO, SIGNAGE AND FLAGGERS.
- THE CONTRACTOR SHALL PROVIDE AN ANTICIPATED ROUTE FROM THE PROJECT AREA TO JONES HOLLOW AND FROM JONES HOLLOW TO THE PROJECT AREA FOR REVIEW BY THE CITY OF WAYNESBORO.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE INTEGRITY OF ALL EXISTING UTILITIES THROUGHOUT CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEARING PUBLIC RIGHT-OF-WAYS OF ALL MUD AND DEBRIS TRACKED EITHER FROM THE SITE OR JONES HOLLOW.
- ALL EQUIPMENT, MATERIALS, AND PERSONNEL SHALL REMAIN WITHIN THE PROJECT LIMITS.
- ALL AFFECTED AREAS INCLUDING ROADS AND ACCESS ROUTES SHALL BE RESTORED TO ORIGINAL CONDITION. ALL DISTURBED AREAS OUTSIDE THE LIMITS OF DISTURBANCE SHALL BE RESTORED TO ORIGINAL CONDITION AT NO COST TO THE OWNER.



PROJECT

ALLIED READY MIX
PROPERTY BMAS

SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

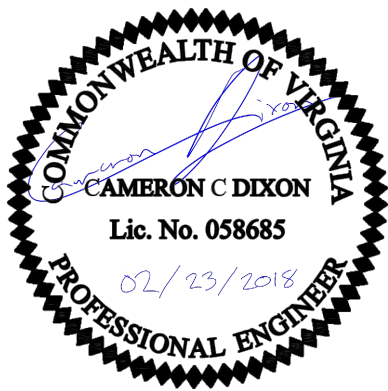
CLIENT

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974 CENTRE ROAD
CHESTNUT RUN PLAZA 730
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CONSULTANT

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REGISTRATION



ISSUE/REVISION

I/R	DATE	DESCRIPTION
0	02-23-2018	100% DESIGN

KEY PLAN

PROJECT NUMBER

60552472

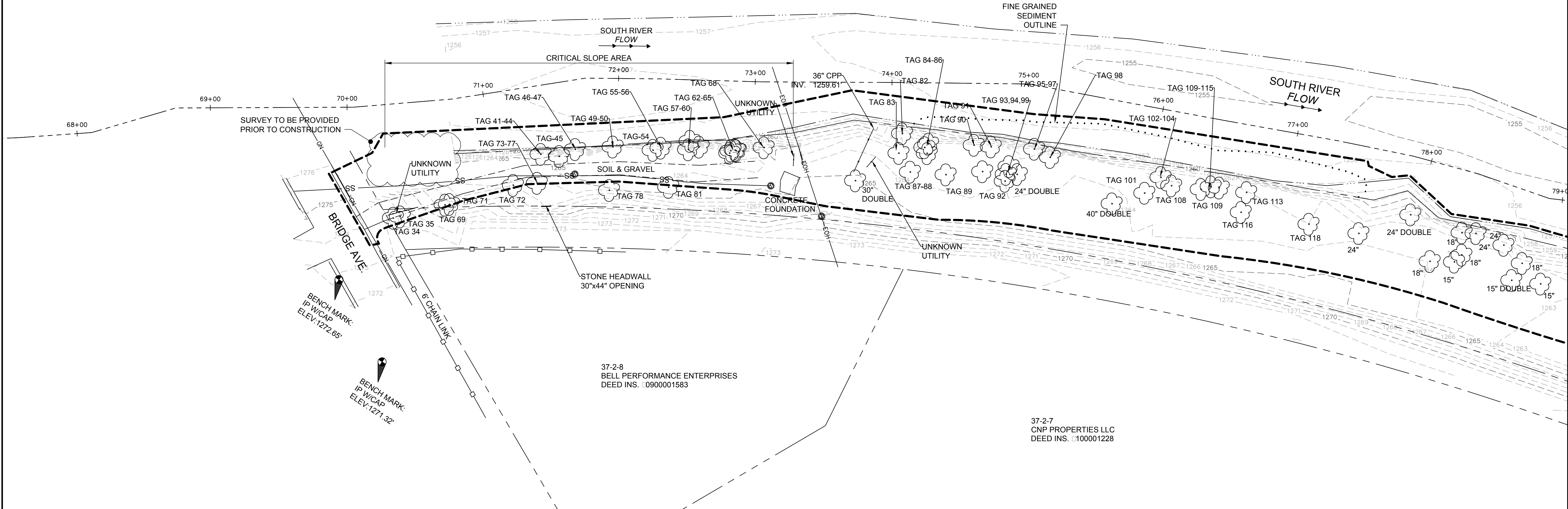
SHEET TITLE

LEGEND, KEY, AND
GENERAL NOTES

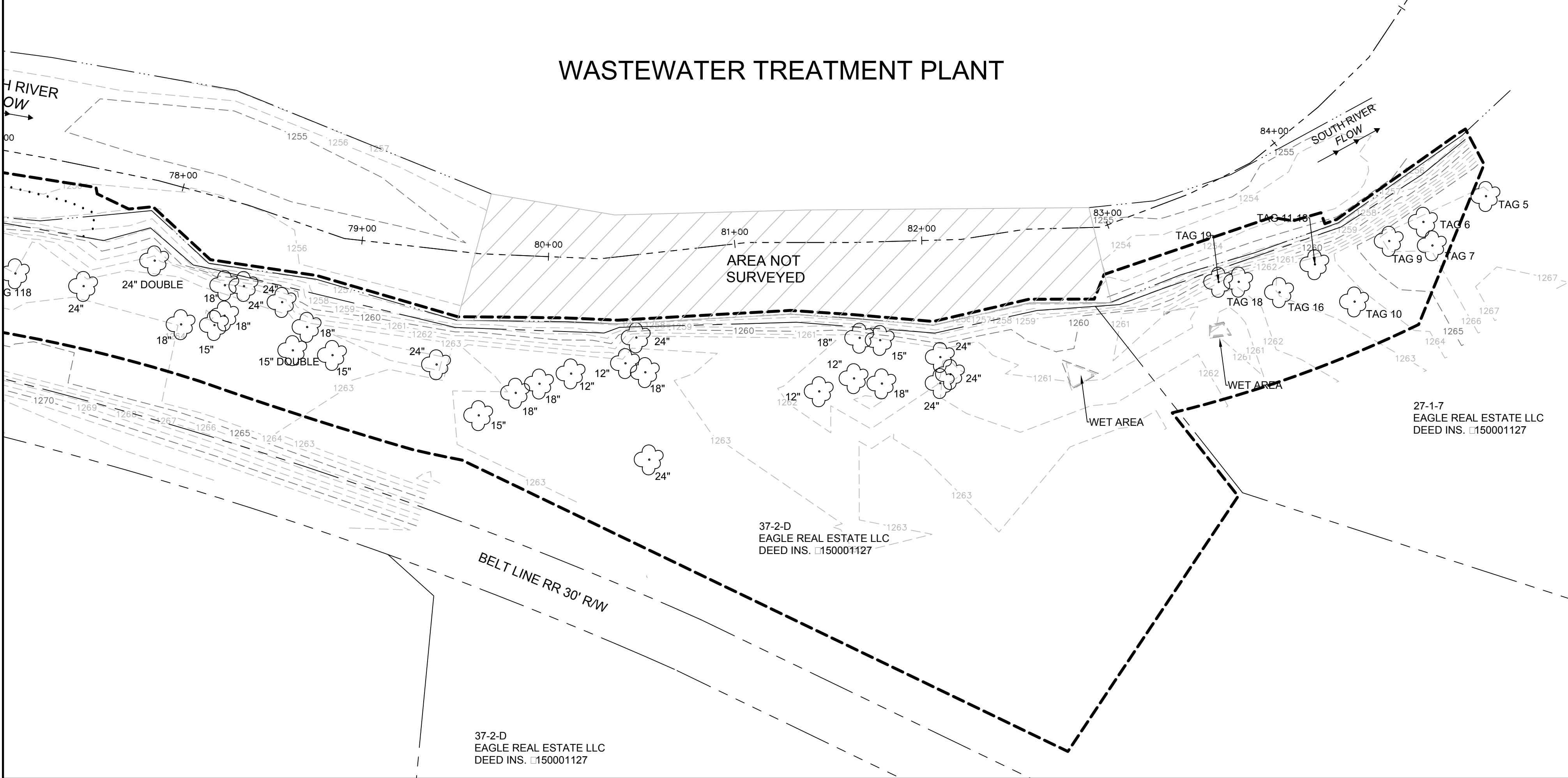
SHEET NUMBER

G-101

CITY SHOPS



WASTEWATER TREATMENT PLANT



NOTES:

1. CRITICAL SLOPE IS DEFINED AS GREATER THAN 1H:1V SLOPE.
2. HORIZONTAL DATUM: VIRGINIA STATE PLANE, NORTH ZONE, NAD 83, U.S. FEET.
3. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM (NAVD 88).
4. A TOPOGRAPHIC SURVEY WAS CONDUCTED ON JULY 10-14, 2017 AND THE BANK AND OVERBANK TOPOGRAPHY WERE OBTAINED FROM THIS SURVEY USING A TOTAL MONITORING STATION.
5. UTILITY LOCATIONS WERE OBTAINED THROUGH GEOPHYSICAL SURVEY METHODS PERFORMED BY AECOM ON JULY 11-12, 2017. SEE APPENDIX E OF THE TECHNICAL EXECUTION PLAN (TEP) - ALLIED READY MIX PROPERTY (AECOM, 2017) FOR A COMPLETE DESCRIPTION OF THE UTILITY SURVEY.
6. TREE SURVEY WAS PERFORMED BY AECOM USING GPS DURING THE WEEK OF JUNE 26, 2017 TO OBTAIN APPROXIMATE POSITIONS, TREE HEIGHT, DIAMETER AT BREAST HEIGHT (DBH), CRITICAL ROOT ZONE (CRZ), AND SPECIES. SEE APPENDIX D OF THE TEP FOR A COMPLETE DESCRIPTION OF THE TREE SURVEY.
7. ORDINARY HIGH WATER (OHW) WAS IDENTIFIED IN THE FIELD USING BANK CHARACTERISTICS.
8. EDGE OF WATER (EW) WAS IDENTIFIED IN THE FIELD USING THE WATER SURFACE ELEVATION AT THE TIME THAT THE TOPOGRAPHIC SURVEY WAS CONDUCTED.

AECOM

PROJECT

ALLIED READY MIX PROPERTY BMAS

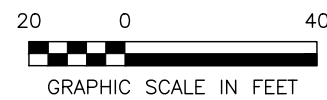
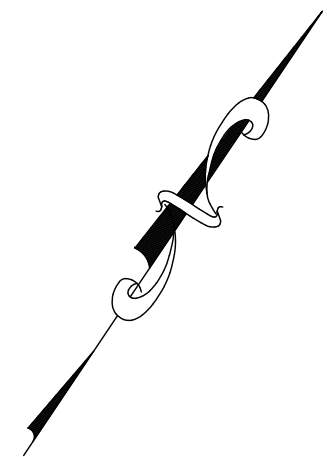
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

CLIENT

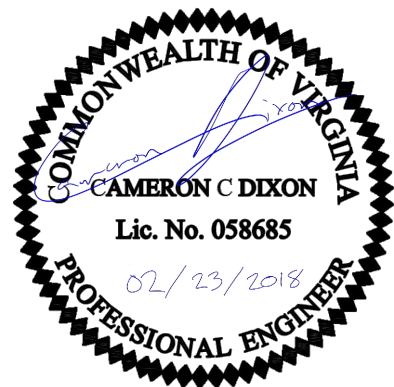
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AECOM
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KEY PLAN

PROJECT NUMBER

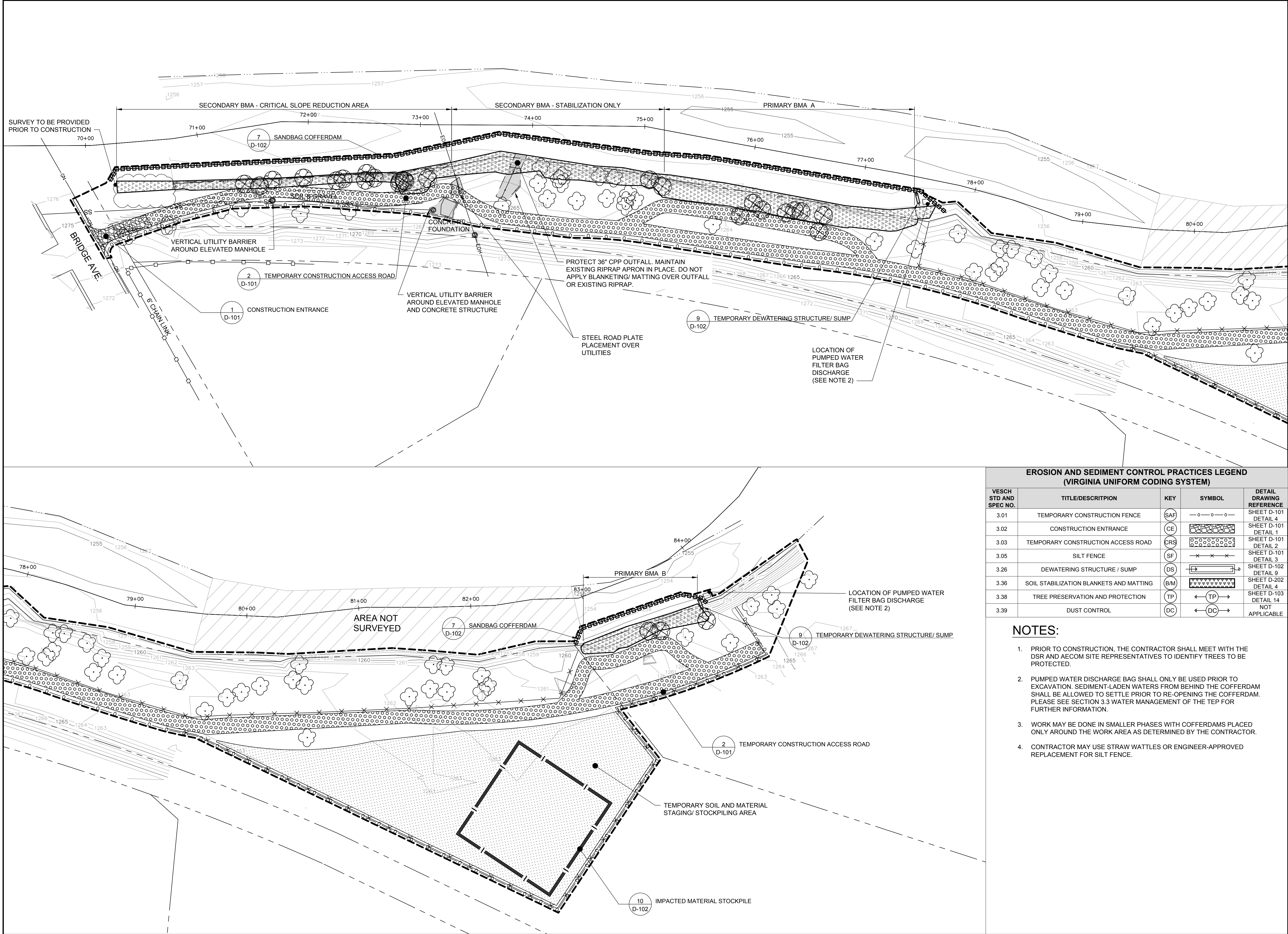
60552472

SHEET TITLE

EXISTING CONDITIONS
PLAN

SHEET NUMBER

V-101



EROSION AND SEDIMENT CONTROL PRACTICES LEGEND (VIRGINIA UNIFORM CODING SYSTEM)				
VESCH STD AND SPEC NO.	TITLE/DESCRIPTION	KEY	SYMBOL	DETAIL DRAWING REFERENCE
3.01	TEMPORARY CONSTRUCTION FENCE	(SAF)	— o — o — o —	SHEET D-101 DETAIL 4
3.02	CONSTRUCTION ENTRANCE	(CE)		SHEET D-101 DETAIL 1
3.03	TEMPORARY CONSTRUCTION ACCESS ROAD	(CRS)		SHEET D-101 DETAIL 2
3.05	SILT FENCE	(SF)	— x — x — x —	SHEET D-101 DETAIL 3
3.26	DEWATERING STRUCTURE / SUMP	(DS)		SHEET D-102 DETAIL 9
3.36	SOIL STABILIZATION BLANKETS AND MATTING	(B/M)		SHEET D-202 DETAIL 4
3.38	TREE PRESERVATION AND PROTECTION	(TP)	← TP →	SHEET D-103 DETAIL 14
3.39	DUST CONTROL	(DC)	← DC →	NOT APPLICABLE

NOTES:

- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL MEET WITH THE DSR AND AECOM SITE REPRESENTATIVES TO IDENTIFY TREES TO BE PROTECTED.
- PUMPED WATER DISCHARGE BAG SHALL ONLY BE USED PRIOR TO EXCAVATION. SEDIMENT-LADEN WATERS FROM BEHIND THE COFFERDAM SHALL BE ALLOWED TO SETTLE PRIOR TO RE-OPENING THE COFFERDAM. PLEASE SEE SECTION 3.3 WATER MANAGEMENT OF THE TEP FOR FURTHER INFORMATION.
- WORK MAY BE DONE IN SMALLER PHASES WITH COFFERDAMS PLACED ONLY AROUND THE WORK AREA AS DETERMINED BY THE CONTRACTOR.
- CONTRACTOR MAY USE STRAW WATTLES OR ENGINEER-APPROVED REPLACEMENT FOR SILT FENCE.

AECOM

PROJECT

ALLIED READY MIX
PROPERTY BMAS

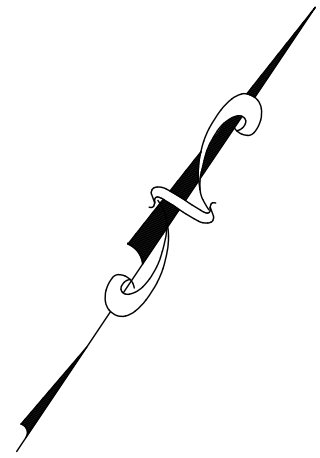
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
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WAYNESBORO, VA

CLIENT

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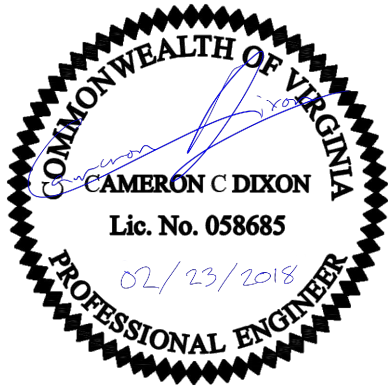
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60552472

SHEET TITLE

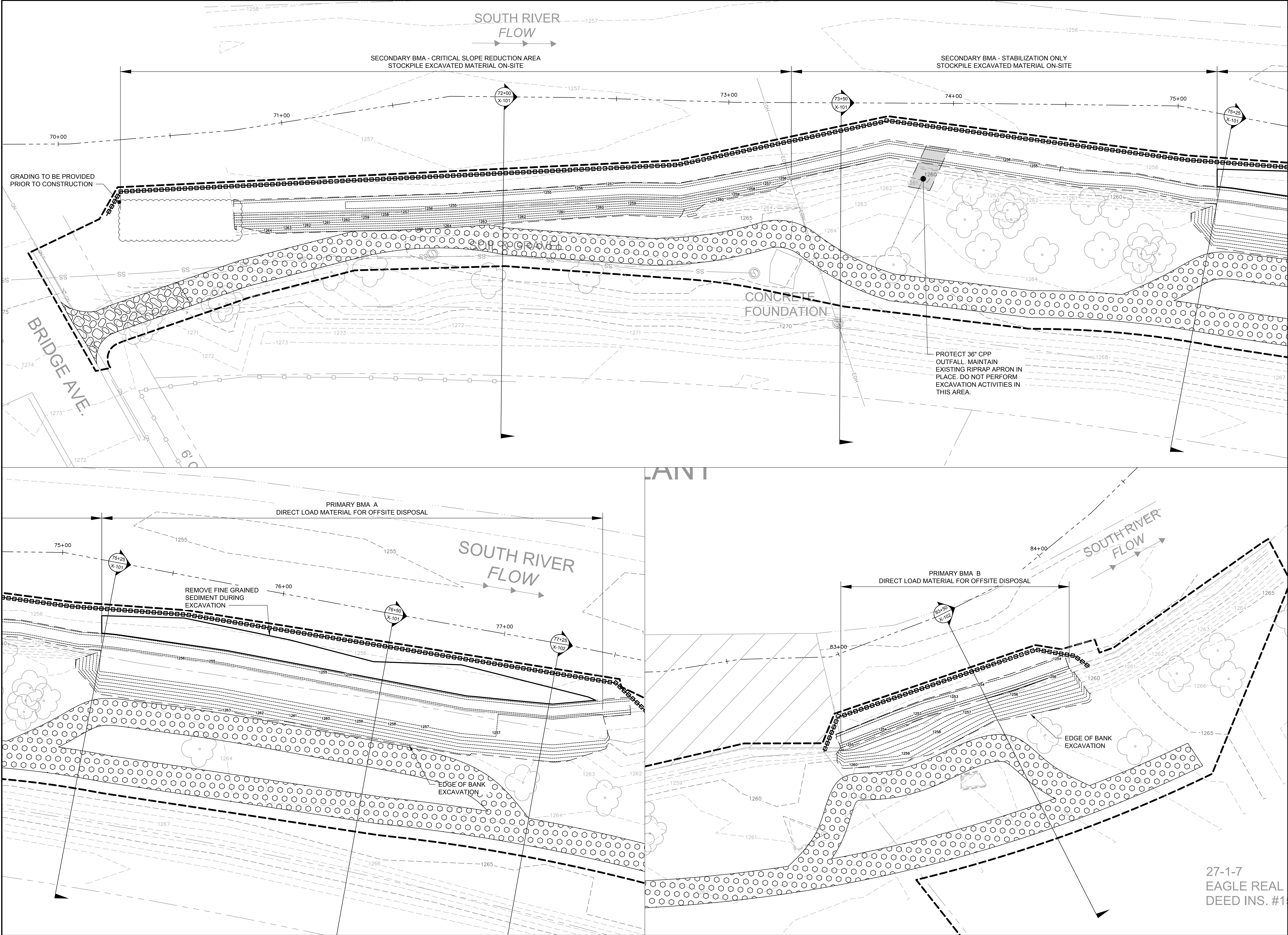
SITE PREPARATION AND
EROSION CONTROL PLAN

SHEET NUMBER

C-101

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PROPERTY BMAS**

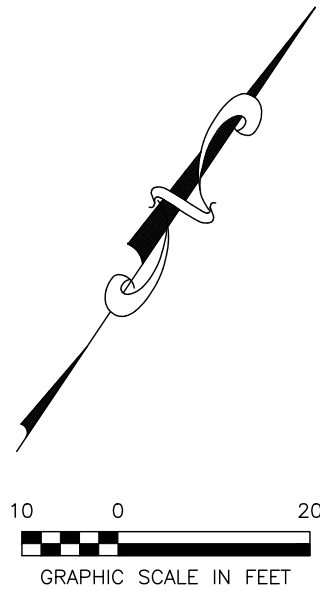
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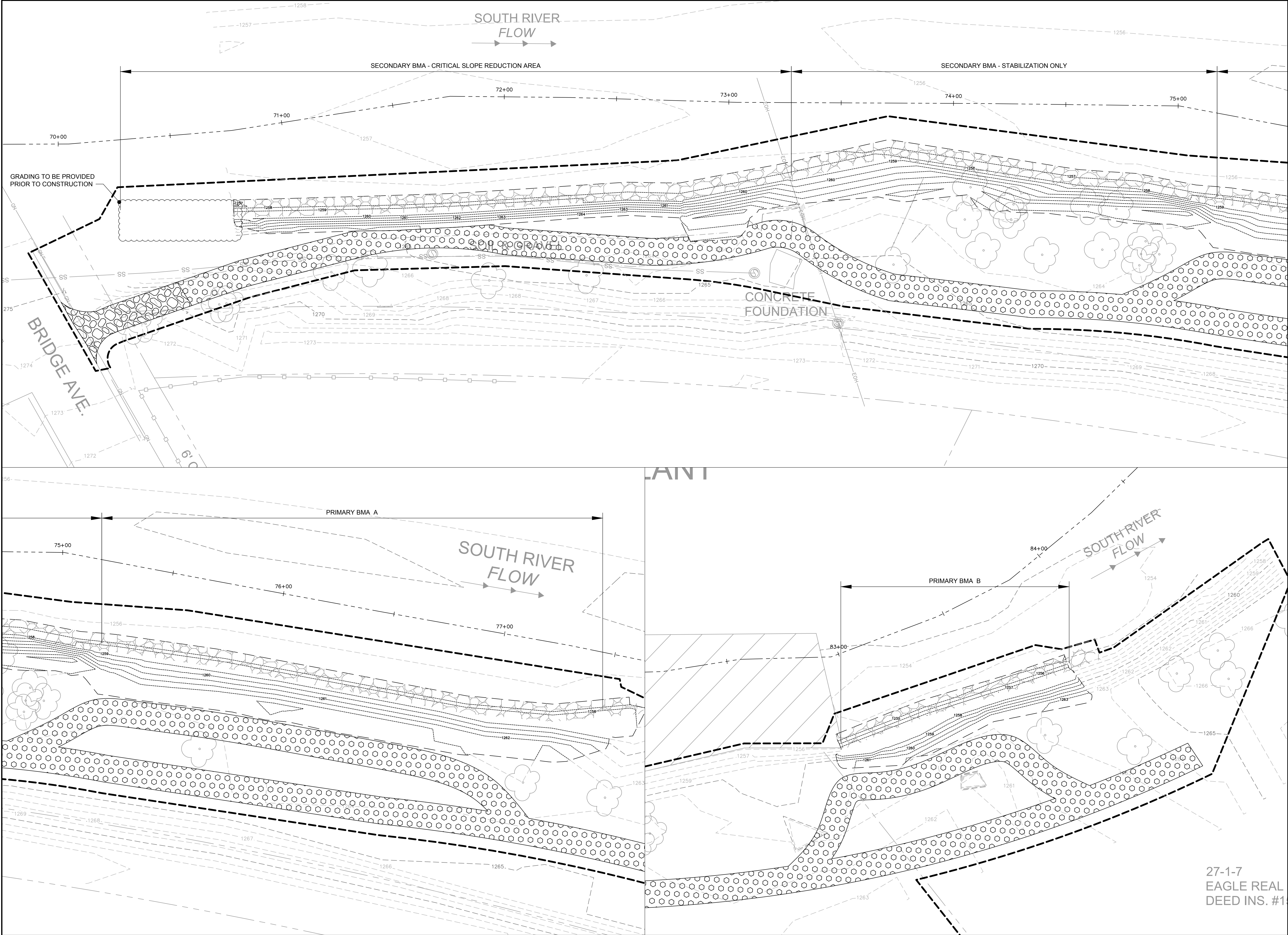
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SHEET TITLE
EXCAVATION PLAN

SHEET NUMBER
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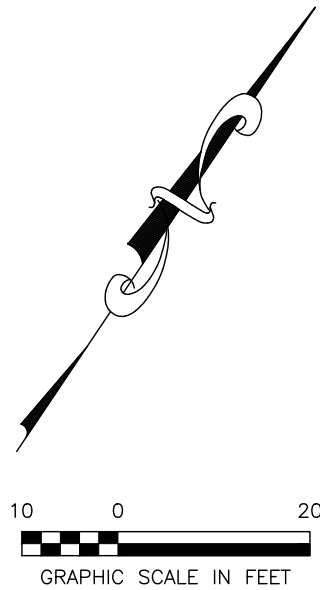
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PROJECT
ALLIED READY MIX
PROPERTY BMAS
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
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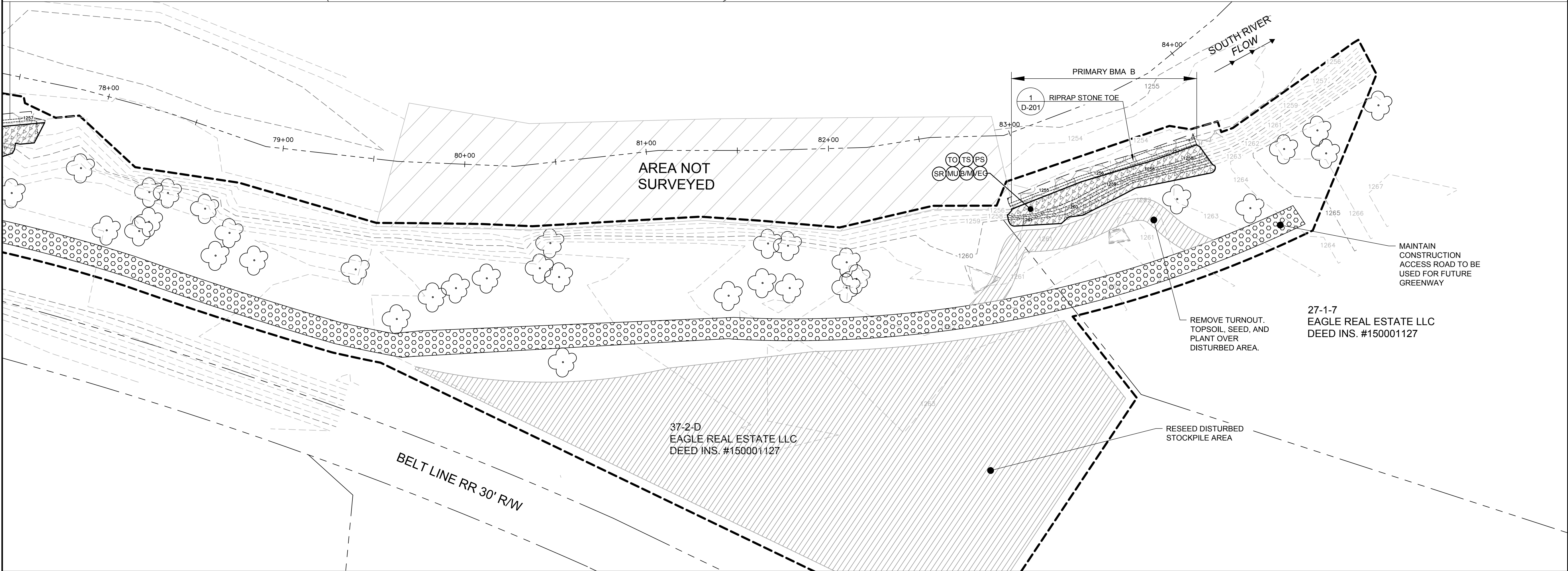
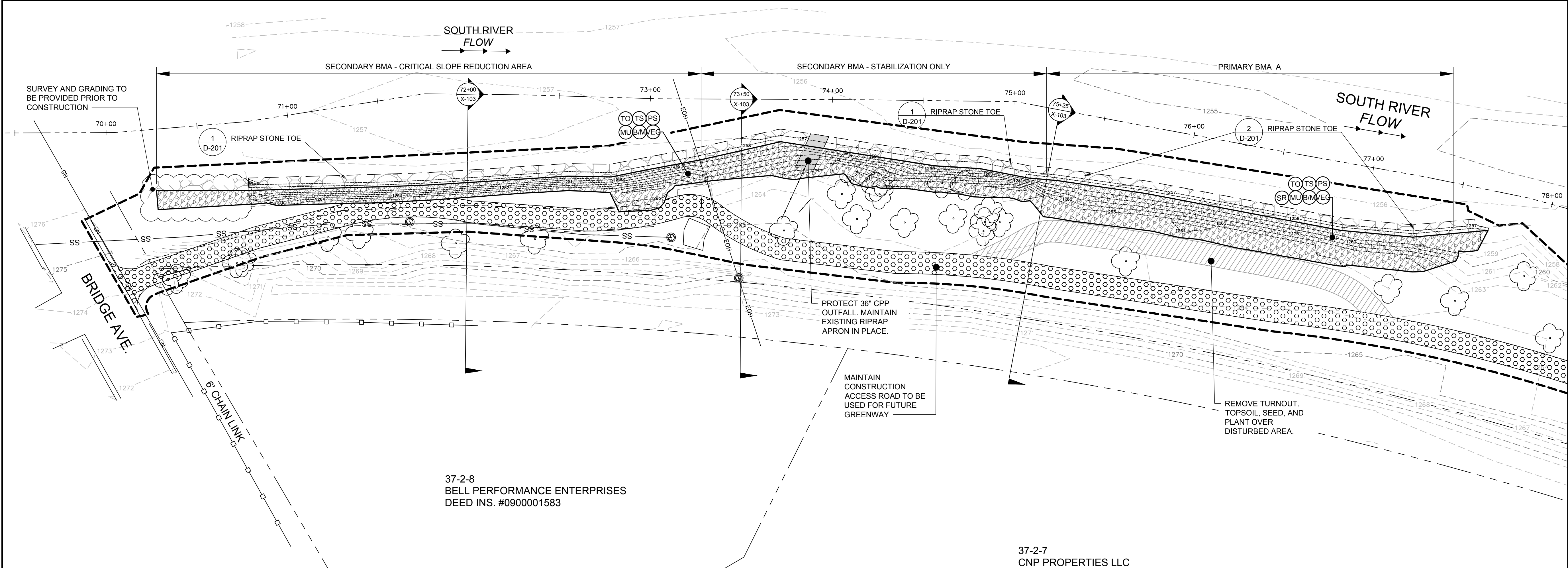
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PROJECT NUMBER
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SHEET TITLE
FINAL GRADING
PLAN

SHEET NUMBER
C-301

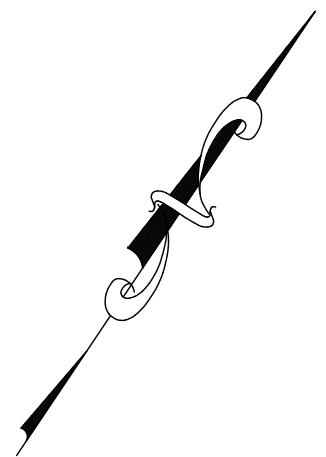
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ANSI D 22" x 34"



PROJECT
ALLIED READY MIX
PROPERTY BMAS
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

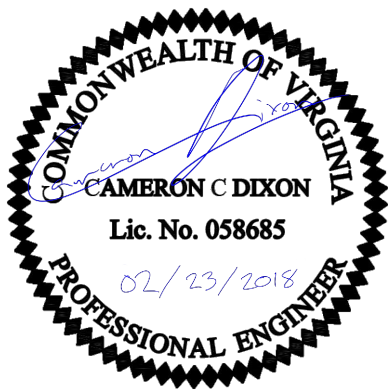
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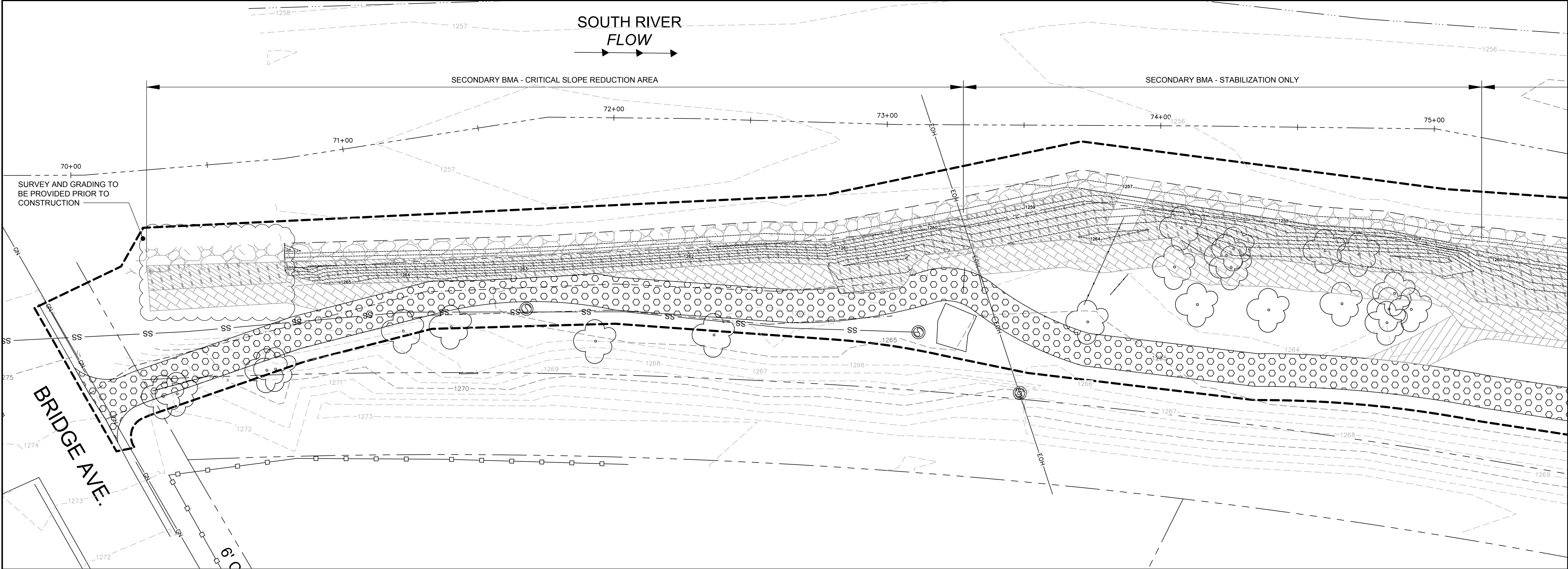
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PROJECT NUMBER
60552472
SHEET TITLE
RESTORATION PLAN

SHEET NUMBER
C-401

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2
D-301

1
D-301

1
D-301

ARM PLANTING SPECIES, SIZE, SPACING, AND QUANTITY				
SPECIES NAME	COMMON NAME	SIZE	SPACING	QUANTITY
RIPARIAN LIVE STAKES				
SALIX SERICEA	SILKY WILLOW	LIVE STAKE	2' O.C.	1,107
VIBURNUM DENTATUM	SOUTHERN ARROW-WOOD	LIVE STAKE	2' O.C.	1,107
RIPARIAN SHRUBS				
CORNUS AMOMUM	SILKY DOGWOOD	1 GAL.	5' O.C.	71
VIBURNUM LENTAGO	NANNYBERRY	1 GAL.	5' O.C.	71
VIBERNUM DENTATUM	SOUTHERN ARROW-WOOD	1 GAL.	5' O.C.	71
SAMBUCUS CANADENSIS	BLACK ELDERBERRY	1 GAL.	5' O.C.	71
STAPHYLEA TRIFOLIA	BLADDERNUT	1 GAL.	5' O.C.	71
UPLAND TREES				
ASIMINA TRILOBA	PAWPAW	5 GAL.	15' O.C.	10
ACER RUBRUM	RED MAPLE	5 GAL.	15' O.C.	10
OSTRYA VIRGINIANA	EASTERN HORNBEAM	5 GAL.	15' O.C.	10
PLANTANUS OCCIDENTALIS	AMERICAN SYCAMORE	5 GAL.	15' O.C.	10

NOTE: THE QUANTITIES SHOWN ARE THE TOTAL NUMBER OF PLANTS FOR ALL ARM BMAS.

PLANTING NOTES:

- ALL DISTURBED AREAS BEYOND THE LIMITS OF PLANTING WILL BE RESTORED TO THE PRE-CONSTRUCTION CONDITION. APPLY SEED TO ALL AREAS OF GROUND DISTURBANCE. THE CONTRACTOR SHALL REFER TO SPECIFICATIONS FOR SEEDING MIX.
- PLANT TREES PRIOR TO INSTALLING THE GEOCELL IN THE BANK STABILIZATION AREA. ONLY 1-GALLON CONTAINERIZED TREES SHALL BE PLANTED WITHIN GEOCELL AFTER GEOCELL INSTALLATION.
- SET CROWN OF TREES AT OR ABOVE FINISHED GRADE AS SHOWN IN DETAILS. DO NOT PLACE PLANTING SUBSTRATE OVER THE DRIPLINE OF TREES PLANTED IN GEOCELL.
- APPLY MULCH IMMEDIATELY AFTER PLANTING IN ACCORDANCE WITH THE SPECIFICATION.
- ALL SEEDED AND PLANTED AREAS SHALL BE PROTECTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION OF THE PROJECT AND UNTIL THE WORK IS ACCEPTED. NO CONSTRUCTION TRAFFIC SHALL BE ALLOWED OVER A SEEDED OR PLANTED AREA ONCE THE SEED AND EROSION CONTROL MEASURES HAVE BEEN COMPLETED. FOOT TRAFFIC SHALL BE MINIMIZED, AND WORKERS SHALL TRAVEL ALONG COMPLETED BANKS ONLY IN DESIGNATED AREAS.
- THE CONTRACTOR SHALL ENSURE THAT THE DOMINANT SPECIES WITHIN EACH CATEGORY IS WELL DISTRIBUTED THROUGHOUT THE PLANTING AREA.



PROJECT

ALLIED READY MIX
PROPERTY BMAS

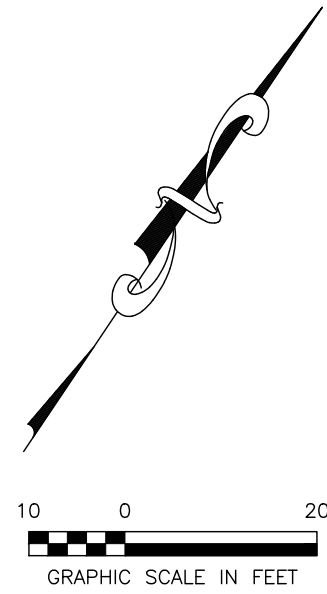
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

CLIENT

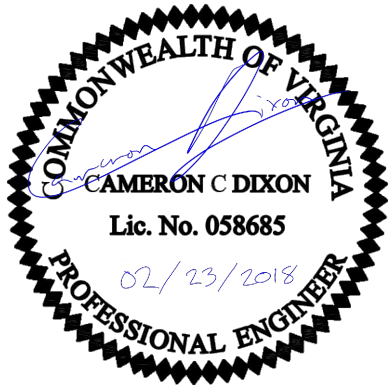
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KEY PLAN

PROJECT NUMBER

60552472

SHEET TITLE

PLANTING PLAN

SHEET NUMBER

C-501

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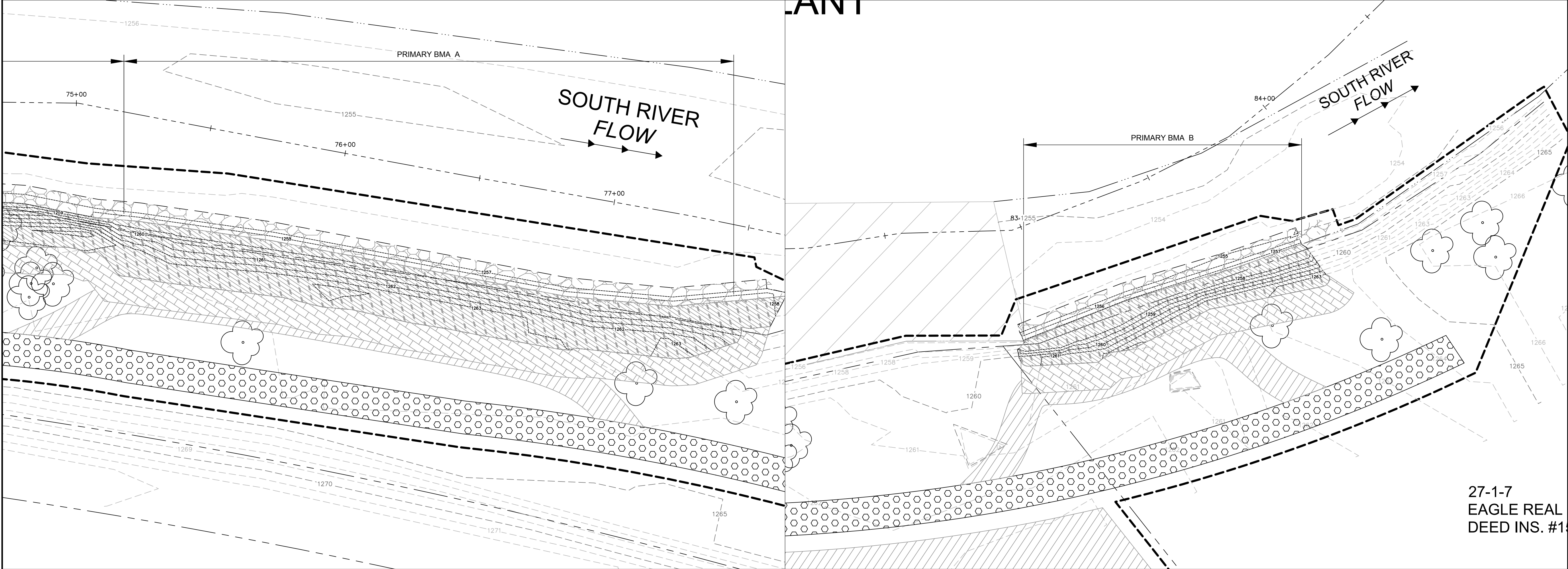
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D-301

ARM PLANTING SPECIES, SIZE, SPACING, AND QUANTITY				
SPECIES NAME	COMMON NAME	SIZE	SPACING	QUANTITY
RIPARIAN LIVE STAKES				
SALIX SERICEA	SILKY WILLOW	LIVE STAKE	2' O.C.	1,107
VIBURNUM DENTATUM	SOUTHERN ARROW-WOOD	LIVE STAKE	2' O.C.	1,107
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VIBURNUM LENTAGO	NANNYBERRY	1 GAL.	5' O.C.	71
VIBERNUM DENTATUM	SOUTHERN ARROW-WOOD	1 GAL.	5' O.C.	71
SAMBUCUS CANADENSIS	BLACK ELDERBERRY	1 GAL.	5' O.C.	71
STAPHYLEA TRIFOLIA	BLADDERNUT	1 GAL.	5' O.C.	71
UPLAND TREES				
ASIMINA TRILOBA	PAWPAW	5 GAL.	15' O.C.	10
ACER RUBRUM	RED MAPLE	5 GAL.	15' O.C.	10
OSTRYA VIRGINIANA	EASTERN HORNBEAM	5 GAL.	15' O.C.	10
PLANTANUS OCCIDENTALIS	AMERICAN SYCAMORE	5 GAL.	15' O.C.	10

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PROJECT

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PROPERTY BMAS

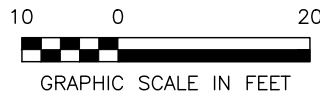
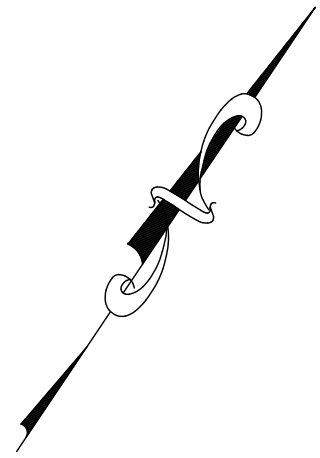
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
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CLIENT

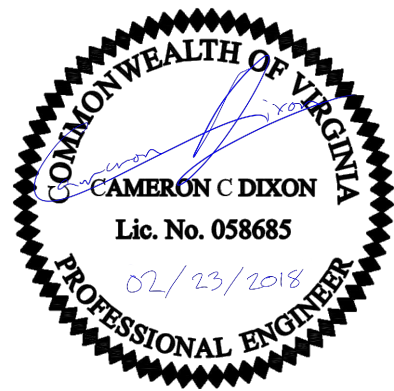
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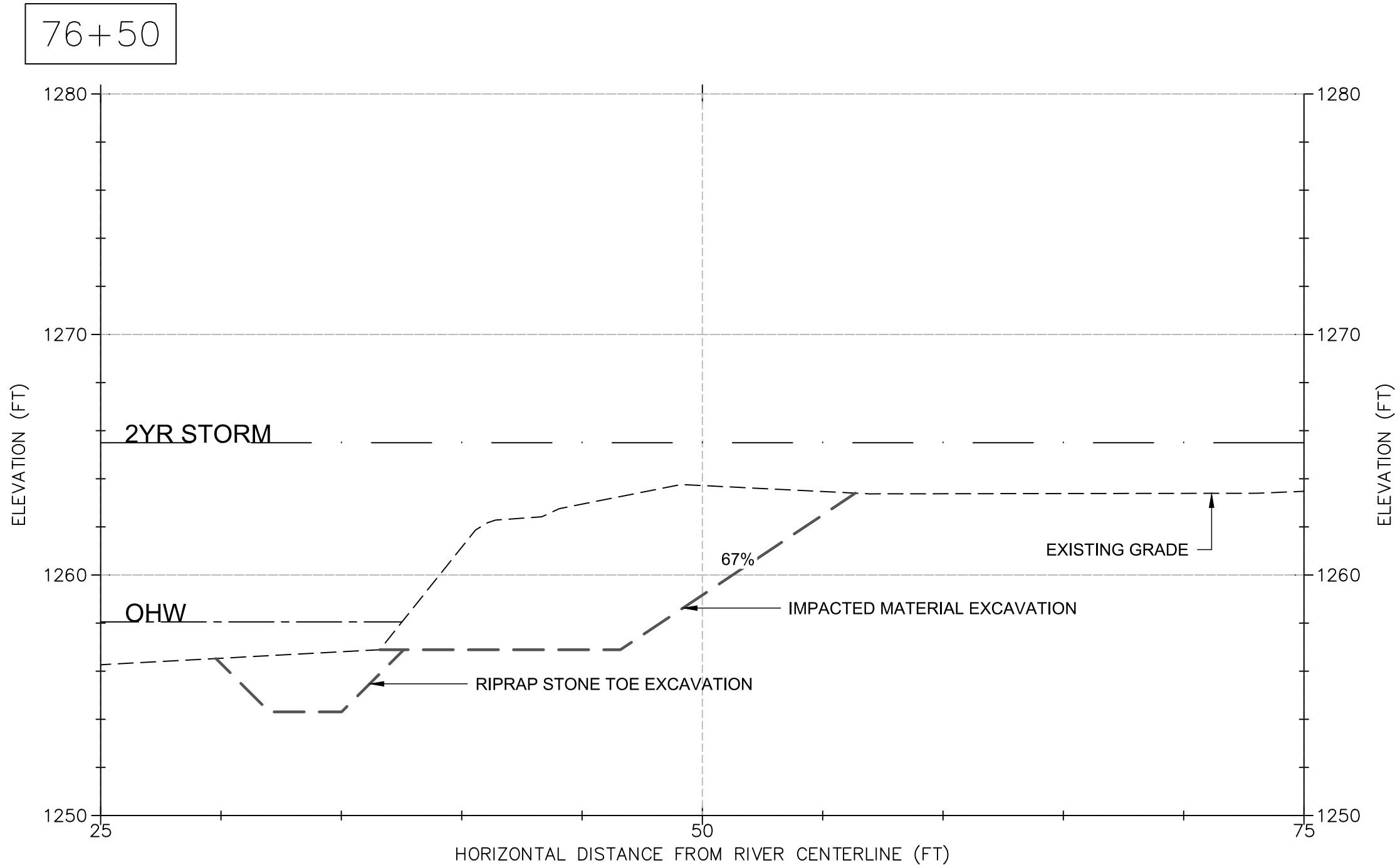
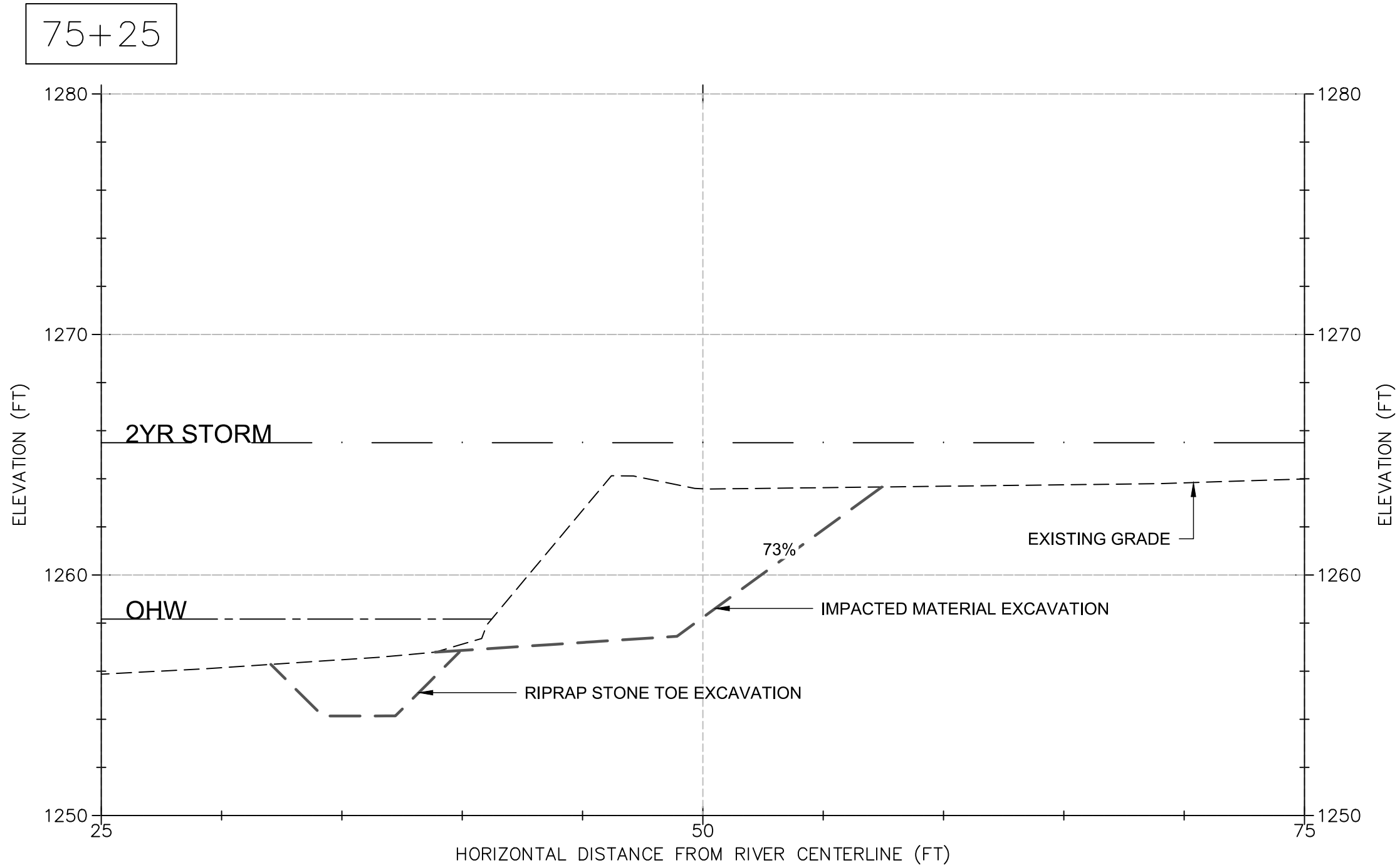
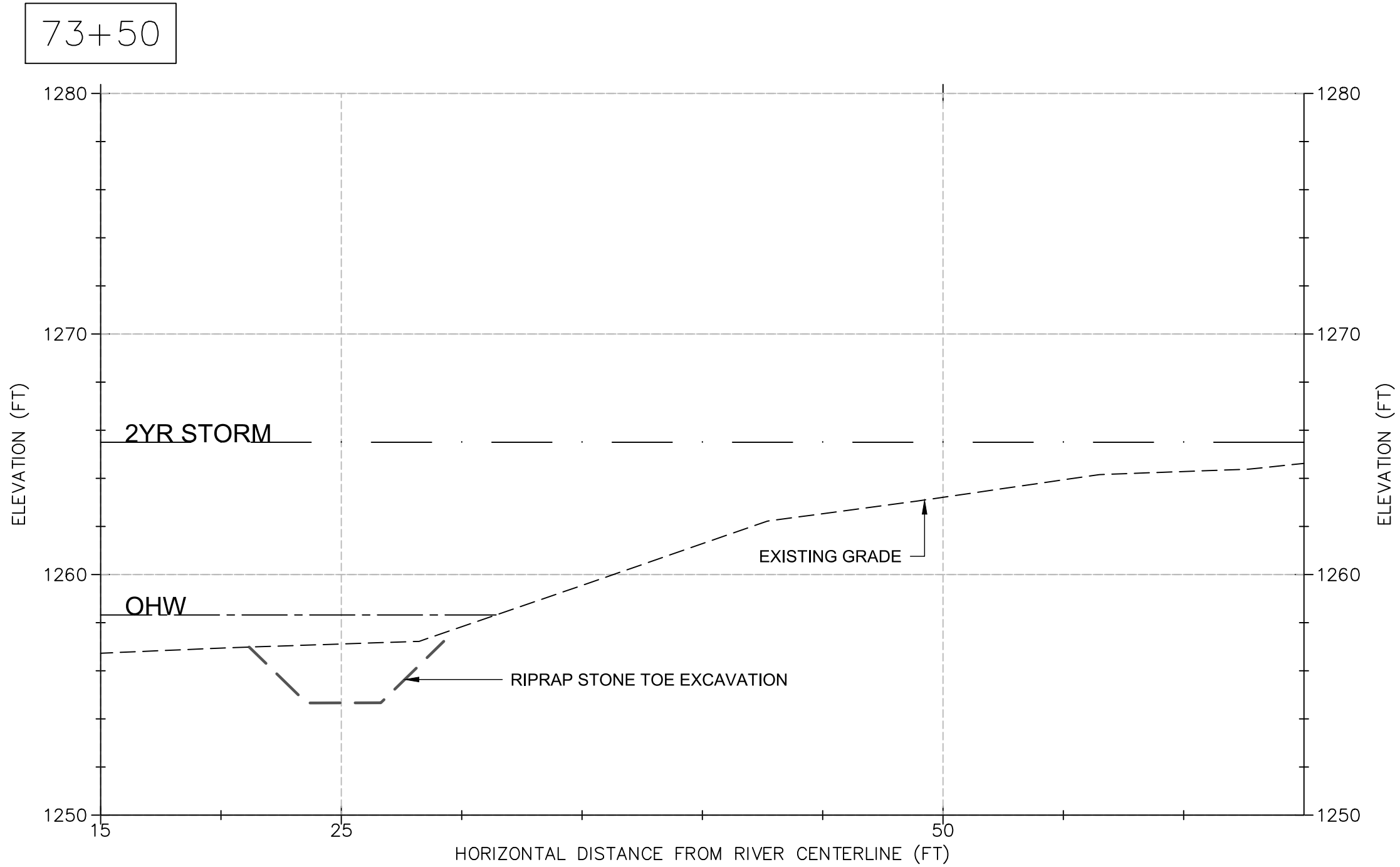
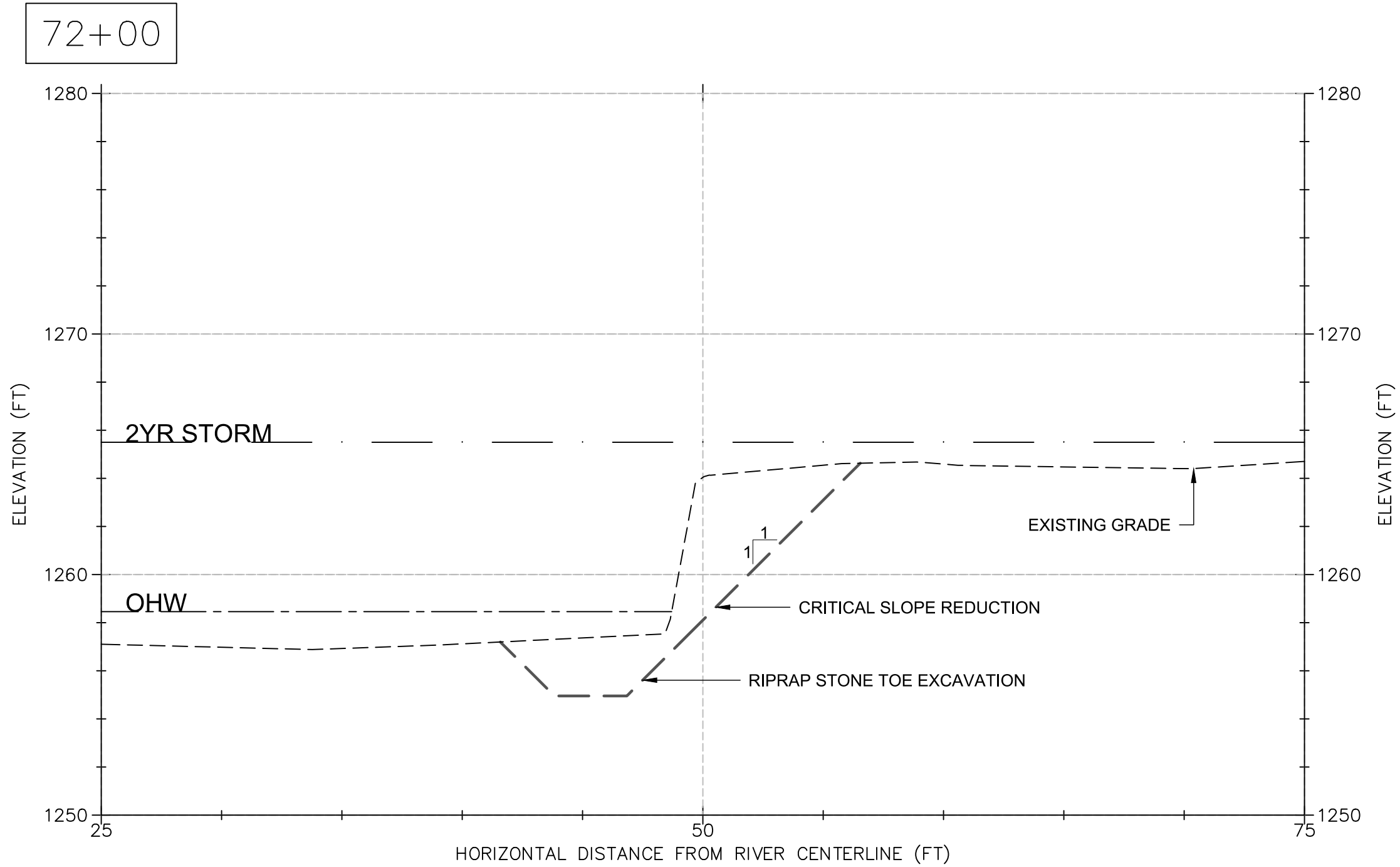
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PLANTING PLAN

SHEET NUMBER

C-502

27-1-7
EAGLE REAL
DEED INS. #1



NOTES:

- EXCAVATION SLOPES IN PRIMARY BMA A AND PRIMARY BMA B SHALL BE APPROXIMATELY 1.5H:1V . CONTRACTOR SHALL FOLLOW THE EXCAVATION GRADES PROVIDED IN C-201 EXCAVATION PLAN.
- CONTRACTOR SHALL DISCUSS EXCAVATION STRATEGIES AND DESIGN GRADES WITH AECOM ENGINEER PRIOR TO BEGINNING EXCAVATION ACTIVITIES.



PROJECT

ALLIED READY MIX
PROPERTY BMAS

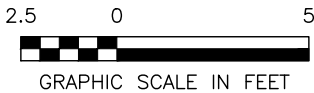
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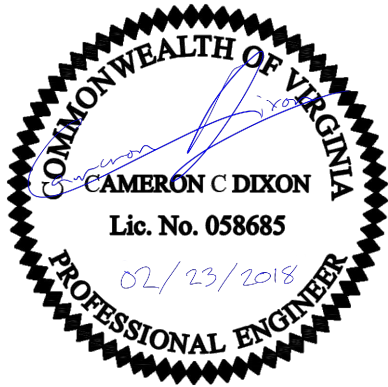
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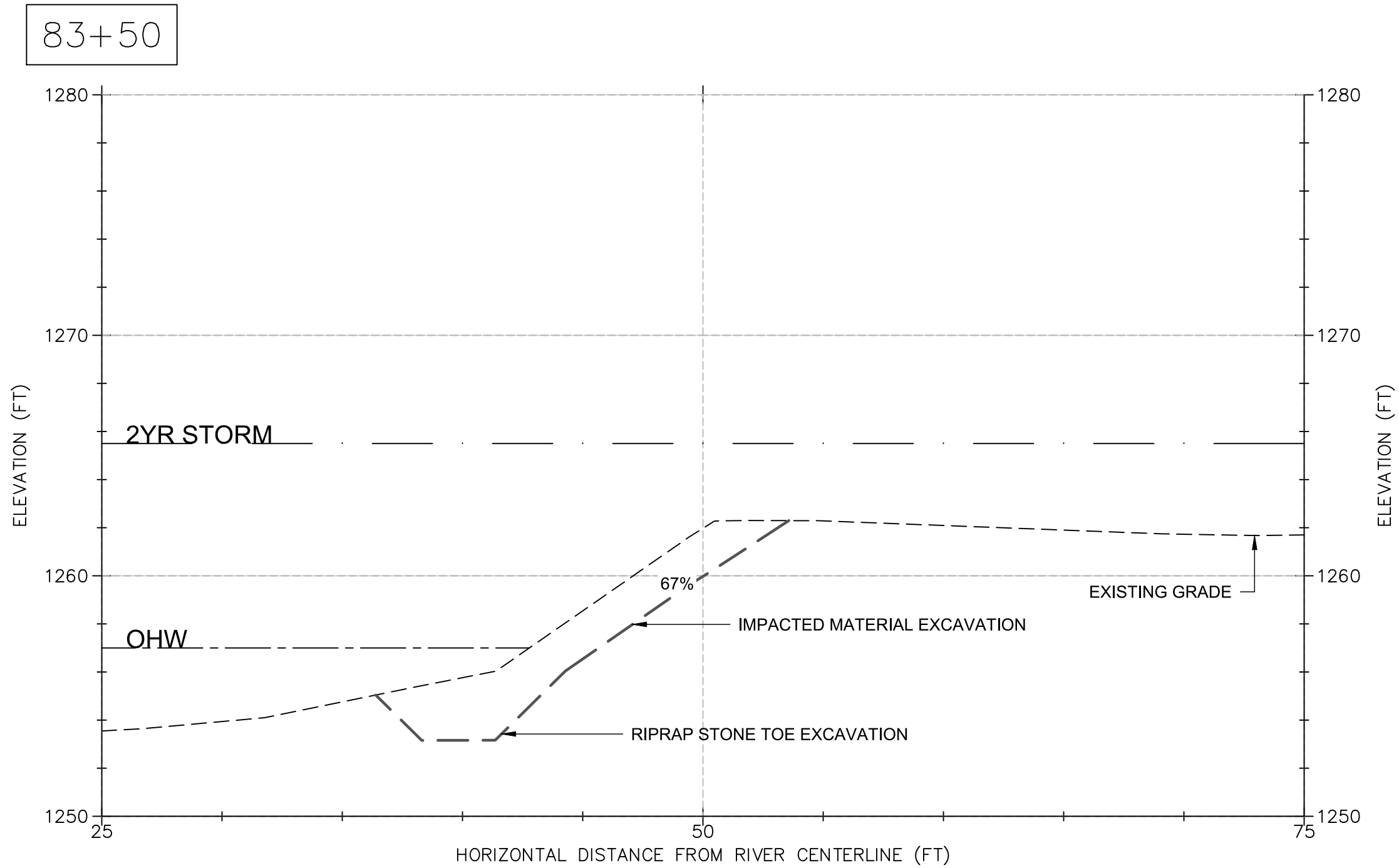
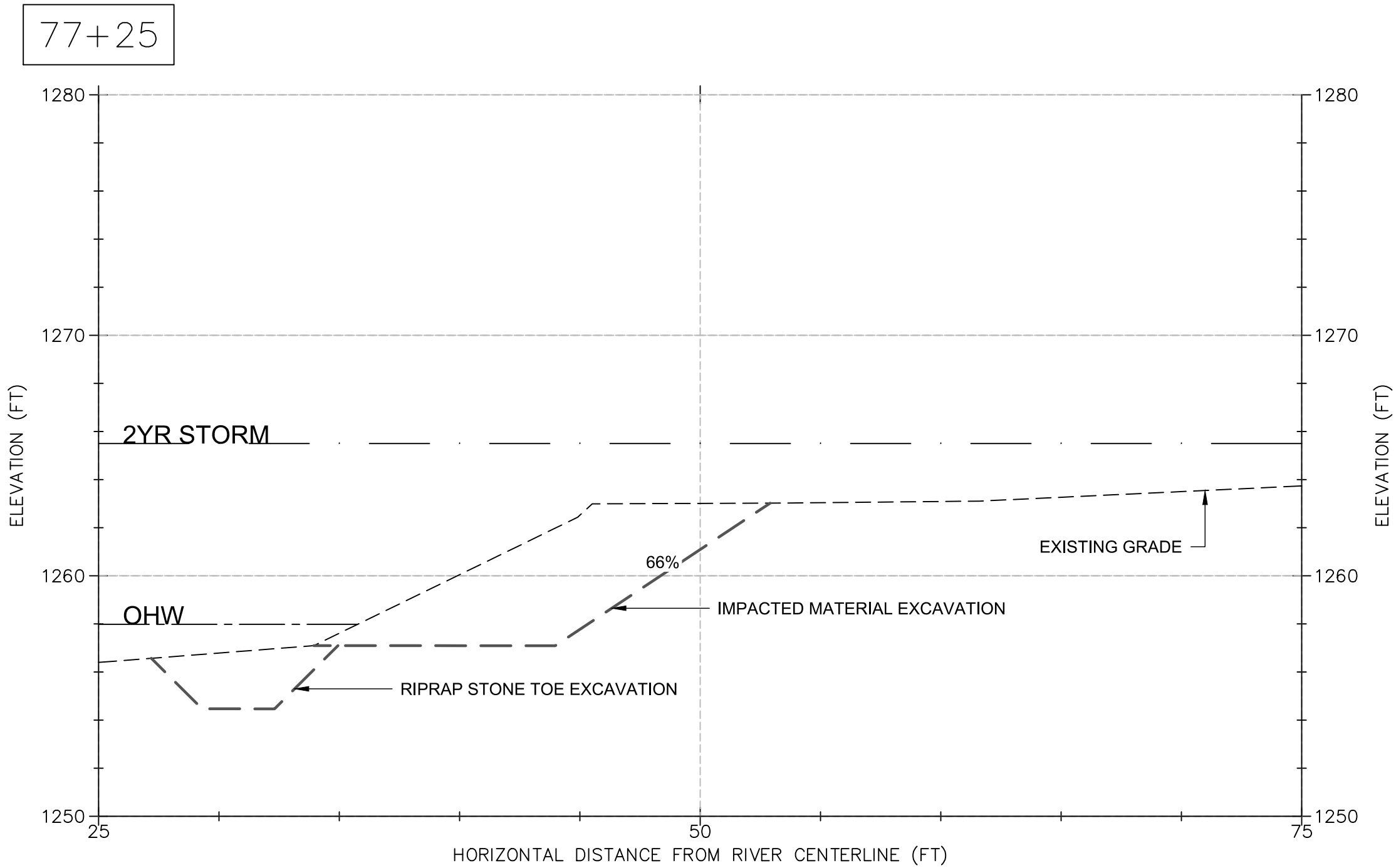
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SHEET TITLE

EXCAVATION
CROSS SECTIONS

SHEET NUMBER

X-101



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PROJECT

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PROPERTY BMAS

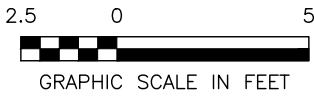
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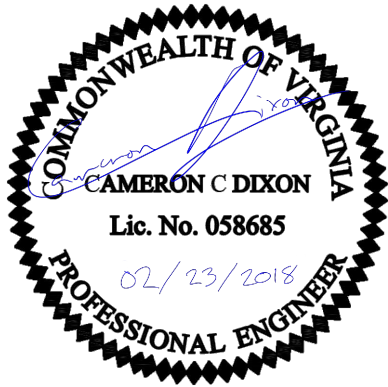
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0	02-23-2018	100% DESIGN

KEY PLAN

PROJECT NUMBER

60552472

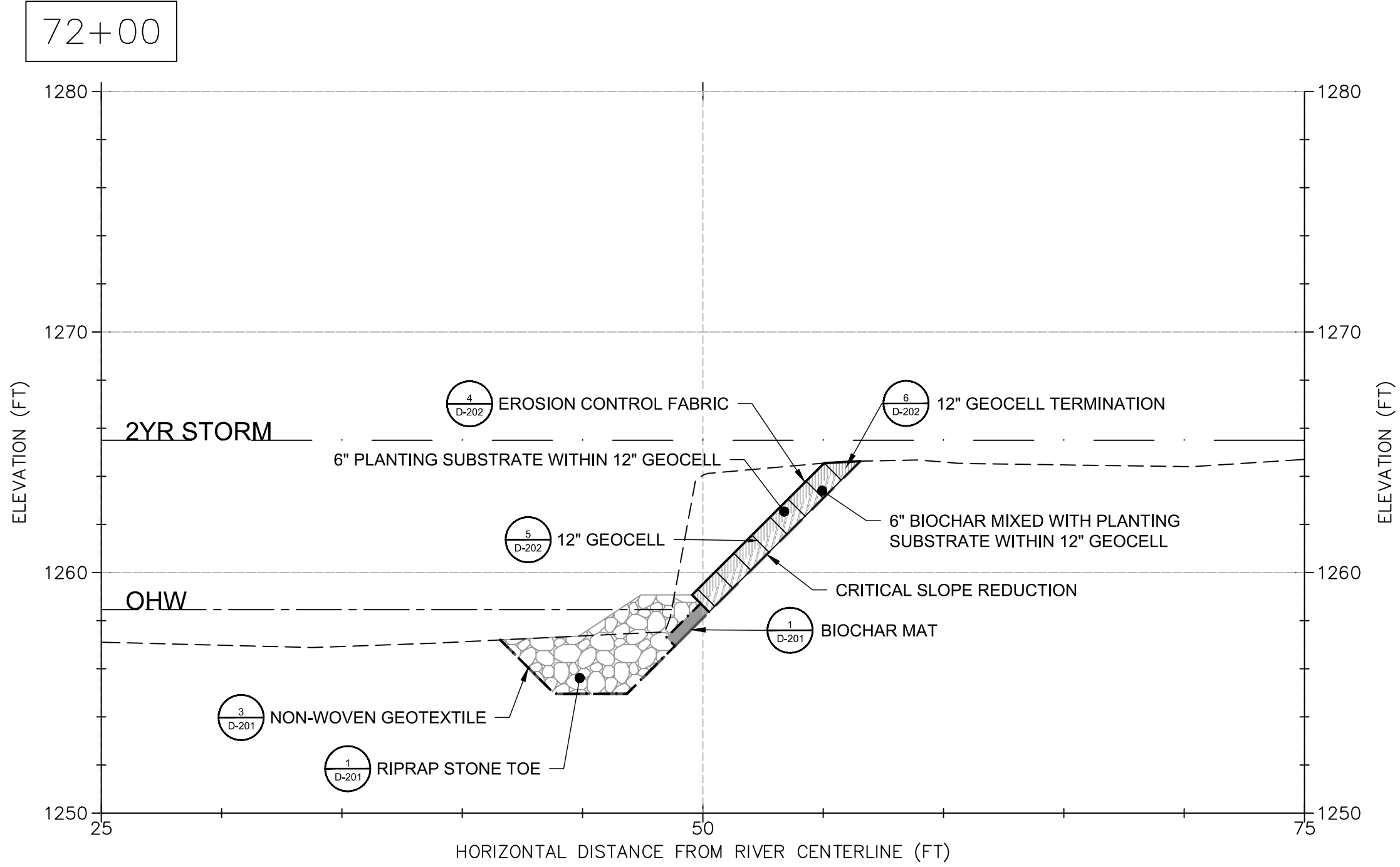
SHEET TITLE

EXCAVATION
CROSS SECTIONS

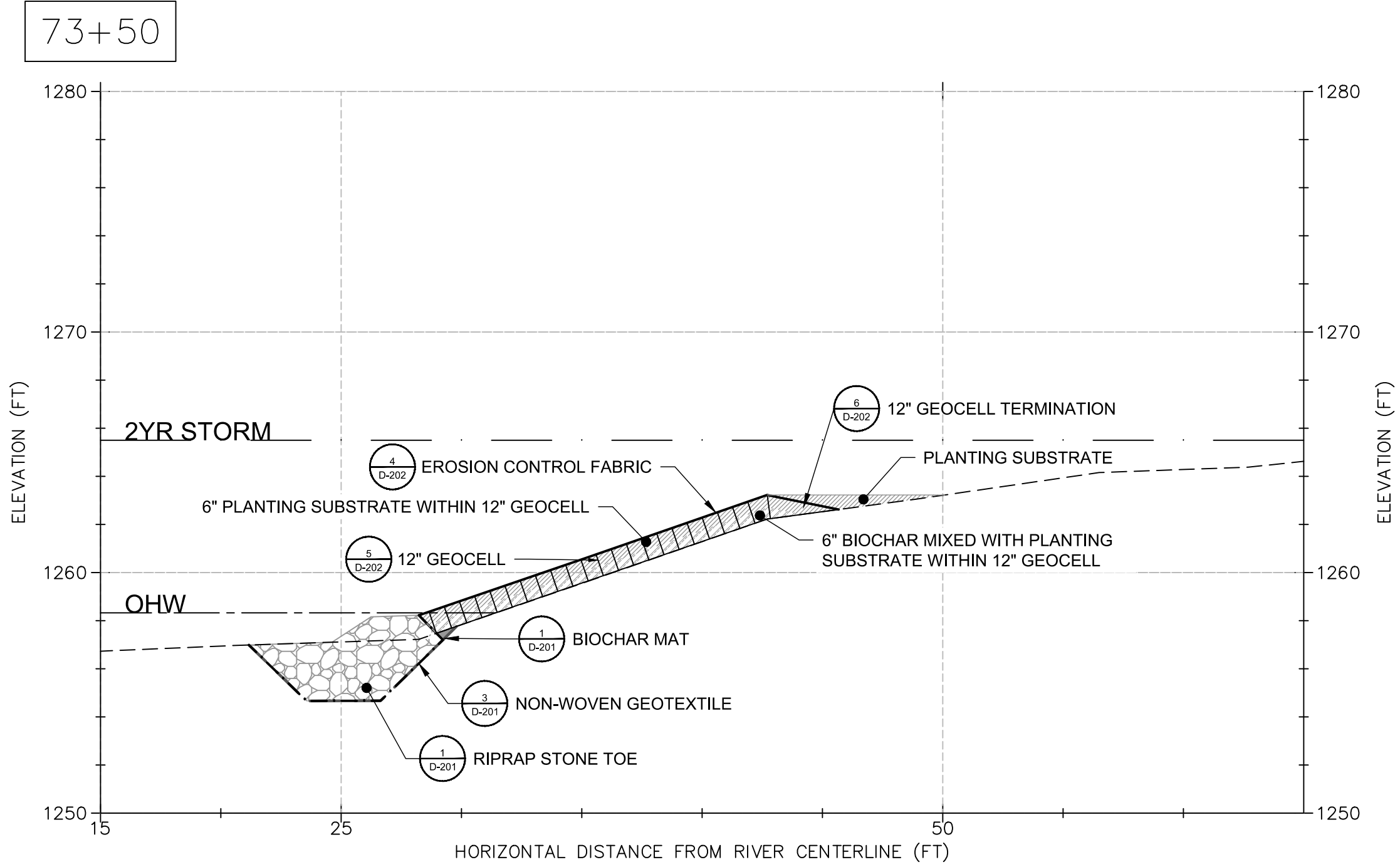
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X-102

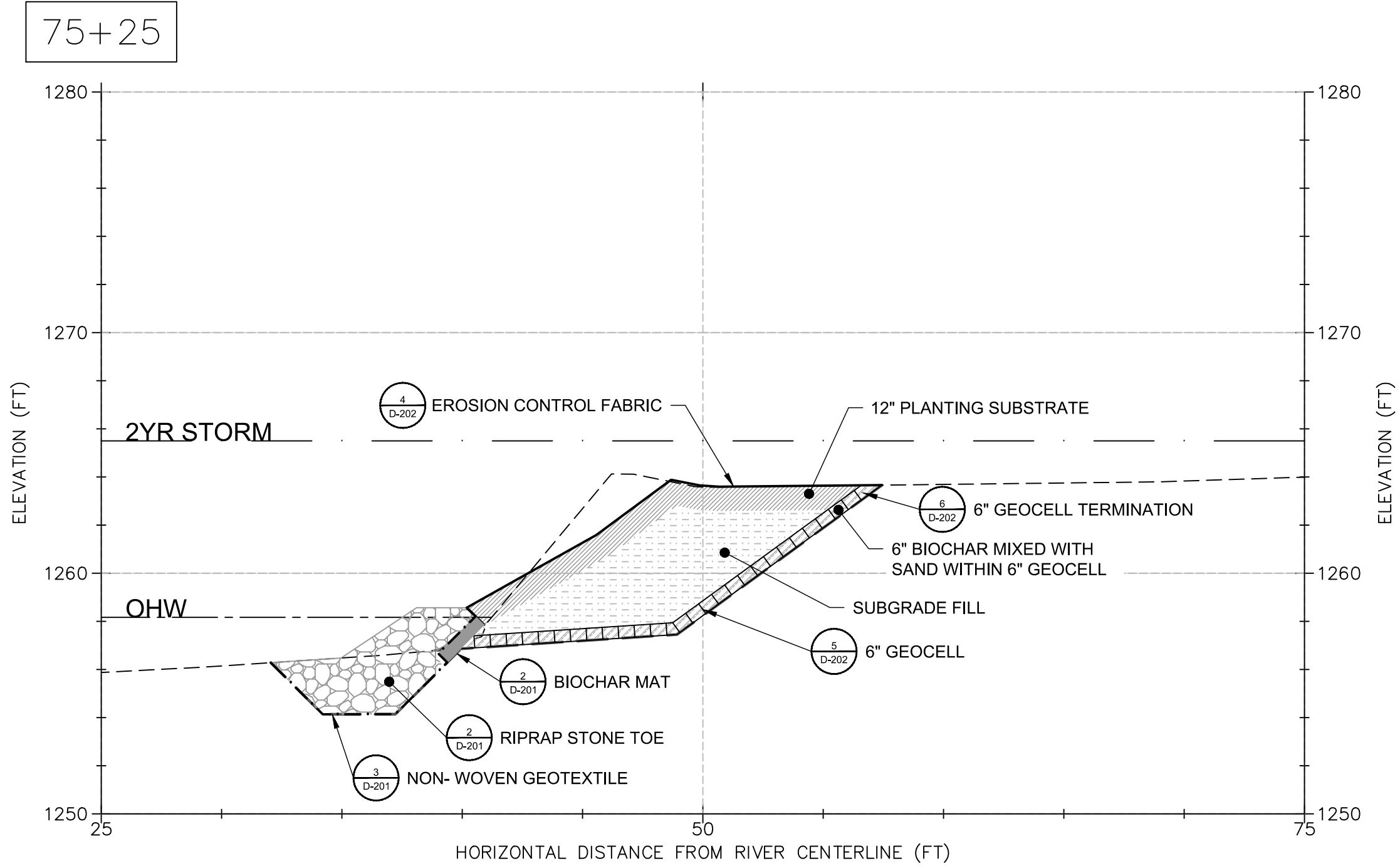
CRITICAL SLOPE-STABILIZATION CROSS SECTION



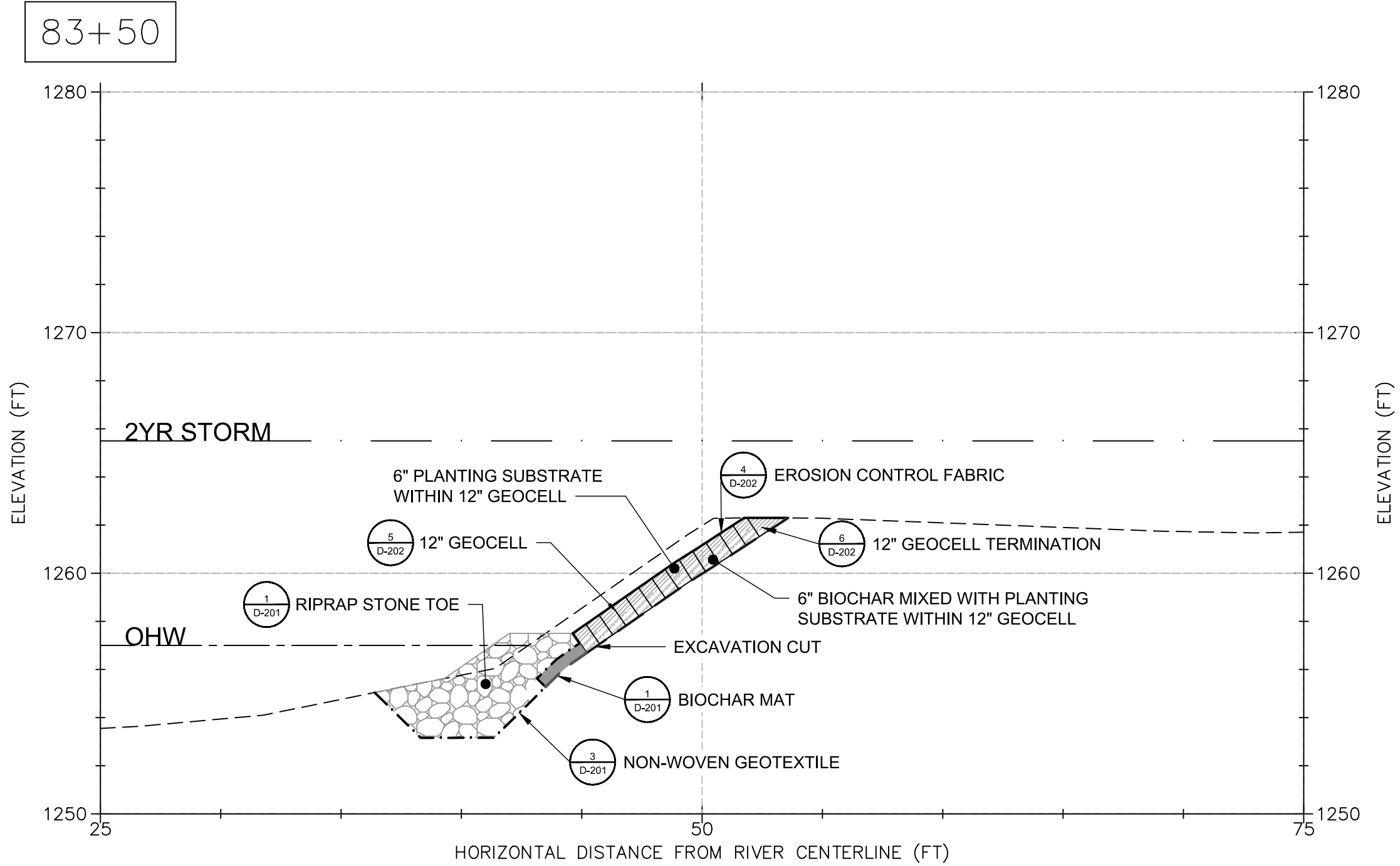
GRADUAL SLOPE-STABILIZATION CROSS SECTION



TYPICAL PRIMARY A RESTORATION CROSS SECTION



TYPICAL PRIMARY B RESTORATION CROSS SECTION



PROJECT

ALLIED READY MIX
PROPERTY BMAS

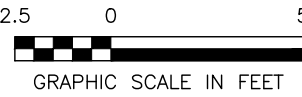
SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
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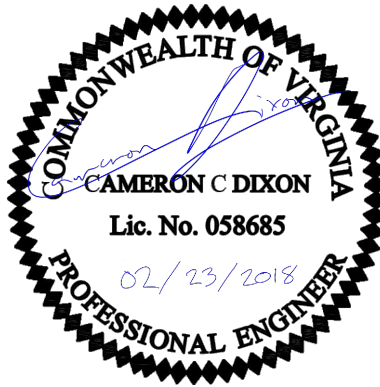
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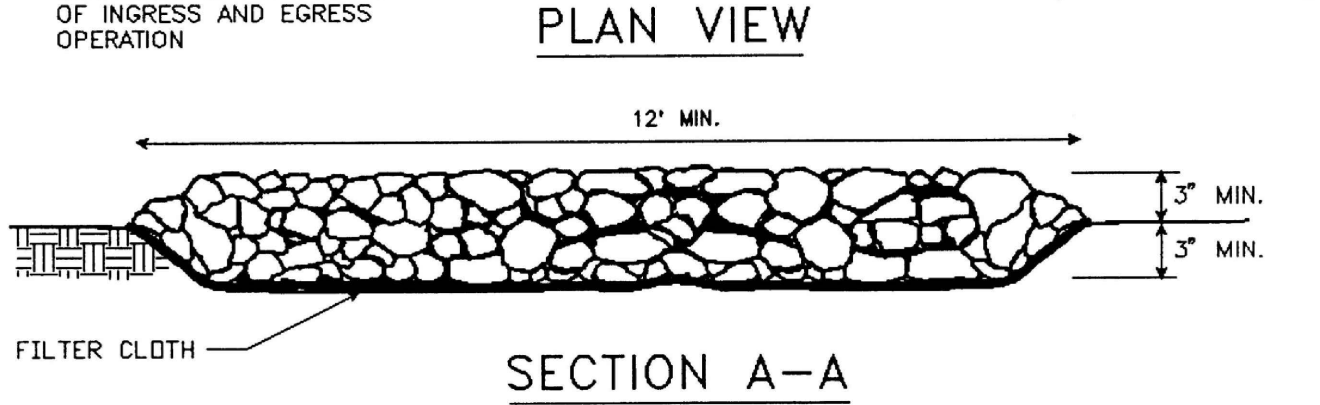
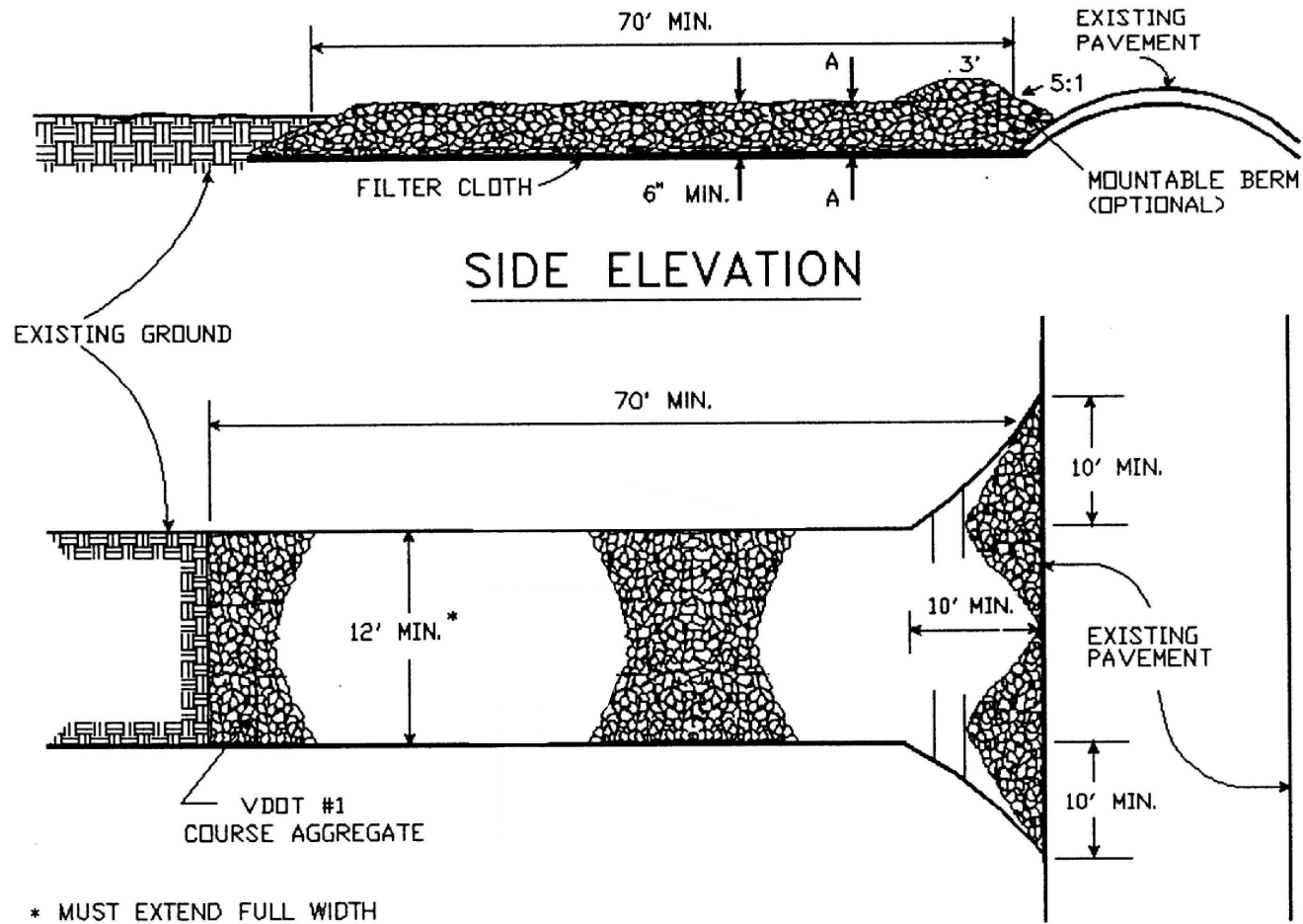
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SHEET TITLE

STABILIZATION AND RESTORATION
CROSS SECTIONS

SHEET NUMBER

X-103

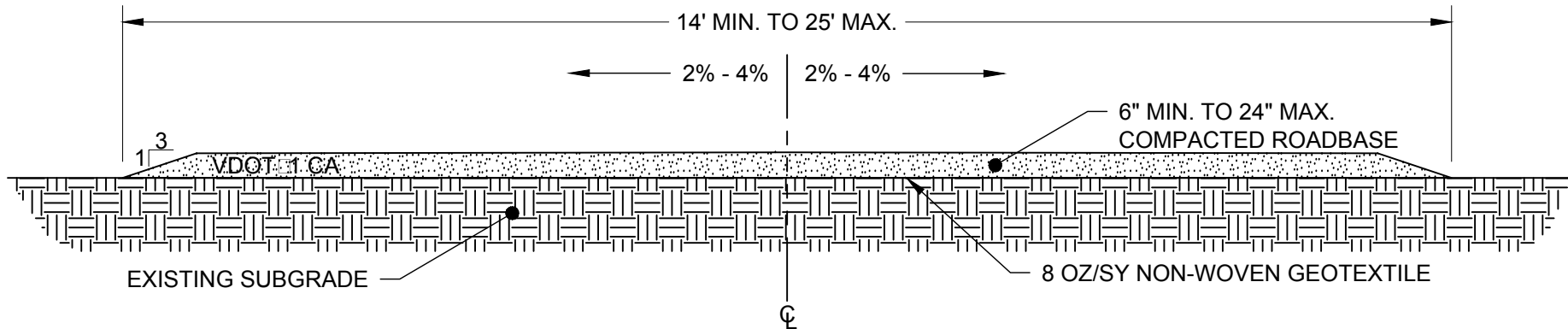
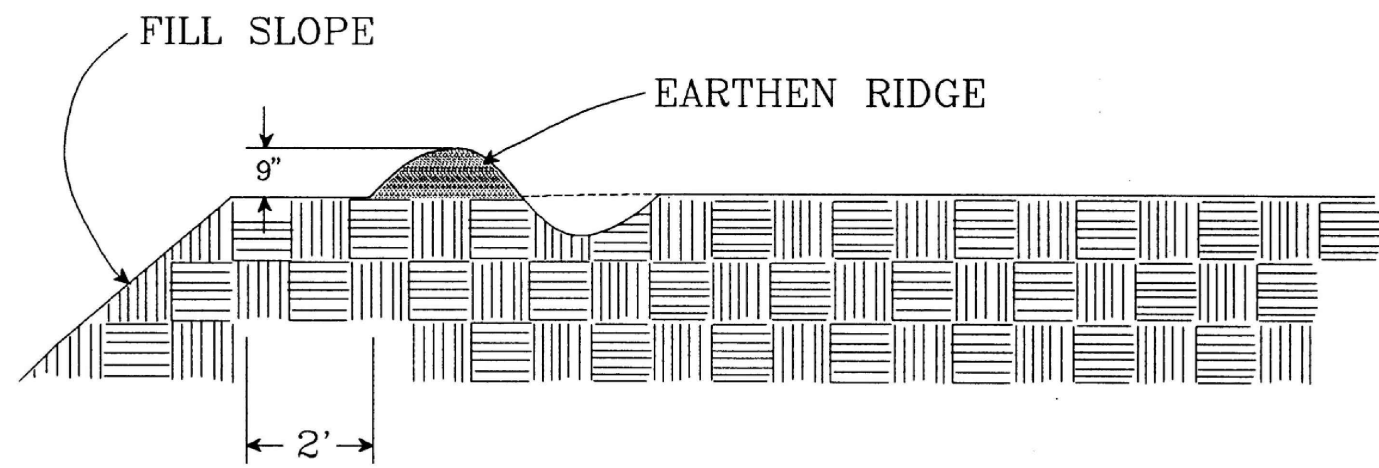


1 CONSTRUCTION ENTRANCE (CE)
- VESCH STD 3.02 NTS

CONSTRUCTION ENTRANCE (CE) NOTES:
VESCH STD & SPEC 3.02

1. STONE SIZE - VDOT #1 COARSE AGGREGATE (2 TO 3 INCH STONE).
2. LENGTH - NOT LESS THAN 70 FEET.
3. THICKNESS - NOT LESS THAN 6 INCHES. A MINIMUM OF 3 INCHES OF AGGREGATE SHALL BE PLACED IN A CUT SECTION TO GIVE THE ENTRANCE ADDED STABILITY AND TO SECURE THE FILTER CLOTH SEPARATOR.
4. WIDTH - 12 FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. USE 24-FOOT WIDTH IF MAIN ENTRANCE TO SITE.
5. 8 OUNCE PER SQUARE YARD GEOTEXTILE SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM CONSTRUCTED OF VDOT #1 COARSE AGGREGATE WITH 5H:1V SIDE SLOPES SHALL BE UTILIZED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. TRUCK WASHING SHALL BE CONDUCTED WITHIN A DECONTAMINATION PAD AND NOT ON THE CONSTRUCTION ENTRANCE PAD.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.

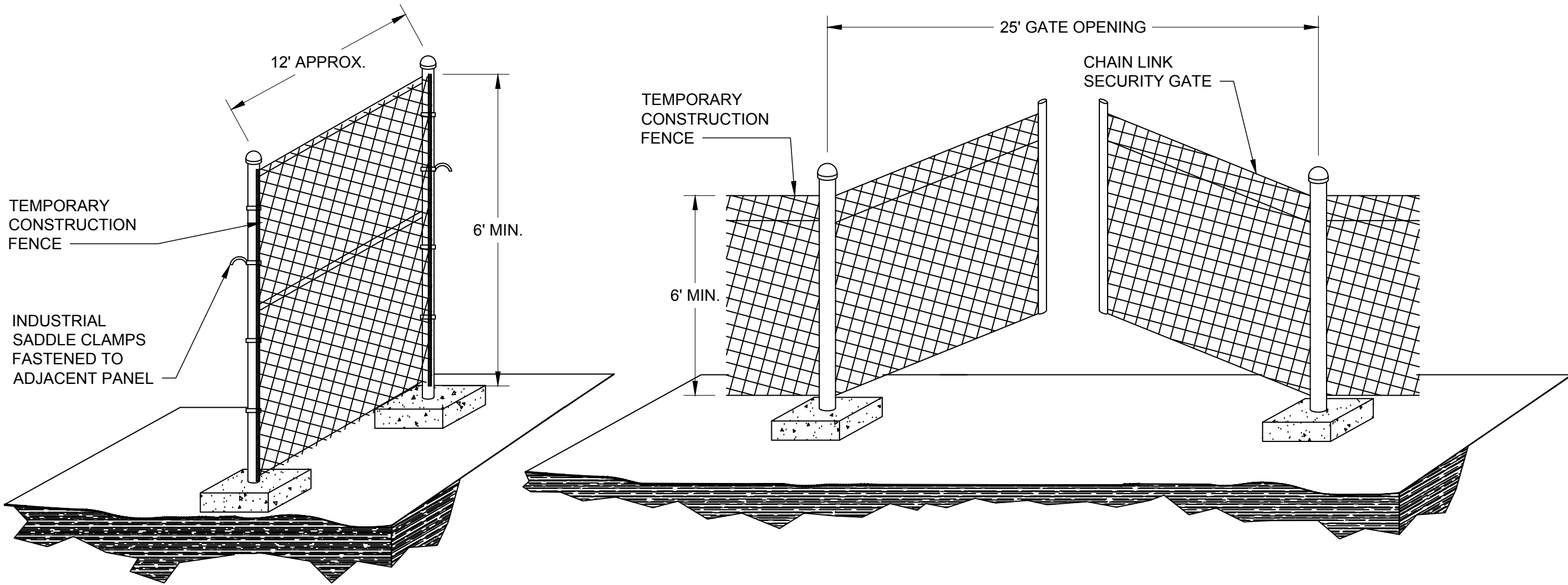
TEMPORARY FILL DIVERSION



2 TEMPORARY CONSTRUCTION ACCESS ROAD (CRS)
- VESCH STD 3.03 NTS

TEMPORARY CONSTRUCTION ACCESS ROAD (CRS) NOTES:
VESCH STD & SPEC 3.03

1. TEMPORARY ACCESS ROAD SHALL BE NO GREATER THAN 25 FEET WIDE. SLOPES SHALL NOT EXCEED 10%. ACTUAL PLACEMENT SHALL BE DETERMINED BASED ON SITE CONDITIONS WITH APPROVAL BY SITE ENGINEER.
2. EXISTING SUBGRADE SHALL BE PREPARED TO MINIMIZE ANGULAR PROTRUSIONS AND SHALL BE COMPACTED TO THE GREATEST EXTENT PRACTICABLE AND TO THE SATISFACTION OF ENGINEER PRIOR TO THE PLACEMENT OF THE GEOTEXTILE.
3. 8 OUNCE PER SQUARE YARD NON-WOVEN GEOTEXTILE SHALL BE PLACED AS DETAILED IN SPECIFICATIONS WITH MINIMUM 12 INCH OVERLAPPING SECTIONS PER MANUFACTURER'S RECOMMENDATIONS.
4. ROADWAY MATERIAL SHALL BE VDOT #1 COARSE AGGREGATE.
5. TEMPORARY ACCESS ROAD SHALL BE GRADED TO DRAIN AWAY FROM THE CENTERLINE AT A 2% TO 4% SLOPE.
6. TEMPORARY ACCESS ROAD SHALL BE INSPECTED REGULARLY. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE TO BE PERFORMED FOR THE DURATION OF THE PROJECT.
7. AS PART OF SITE RESTORATION, CONTRACTOR SHALL REMOVE GEOTEXTILE FABRIC AND FILL MATERIALS AND RESTORE AREA TO PRE-EXISTING CONDITIONS.



4 TEMPORARY CONSTRUCTION FENCE (SAF)
- VESCH STD 3.01 NTS

TEMPORARY CONSTRUCTION FENCE (SAF) NOTES:
VESCH STD & SPEC 3.01

1. ALL TEMPORARY CONSTRUCTION FENCE IS TO HAVE VISUAL BARRIER FABRIC SECURED TO CHAIN LINK MESH.

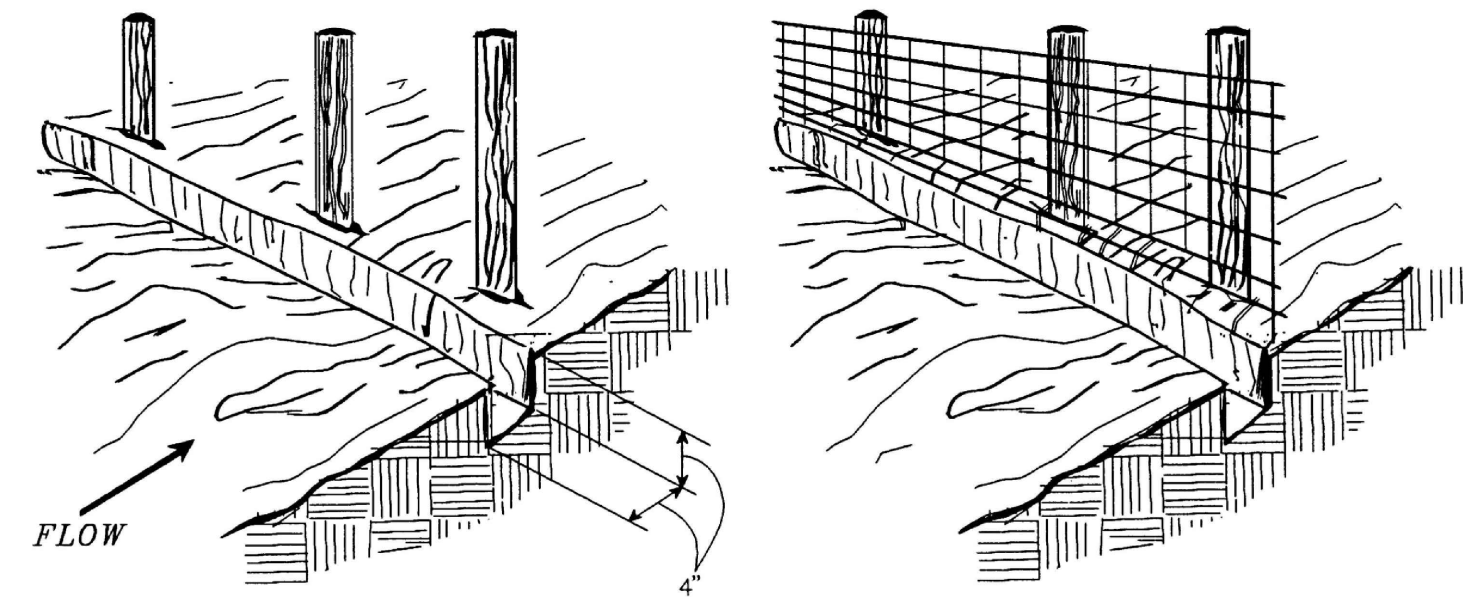
5 TEMPORARY FILL DIVERSION (FD)
- VESCH STD 3.10 NTS

TEMPORARY FILL DIVERSION (FD) NOTES:
VESCH STD & SPEC 3.10

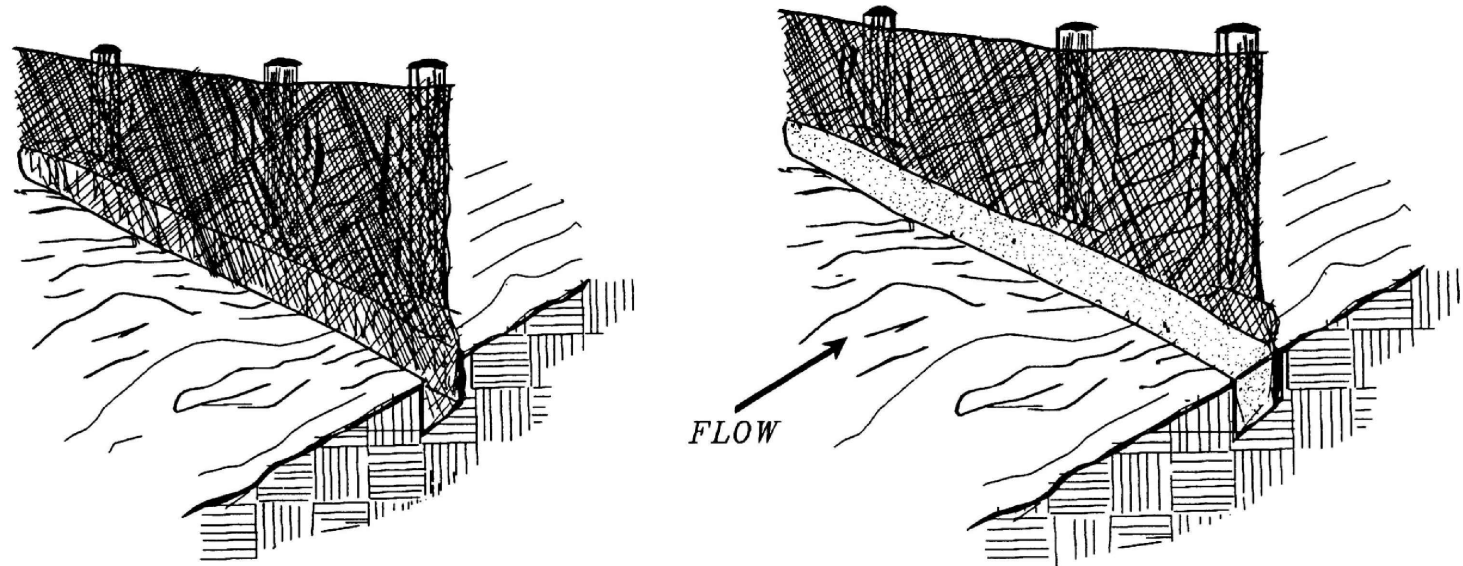
1. AS NEEDED, A TEMPORARY FILL DIVERSION SHALL BE CONSTRUCTED AT THE TOP OF THE FILL AT THE END OF EACH WORK DAY TO PROTECT FILL SLOPES.
2. THE MINIMUM HEIGHT OF THE SUPPORTING RIDGE SHALL BE 9 INCHES. THE SUPPORTING RIDGE SHALL BE CONSTRUCTED WITH A UNIFORM HEIGHT ALONG ITS ENTIRE LENGTH TO AVOID BREACHING.
3. THE DIVERSION SHALL BE LOCATED AT LEAST 2 FEET INSIDE THE TOP EDGE OF THE FILL.
4. CHANNELS SHALL HAVE A POSITIVE GRADE TO A STABILIZED OUTLET.

CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)

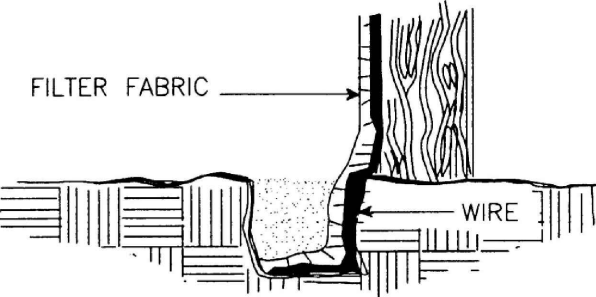
1. SET POSTS AND EXCAVATE A 4" X 4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.
2. STAPLE WIRE FENCING TO THE POSTS.



3. ATTACH THE FILTER FABRIC TO THE WIRE FENCE AND EXTEND IT INTO THE TRENCH.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



EXTENSION OF FABRIC AND WIRE INTO THE TRENCH.



3 SILT FENCE (SF)
- VESCH STD 3.05 NTS

SILT FENCE (SF) NOTES:
VESCH STD & SPEC 3.05

1. SYNTHETIC FILTER FABRIC SHALL BE A PERVIOUS SHEET OF PROPYLENE, NYLON, POLYESTER, OR ETHYLENE YARN AND SHALL BE CERTIFIED BY THE MANUFACTURER OR SUPPLIER FOR THE FOLLOWING:
 - A. FILTERING EFFICIENCY - 75% MINIMUM (ASTM 5141).
 - B. TENSILE STRENGTH AT 20% (MAXIMUM) ELONGATION - EXTRA STRENGTH - 50 POUNDS PER LINEAR INCH (MINIMUM) (TEST METHOD VTM-52).
 - C. FLOW RATE - 0.2 GALLONS PER SQUARE FOOT PER MINUTE (MINIMUM) (ASTM 5141).
 - D. ULTRAVIOLET RADIATION STABILITY %: 90% (MINIMUM) (ASTM G26).
2. WOODEN STAKES SHALL HAVE A DIAMETER OF 2 INCHES WHEN OAK IS USED AND 4 INCHES WHEN PINE IS USED. WOODEN STAKES SHALL HAVE A MINIMUM LENGTH OF 5 FEET.
3. STEEL POSTS (STANDARD "U" OR "T" SECTION) SHALL HAVE A MINIMUM WEIGHT OF 1.33 POUNDS PER LINEAR FOOT AND SHALL HAVE A MINIMUM LENGTH OF 5 FEET.
4. WIRE FENCE REINFORCEMENT USING STANDARD-STRENGTH FILTER CLOTH SHALL BE A MINIMUM OF 14 GAUGE AND SHALL HAVE A MAXIMUM MESH SPACING OF 6 INCHES.
5. HEIGHT OF SILT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34 INCHES ABOVE GROUND ELEVATION.
6. FILTER FABRIC SHALL BE A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHERE JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM OF A 6-INCH OVERLAP, AND SECURELY SEALED.
7. TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES WIDE AND 4 INCHES DEEP ON THE UPSLOPE SIDE OF THE PROPOSED LOCATION OF THE MEASURE.
8. POSTS SHALL BE PLACED A MAXIMUM OF 10 FEET APART.
9. WIRE MESH FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG, TIRE WIRES OR HOG RINGS. WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 2 INCHES AND SHALL NOT EXTEND MORE THAN 34 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
10. STANDARD-STRENGTH FABRIC SHALL BE STAPLED OR WIRED TO THE WIRE FENCE, AND 8 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
11. THE 4-INCH BY 4-INCH TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER CLOTH.
12. SILT FENCE SHALL BE REMOVED WHEN IT HAS SERVED ITS USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.

AECOM

PROJECT

ALLIED READY MIX PROPERTY BMAS

SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

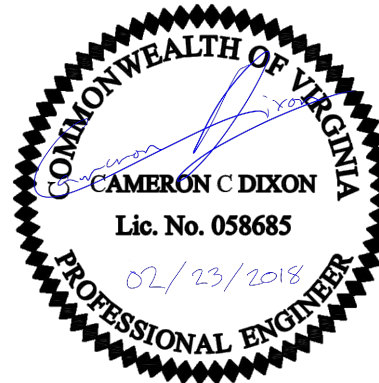
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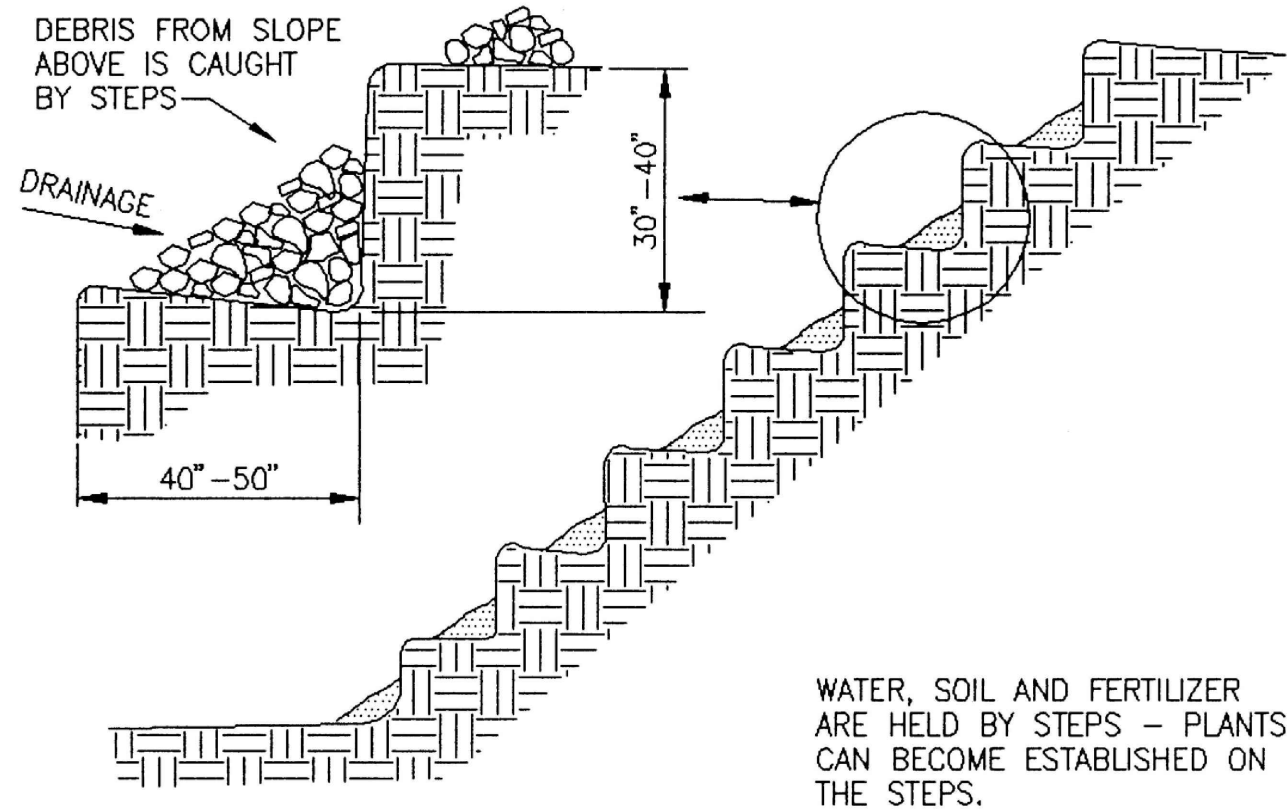
SHEET TITLE

SITE PREPARATION AND
EROSION CONTROL DETAILS

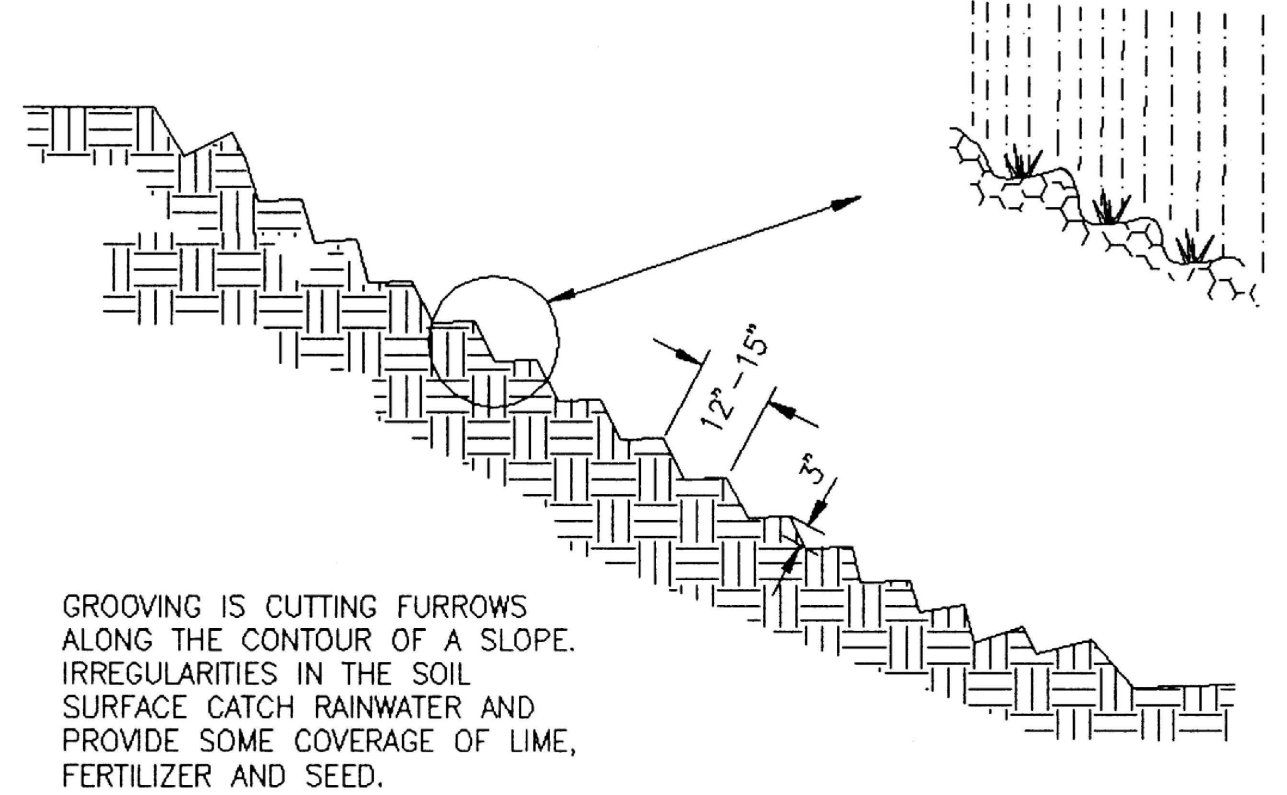
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D-101

STAIR STEPPING CUT SLOPES



GROOVING SLOPES

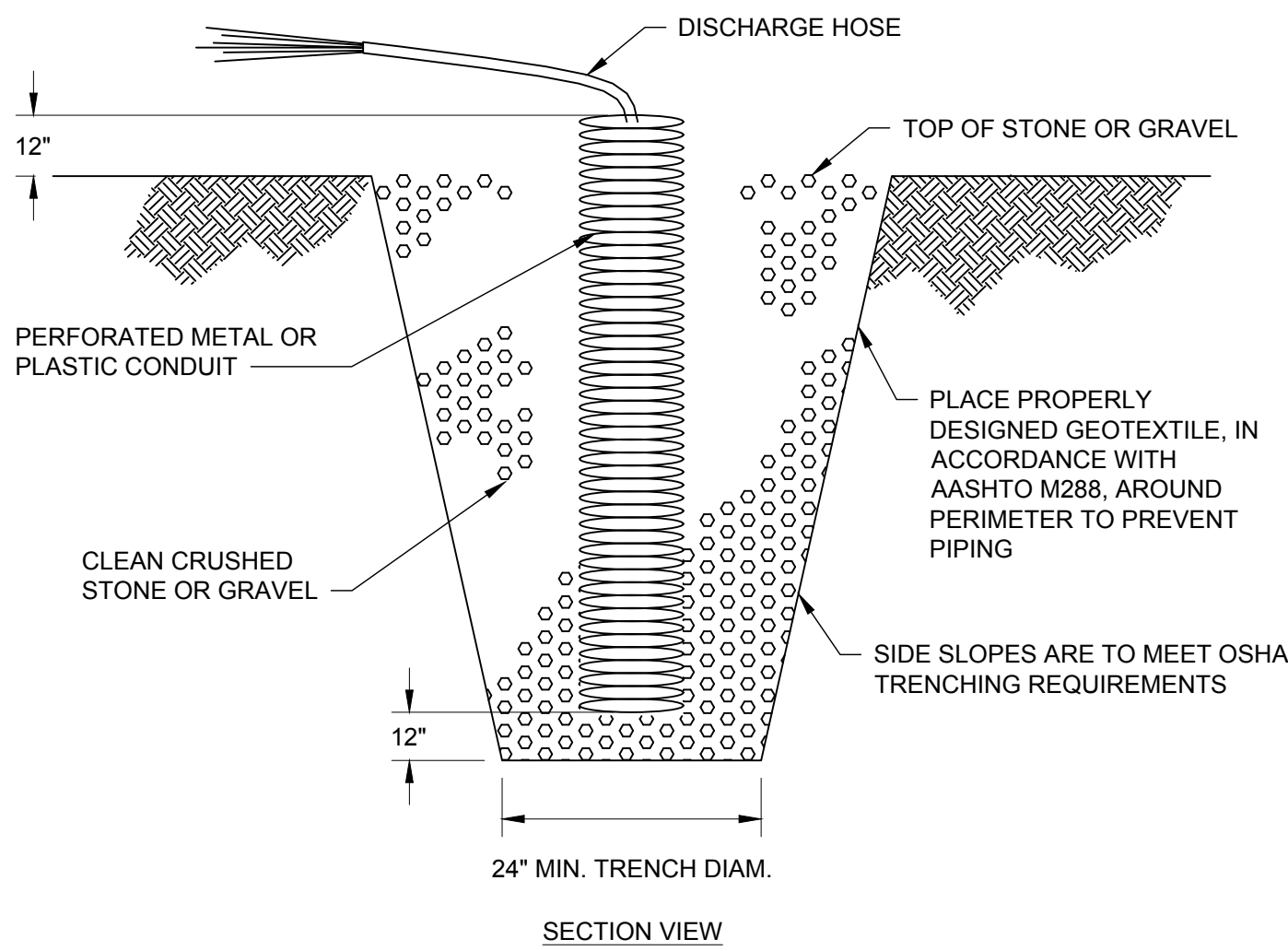


6 SURFACE ROUGHENING

VESCH STD 3.29 NTS

SURFACE ROUGHENING (SR) NOTES:
VESCH STD & SPEC 3.29

- CUT OR GRADED SLOPES WHERE GEOCELL WILL BE INSTALLED SHOULD NOT BE ROUGHENED. CUT SLOPES STEEPER THAN 3H:1V ABOVE THE LIMIT OF GEOCELL INSTALLATION REQUIRE SURFACE ROUGHENING WITH EITHER STAIR-STEP GRADING OR FURROWING.
- RESTORED SLOPES IN BANK REMOVAL AND RESTORATION AREAS SHOULD HAVE SOIL SURFACE LIGHTLY ROUGHENED AND LOOSE TO A DEPTH OF 2 TO 4 INCHES PRIOR TO SEEDING.
- AREAS WHICH HAVE BEEN GRADED AND WILL NOT BE STABILIZED IMMEDIATELY MAY BE ROUGHENED TO REDUCE RUNOFF VELOCITY UNTIL SEEDING AND OTHER STABILIZATION PRODUCTS ARE INSTALLED.
- SLOPES WITH EXISTING STABLE ROCK FACES (ROCK OUTCROPS) DO NOT REQUIRE ROUGHENING.

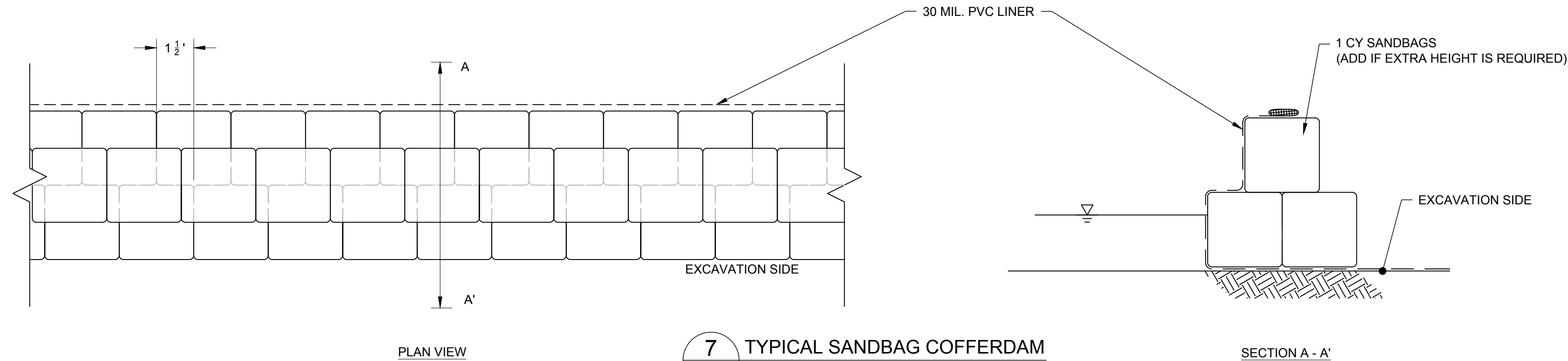


9 DEWATERING STRUCTURE/ SUMP (DS)

VESCH STD 3.26 NTS

DEWATERING STRUCTURE/ SUMP (DS) NOTES:
VESCH STD & SPECS 3.26

- OVERALL SUMP PIT DIMENSIONS SHALL BE COMPATIBLE WITH ANTICIPATED SEEPAGE RATES AND PUMP SIZE TO BE USED.
- THE STANDPIPE DIAMETER AND NUMBER OF PERFORATIONS SHALL BE COMPATIBLE WITH THE PUMP SIZE BEING USED.
- PERFORATIONS IN THE STANDPIPE SHALL BE EITHER CIRCULAR OR SLOTS. PERFORATION SIZE SHALL BE EXCEED 1/2 INCH IN DIAMETER.
- CRUSHED STONE OR GRAVEL SHALL BE NO SMALLER THAN AASHTO -57 SIZE NOR LARGER THAN VDOT 3 SIZE. CRUSHED STONE SHALL EXTEND A MINIMUM OF 12 INCHES BELOW THE BOTTOM OF THE STANDPIPE.
- IF EXCESSIVE MOVEMENT OF FINE SOIL PARTICLES FROM THE SURROUNDING EXISTING SOILS IS ANTICIPATED, A PROPERLY DESIGNED GEOTEXTILE SHALL BE PLACED BETWEEN THE EXISTING SOILS AND THE CRUSHED STONE OR GRAVEL BACKFILL.
- THE STANDPIPE SHALL EXTEND A MINIMUM OF 12 INCHES ABOVE THE SURROUNDING GROUND.

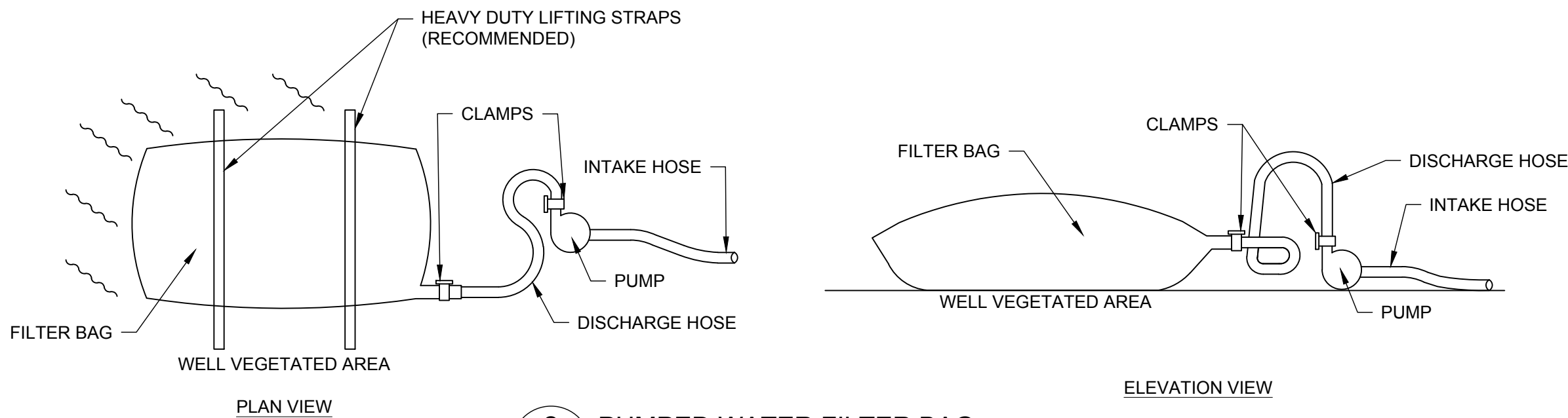


7 TYPICAL SANDBAG COFFERDAM

NTS

TYPICAL SANDBAG COFFERDAM NOTES:

- ADD AND STACK SANDBAGS IF EXTRA HEIGHT IS REQUIRED.
- THIS DETAIL IS A TYPICAL SANDBAG COFFERDAM AND IS PROVIDED TO BE GUIDANCE FOR THE CONTRACTOR. THE CONTRACTOR MAY PROPOSE AN ALTERNATIVE TO THIS DETAIL. COFFERDAM SYSTEM SUBJECT TO AECOM ENGINEER APPROVAL.

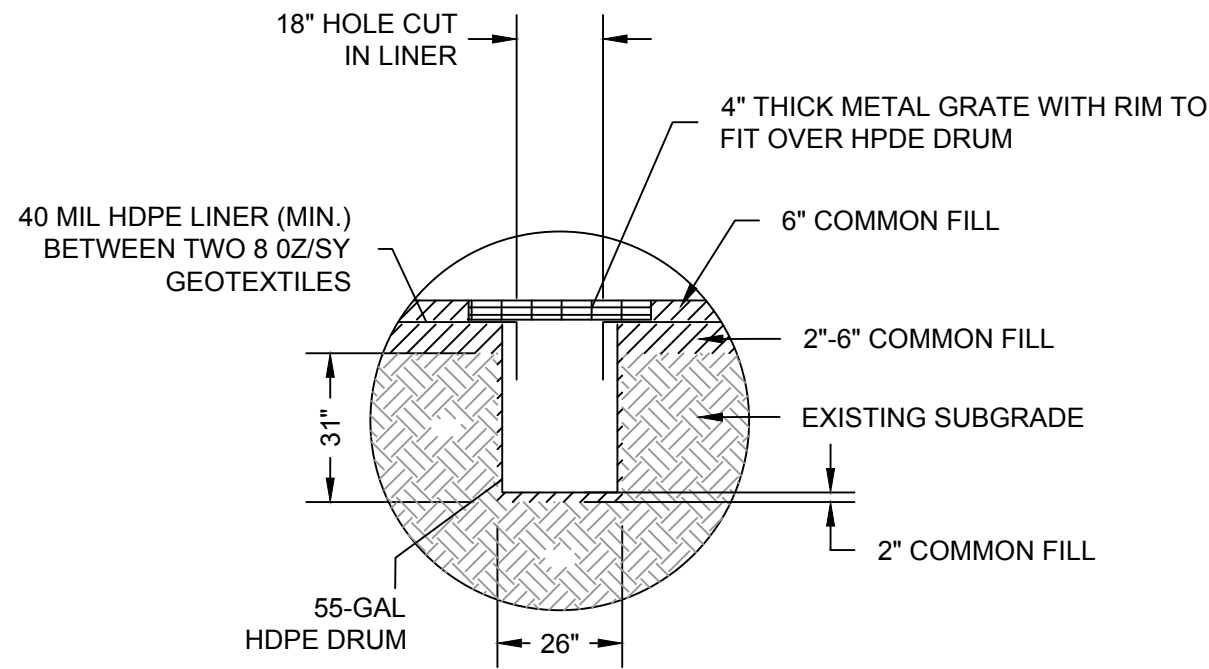
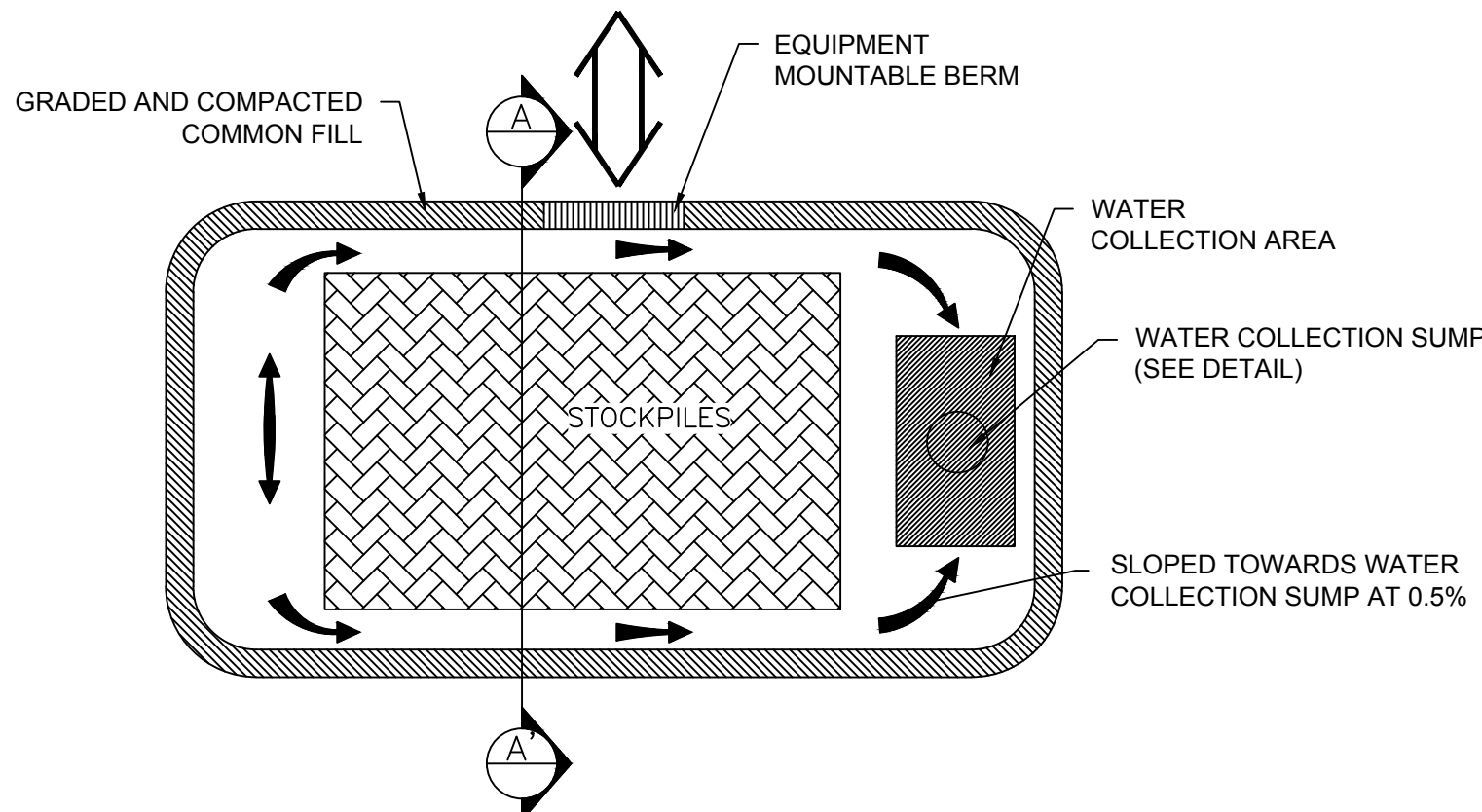


8 PUMPED WATER FILTER BAG

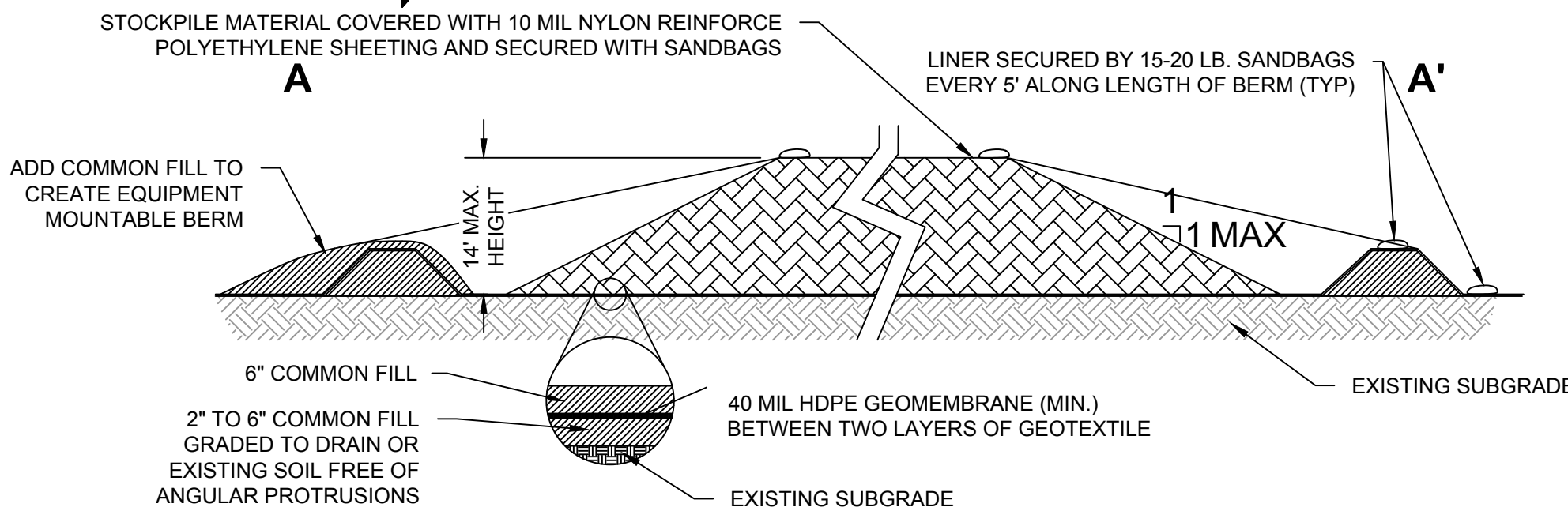
NTS

PUMPED WATER FILTER BAG NOTES:

- FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
- A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME HALF FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.
- BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) OR STABILIZED AREAS WITHIN SOUTH RIVER AND DOWNSTREAM OF COFFERDAM AREAS, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
- THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
- THE PUMPING RATE SHALL BE NO GREATER THAN 750 GALLONS PER MINUTE (GPM) OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.



WATER COLLECTION SUMP DETAIL



10 IMPACTED MATERIAL STOCKPILE

NTS

IMPACTED MATERIAL STOCKPILE NOTES:

- THE 40 MIL HPDE GEOMEMBRANE AND WATER COLLECTION SUMP IS REQUIRED FOR IMPACTED MATERIAL STOCKPILES ONLY.
- BERMS AROUND IMPACTED MATERIALS SHALL BE HIGHER THAN ELEVATION 1265 MIN.
- NON-IMPACTED MATERIAL STORED ON STOCKPILE CAN OMIT THE LINER AND SUMP, AND REPLACE THE BERMS WITH SILT FENCE/ STRAW WADDLE AROUND THE ENTIRE PERIMETER.
- ALL STOCKPILES SHALL BE COVERED WITH 10 MIL NYLON REINFORCED POLYETHYLENE SHEETING TO PREVENT STORMWATER COLLECTION INSIDE STOCKPILE AREA WHEN NOT IN USE.

AECOM

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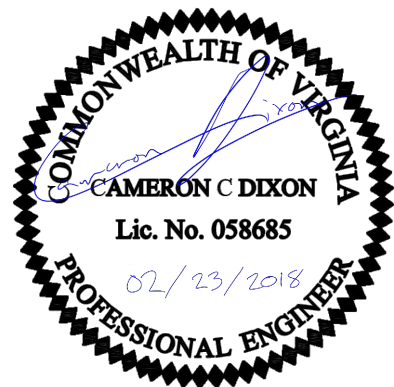
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SITE PREPARATION AND
EROSION CONTROL DETAILS

SHEET NUMBER

D-102

ANSI D 22" x 34" Approved: CD Designer: DSK Project Management Initials: Project Management Initials: Last saved by: DARRELL KENNEDY(2018-02-21) Last Plotted: ---- Filename: P:\JOBS\REM_ENG\PROJECT FILES\DUPONT-SOUTH RIVER\B00-CAD\910 CAD\20 SHEETS\100% DESIGN\RM SITE PREP AND EROSION CONTROL DETAILS.DWG

11 TEMPORARY SEEDING (TS)
- VESCH STD 3.31

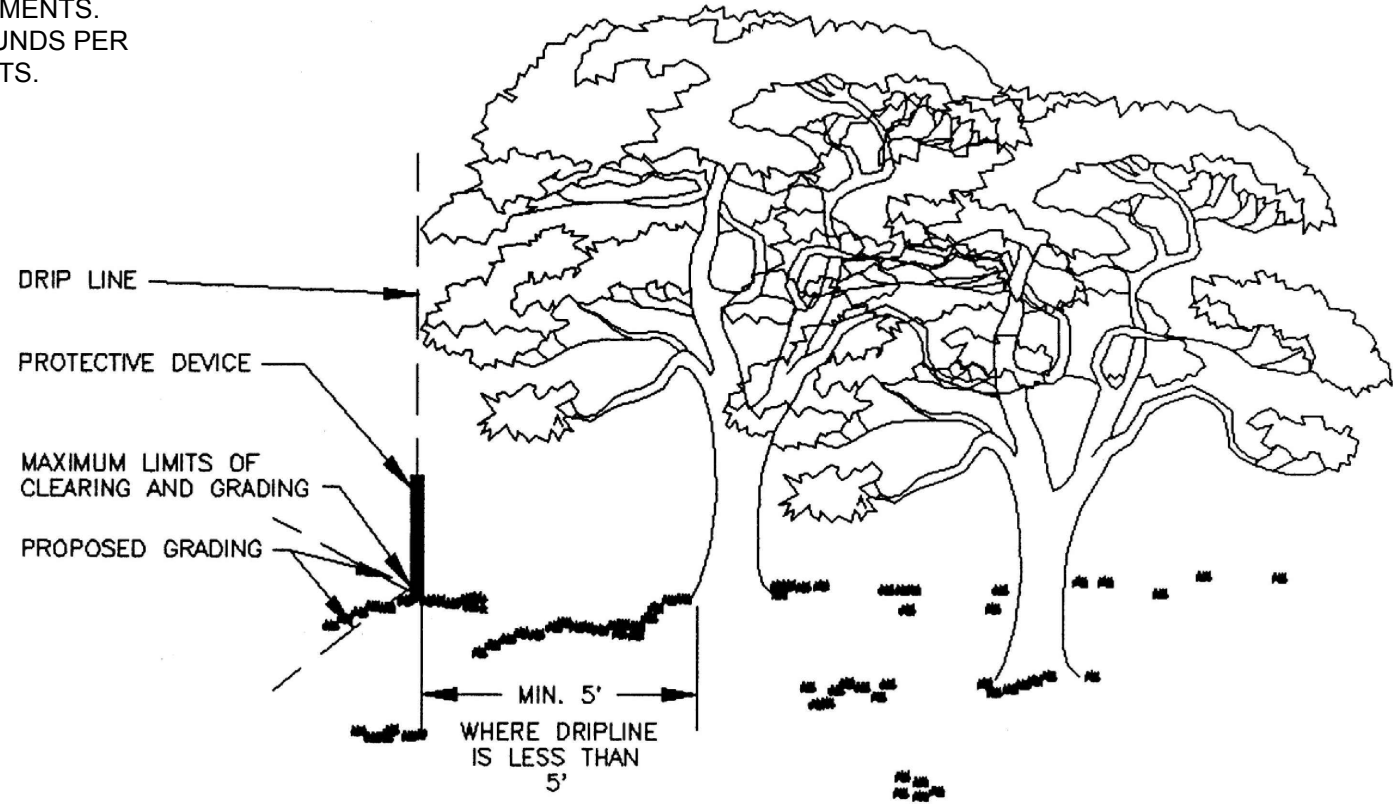
TEMPORARY SEEDING (TS) NOTES:
VESCH STD & SPEC 3.31

- TEMPORARY SEEDING SHALL BE APPLIED TO STABILIZE DISTURBED AREAS THAT WILL NOT BE BROUGHT TO FINAL GRADE FOR A PERIOD OF MORE THAN 14 DAYS.
- A PERMANENT VEGETATIVE COVER SHALL BE APPLIED TO AREAS THAT WILL BE LEFT DORMANT FOR A PERIOD OF MORE THAN 1 YEAR.
- LIMING REQUIREMENTS:
 - pH TEST BELOW 4.2 - 3 TONS PER ACRE
 - pH TEST 4.2 TO 5.2 - 2 TONS PER ACRE
 - pH TEST 5.2 TO 6 - 1 TON PER ACRE
- FERTILIZER SHALL BE APPLIED AT 600 POUNDS PER ACRE OR 10-20-10 (14 POUNDS PER 1,000-SQUARE-FEET) OR EQUIVALENT NUTRIENTS.
- LIME AND FERTILIZER SHALL BE INCORPORATED INTO THE TOP 2 TO 4 INCHES OF THE SOIL.
- WHEN THE AREA IS COMPACTED, CRUSTED, OR HARDENED, THE SOIL SURFACE SHALL BE LOOSENED BY DISCING, RAKING, HARROWING, OR OTHER ACCEPTABLE MEANS.
- SEED SHALL BE EVENLY APPLIED WITH A BROADCAST SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER. SMALL GRAINS SHALL BE PLANTED NO MORE THAN 1.5 INCHES DEEP. SMALL SEEDS SHALL BE PLANTED NO MORE THAN 0.25 INCHES DEEP. OTHER GRASSES AND LEGUMES SHALL BE PLANTED FROM 0.25 TO 0.5 INCHES DEEP.
- SEEDINGS MADE IN FALL FOR WINTER COVER AND DURING HOT AND DRY SUMMER MONTHS SHALL BE MULCHED, EXCEPT THAT HYDROMULCHES (FIBER MULCH) WILL NOT BE CONSIDERED ADEQUATE. STRAW MULCH SHALL BE USED DURING THESE PERIODS.
- TEMPORARY SEEDINGS MADE UNDER FAVORABLE SOIL AND SITE CONDITIONS DURING OPTIMUM SPRING AND FALL SEEDING DATES MAY NOT REQUIRE MULCH.
- AREAS WITH NO ESTABLISHED VEGETATIVE COVER ADEQUATE TO PREVENT RILL EROSION SHALL BE RE-SEEDED AS SOON AS SUCH AREAS ARE IDENTIFIED.
- TEMPORARY SEEDING APPLICATIONS:
 - SEPTEMBER 1 - FEBRUARY 15: DORMANT SEEDING WITH PERMANENT SEED MIX AND COVER CROP OF GRAIN RYE AT 30 POUNDS PER ACRE. AREAS TO BE COVERED BY COIR FABRIC (BLANKETS / MATTING) FOLLOWING SEEDING.
 - FEBRUARY 16 - APRIL 30: ERNST SEEDS, ERNMX-101 FOR DISTURBED SITES AND STEEP SLOPES AT 50 POUNDS PER ACRE (<http://www.ernstseeds.com/>) OR APPROVED EQUAL MEETING THE VESCH SEEDING REQUIREMENTS.
 - MAY 1 - AUGUST 31: ERNST SEEDS, ERNMX-101 FOR DISTURBED SITES AND STEEP SLOPES AT 50 POUNDS PER ACRE (<http://www.ernstseeds.com/>) OR APPROVED EQUAL MEETING THE VESCH SEEDING REQUIREMENTS.

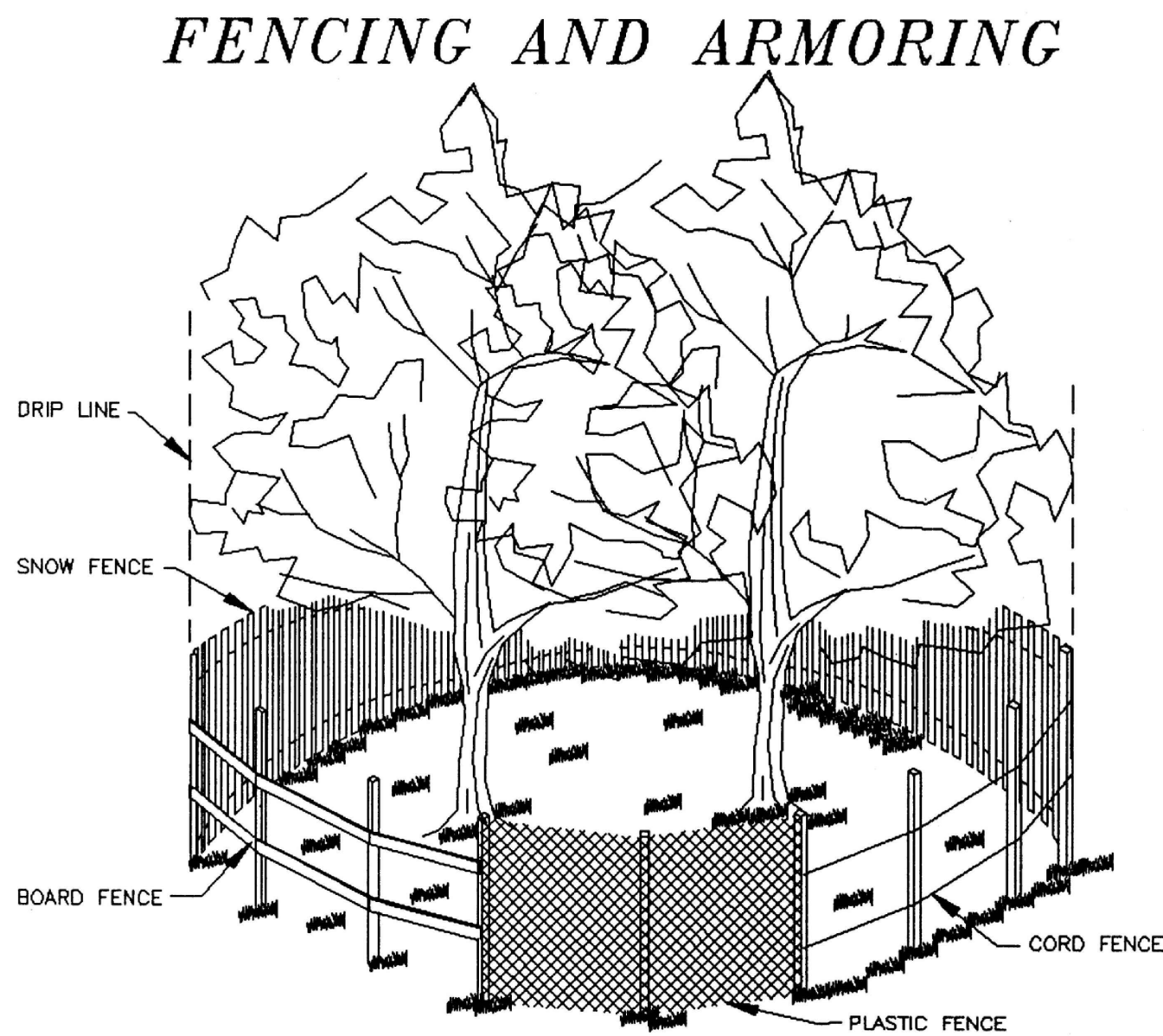
12 PERMANENT SEEDING (PS)
- VESCH STD 3.32

PERMANENT SEEDING (PS) NOTES:
VESCH STD & SPEC 3.32

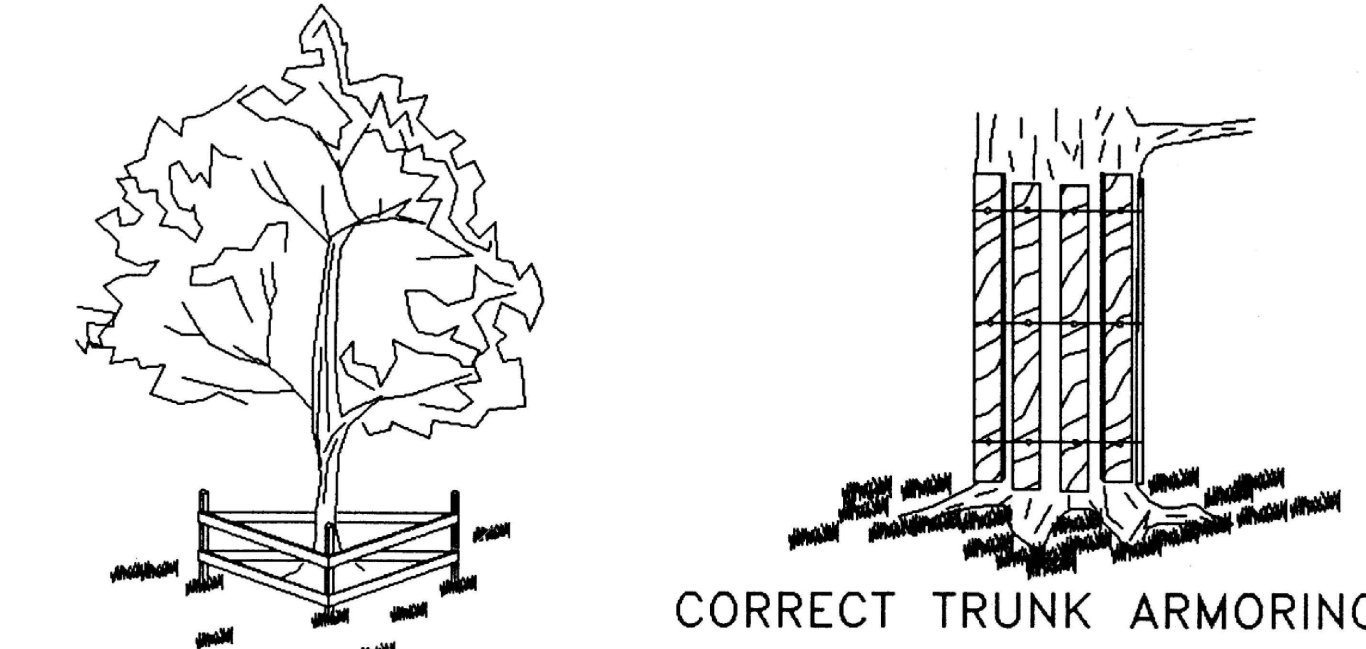
- PERMANENT SEEDING SHALL BE APPLIED TO STABILIZE DISTURBED AREAS THAT ARE BROUGHT TO FINAL GRADE OR AREAS TO BE LEFT DORMANT FOR A PERIOD OF MORE THAN 1 YEAR.
- LIMING AND FERTILIZER REQUIREMENTS SHALL BE BASED UPON SOIL TESTING PERFORMED BY THE CONTRACTOR.
- WHEN THE AREA IS COMPACTED, CRUSTED, OR HARDENED, THE SOIL SURFACE SHALL BE LOOSENED BY DISCING, RAKING, HARROWING, OR OTHER ACCEPTABLE MEANS.
- SEED SHALL BE EVENLY APPLIED WITH A BROADCAST SEEDER, DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER. SMALL GRAINS SHALL BE PLANTED NO MORE THAN 1.5 INCHES DEEP. SMALL SEEDS SHALL BE PLANTED NO MORE THAN 0.25 INCHES DEEP. OTHER GRASSES AND LEGUMES SHALL BE PLANTED FROM 0.25 TO 0.5 INCHES DEEP.
- SEEDINGS MADE IN FALL FOR WINTER COVER AND DURING HOT AND DRY SUMMER MONTHS SHALL BE MULCHED OR COVERED WITH COIR FABRIC (BLANKETS / MATTING), EXCEPT THAT HYDROMULCHES (FIBER MULCH) WILL NOT BE CONSIDERED ADEQUATE. STRAW MULCH SHALL BE USED DURING THESE PERIODS.
- AREAS WITH NO ESTABLISHED VEGETATIVE COVER ADEQUATE TO PREVENT RILL EROSION SHALL BE RE-SEEDED AS SOON AS SUCH AREAS ARE IDENTIFIED.
- PERMANENT SEEDING APPLICATIONS:
 - ERNMX-822 (VA SOUTHERN RIDGE & VALLEY RIPARIAN MIX) FOR RIPARIAN SITES AT 20 POUNDS PER ACRE (<http://www.ernstseeds.com/>). AREAS TO BE COVERED BY COIR FABRIC (BLANKETS / MATTING) FOLLOWING SEEDING.
 - AN APPROVED EQUAL MAY BE UTILIZED BY THE CONTRACTOR IF IT MEETS THE VESCH SEEDING REQUIREMENTS.
- WATERING SCHEDULE -
 - WATER TREES, SHRUBS, AND LIVESTAKES WITHIN THE FIRST 24 HOURS OF INITIAL PLANTING, AND NOT LESS THAN TWICE PER WEEK (INCLUDING RAIN) FOR 1 YEAR AFTER PLANTING AND SEEDING.



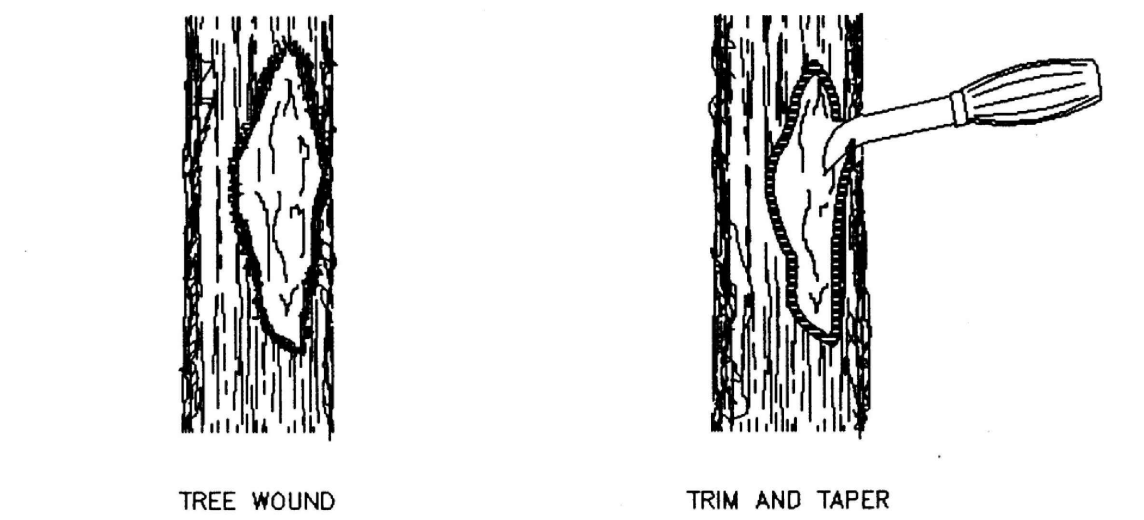
CONSTRUCTION OPERATIONS RELATIVE
TO THE LOCATION OF PROTECTED TREES
TREE CARE



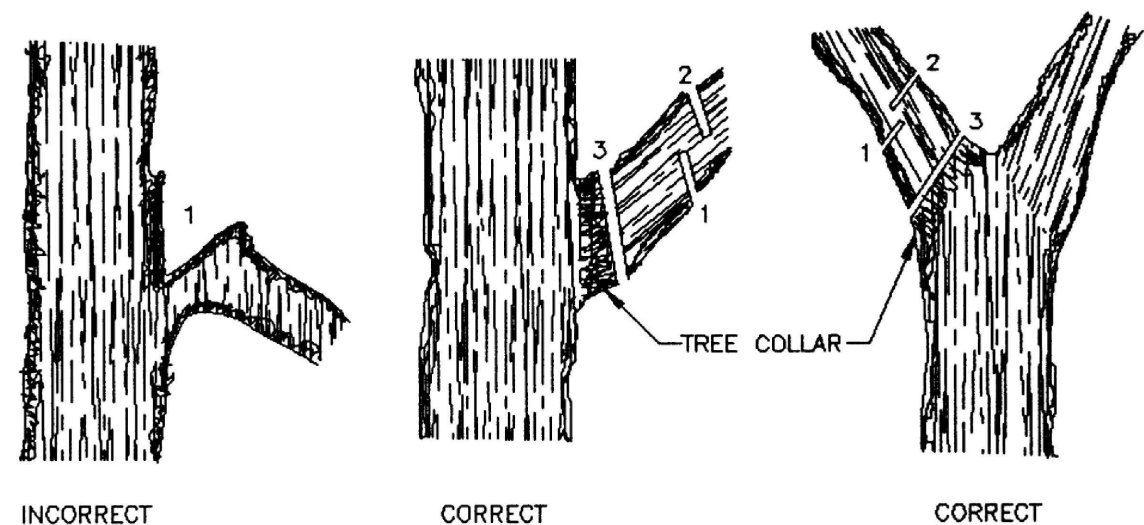
CORRECT METHODS OF TREE FENCING



TRIANGULAR BOARD FENCE



TREATING BARK WOUNDS



PRUNING DAMAGED BRANCHES

TABLE 3.35-A			
ORGANIC MULCH MATERIALS AND APPLICATION RATES			
MULCHES:	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
Straw or Hay	1½ - 2 tons (Minimum 2 tons for winter cover)	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry.
Corn Stalks	4 - 6 tons	185 - 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 - 6 tons	185 - 275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 - 70 cu. yds.	1-2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. or 45 lbs./1000 sq. ft.			

13 MULCHING (MU)
- VESCH STD 3.35

MULCHING (MU) NOTES:
VESCH STD & SPEC 3.35

- MULCH MATERIALS SHALL BE SPREAD UNIFORMLY BY HAND OR MACHINE. WHEN SPREADING STRAW MULCH BY HAND, DIVIDE THE AREA TO BE MULCHED INTO APPROXIMATELY 1,000-SQUARE-FOOT SECTIONS AND PLACE 70 TO 90 POUNDS (1½ TO 2 BALES) OF STRAW IN EACH SECTION TO FACILITATE UNIFORM DISTRIBUTION.
- STRAW MULCH MUST BE ANCHORED IMMEDIATELY AFTER SPREADING TO PREVENT DISPLACEMENT. OTHER ORGANIC MULCHES LISTED IN TABLE 3.35-A DO NOT REQUIRE ANCHORING. THE FOLLOWING METHODS OF ANCHORING MAY BE USED: MULCH ANCHORING TOOL (OFTEN REFERRED TO AS A KRIMPER OR KRIMPER TOOL), FIBER MULCH, LIQUID MULCH BINDERS, MULCH NETTINGS, OR PEG AND TWINE.

14 TREE PRESERVATION AND PROTECTION (TP)
- VESCH STD 3.38 NTS

TREE PRESERVATION AND PROTECTION (TP) NOTES:
VESCH STD & SPEC 3.38

- TREES THAT DO NOT HAVE FENCING SHALL BE ARMORED WITH BURLAP WRAPPING AND 2-INCH STUDS WIRED VERTICALLY NO MORE THAN 2 INCHES APART TO A HEIGHT OF 5 FEET ENCIRCLING THE TRUNK. IF THIS ALTERNATIVE IS USED, THE ROOT ZONE WITHIN THE DRIP LINE WILL STILL REQUIRE PROTECTION. NOTHING SHOULD EVER BE NAILED TO A TREE.
- GROUPS OF TREES AND INDIVIDUAL TREES SELECTED FOR RETENTION SHALL BE ACCURATELY LOCATED ON THE CONTRACT DRAWINGS AND DESIGNATED AS "TREE(S) TO BE SAVED" IN THE FIELD
- THE LIMITS OF CLEARING SHALL BE LOCATED OUTSIDE THE DRIP LINE OF ANY TREE TO BE RETAINED AND, IN NO CASE, CLOSER THAN 5 FEET TO THE TRUNK OF ANY TREE.
- PRIOR TO CONSTRUCTION AND BEFORE THE PRECONSTRUCTION CONFERENCE, INDIVIDUAL TREES AND STANDS OF TREES TO BE RETAINED WITHIN THE LIMITS OF CLEARING SHALL BE MARKED AT A HEIGHT VISIBLE TO EQUIPMENT OPERATORS.
- HEAVY EQUIPMENT, VEHICULAR TRAFFIC, OR STOCKPILES OF ANY CONSTRUCTION MATERIALS (INCLUDING PLANTING SUBSTRATE) SHALL NOT BE PERMITTED WITHIN THE DRIP LINE OF ANY TREE TO BE RETAINED. TREES BEING REMOVED SHALL NOT BE FELLED, PUSHED, OR PULLED INTO TREES BEING RETAINED. OPERATORS SHALL NOT CLEAN ANY PART OF THEIR EQUIPMENT BY SLAMMING AGAINST THE TRUNKS OF TREES TO BE RETAINED.
- NO TOXIC MATERIALS SHALL BE STORED CLOSER THAN 100 FEET TO THE DRIP LINE OF ANY TREES TO BE RETAINED.
- STANDARD 40-INCH HIGH SNOW FENCE SHALL BE PLACED AT THE LIMITS OF CLEARING ON STANDARD "T" OR "U" POSTS DRIVEN TO A MINIMUM DEPTH OF 18 INCHES AND SET 6 FEET APART
- FENCING AND ARMORING DEVICES SHALL BE IN PLACE BEFORE ANY EXCAVATION OR GRADING ACTIVITIES HAVE BEGUN, SHALL BE KEPT IN GOOD REPAIR FOR THE DURATION OF CONSTRUCTION ACTIVITIES, AND SHALL BE THE LAST ITEMS REMOVED DURING THE FINAL CLEANUP AFTER THE COMPLETION OF THE PROJECT.
- ANY DAMAGE TO THE CROWN, TRUNK, OR ROOT SYSTEM OF ANY TREE RETAINED SHALL BE REPAIRED / ADDRESSED IMMEDIATELY.
- WHENEVER MAJOR ROOT OR BARK DAMAGE OCCURS, REMOVE SOME FOLIAGE TO REDUCE THE DEMAND FOR WATER AND NUTRIENTS.
- DAMAGED ROOTS SHALL IMMEDIATELY BE CUT OFF CLEANLY INSIDE THE EXPOSED OR DAMAGED AREA. CUT SURFACES SHALL BE PAINTED WITH APPROVED TREE PAINT, AND MOIST PEAT MOSS, BURLAP, OR PLANTING SUBSTRATE SHALL BE SPREAD OVER THE EXPOSED AREA.
- TO TREAT BARK DAMAGE, CAREFULLY CUT AWAY ALL LOOSENED BARK BACK INTO THE UNDAMAGED AREA, TAPER THE CUT AT THE TOP AND BOTTOM, AND PROVIDE DRAINAGE AT THE BASE OF THE WOUND.
- ALL TREE LIMBS DAMAGED DURING CONSTRUCTION OR REMOVED FOR ANY OTHER REASON SHALL BE CUT OFF ABOVE THE COLLAR AT THE PRECEDING BRANCH JUNCTION.
- CARE FOR SERIOUS INJURIES SHALL BE PRESCRIBED BY A FORESTER OR A TREE SPECIALIST.

AECOM

PROJECT

**ALLIED READY MIX
PROPERTY BMAS**

SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

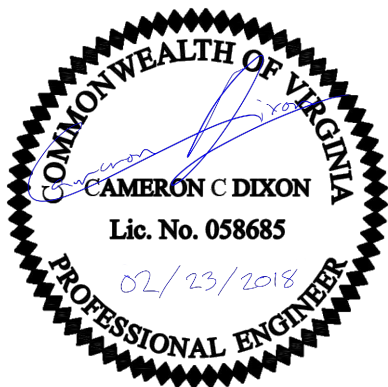
CLIENT

E.I. DU PONT DE NEMOURS AND COMPANY
974 CENTRE ROAD
CHESTNUT RUN PLAZA 730
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CONSULTANT

AECOM
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CONSHOHOCKEN, PA 19428
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www.aecom.com

REGISTRATION



ISSUE/REVISION

I/R	DATE	DESCRIPTION
0	02-23-2018	100% DESIGN

KEY PLAN

PROJECT NUMBER

60552472

SHEET TITLE

SITE PREPARATION AND
EROSION CONTROL DETAILS

SHEET NUMBER

D-103

EROSION AND SEDIMENT CONTROL NARRATIVE (CONTINUED)

10. PERMANENT STABILIZATION
THE PROJECT SITE UNDER POST-STABILIZATION ACTIVITIES SHALL BE PERMANENTLY STABILIZED WITH PERMANENT SEEDING AND VEGETATIVE AND STRUCTURAL BANK STABILIZATION MEASURES AS PRESENTED ON THE CONTRACT DRAWINGS.
11. MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES
TEMPORARY E&SC CONTROL MEASURES SHALL BE INSPECTED DAILY AND AFTER ANY RAIN EVENT. DAMAGED BMPs SHALL BE REPAIRED IMMEDIATELY UPON THEIR DISCOVERY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION.

A. STONE CONSTRUCTION ENTRANCE - ANY SINKHOLES OR RUTS SHALL BE REPAIRED BY ADDING STONE TO BRING THE CONSTRUCTION ENTRANCE TO ITS SPECIFIED DIMENSIONS. A STOCKPILE OF EXTRA STONE SHALL BE AVAILABLE ON-SITE FOR SUCH REPAIRS. THE WASH RACK OR OTHER DECONTAMINATION / WASH PAD SHALL BE CLEARED OF SEDIMENT DAILY. SEDIMENT SHALL BE COLLECTED AND DISPOSED OF PROPERTY OFF-SITE OR DISTRIBUTED ON-SITE IF DETERMINED TO BE CLEAN. SEDIMENT ON PUBLIC ROADWAYS SHALL BE SWEEPED BACK ON-SITE AND SHALL NOT BE WASHED AWAY WITH WATER.

B. CONSTRUCTION ROAD STABILIZATION - ANY SINKHOLES OR RUTS SHALL BE REPAIRED BY ADDING STONE TO BRING THE CONSTRUCTION ENTRANCE TO ITS SPECIFIED DIMENSIONS. A STOCKPILE OF EXTRA STONE SHALL BE AVAILABLE ON-SITE FOR SUCH REPAIRS.

C. SILT FENCE - SEDIMENT DEPOSITS SHALL BE REMOVED WHERE ACCUMULATIONS REACH ONE-HALF OF THE HEIGHT OF THE FENCE. ALL UNDERCUTTING OR EROSION OF THE TOE ANCHOR SHALL BE IMMEDIATELY REPAIRED WITH COMPACTED BACKFILL MATERIALS. ANY SILT FENCE THAT HAS BEEN UNDERMINED OR TOPPED SHALL BE PROMPTLY REPLACED. SEDIMENT DEPOSITS SHALL BE SPREAD ACROSS THE SITE AS FILL, WHEN SUITABLE, OR OTHERWISE CONTAINED AND DISPOSED OF OFF-SITE.

D. COFFERDAM - THE COFFERDAM SHALL BE INSPECTED DAILY FROM THE RIVERBANK TO DETECT ANY POSSIBLE BREACHES. IF A POSSIBLE BREACH IS DETECTED, A CLOSER INSPECTION SHALL BE COMPLETED. CONFIRMED BREACHES SHALL BE REPAIRED IMMEDIATELY.

E. FILTER FABRIC AND GEOSYNTHETIC GEOCELL LAYER - FILTER FABRICS AND GEOCELL MATERIALS COVERING SUBSOILS SHALL BE INSPECTED DAILY DURING CONSTRUCTION. ANY MAJOR HOLES OR TEARS IN THE MATERIALS SHALL BE REPAIRED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE CONTRACTOR SHALL BE ADVISED TO LIMIT TRAFFIC AND STAGING OF EQUIPMENT ON GEOSYNTHETIC MATERIALS TO WHAT IS NECESSARY FOR INSTALLATION AND SLOPE STABILIZATION.

F. RIPRAP STONE TOE - RIPRAP STONE TOE LOCATIONS SHALL BE INSPECTED PERIODICALLY TO ASSESS WHETHER HIGH FLOWS HAVE CAUSED SCOUR BENEATH THE RIPRAP STONE OR SECTIONS OF FILTER FABRIC / GEOCELL OR DISLODGED ANY OF THE STONE MATERIALS. ANY REQUIRED REPAIRS, INCLUDING THE ADDITION OF STONE TO BRING THE TOE BACK UP TO PROPOSED FINISHED GRADES SHALL BE COMPLETED IMMEDIATELY.

G. VEGETATED STREAMBANK STABILIZATION - STABILIZED BANKS SHALL BE INSPECTED ONCE A WEEK (MINIMUM) AND AFTER EVERY HIGH-WATER EVENT FROM THE TIME OF FINAL STABILIZATION UNTIL THE END OF THE NEXT DORMANT SEASON AND SEMIANNUALLY THEREAFTER. GAPS IN VEGETATIVE COVER SHALL BE FIXED WITH NEW PLANTS (OR FRESH CUTTINGS FROM ADJACENT PLANTS) IMMEDIATELY AND MULCHED / BLANKETED AS NECESSARY.

H. TEMPORARY SEEDING - AREAS WHICH FAIL TO ESTABLISH TEMPORARY VEGETATIVE COVER ADEQUATE TO MITIGATE EROSION SHALL BE RE-SEEDED AS SOON AS SUCH AREAS ARE IDENTIFIED.

I. PERMANENT SOIL STABILIZATION - IF PERMANENT SOIL STABILIZATION MEASURES (SEEDED AREAS OR TREES / SHRUBS) HAVE BEEN DETERMINED TO HAVE NOT GERMINATED OR HAVE DIED, THE AREA SHALL BE RE-SEEDED (OR REPLANTED). THE REASON FOR THE FAILURE SHALL BE DETERMINED AND CORRECTIVE ACTION SHALL BE IMPLEMENTED PRIOR TO RE-SEEDING (OR REPLANTING).

J. SOIL STABILIZATION BLANKETS / MATTING - BLANKETS / MATTING SHALL BE INSPECTED ONCE A WEEK AND AFTER EVERY HIGH-WATER EVENT FROM THE TIME OF FINAL STABILIZATION UNTIL THE END OF THE NEXT DORMANT PERIOD. EROSION, UNDERMINING, DISLOCATION, OR ANY OTHER FAILURE SHALL BE REPAIRED IMMEDIATELY. IF WASHOUT OR BREAKAGE OCCURS, THE BLANKET / MATTING MATERIAL SHALL BE REINSTALLED AFTER THE DAMAGED BANK SLOPES ARE REPAIRED.

K. SAFETY FENCE - SAFETY FENCE SHALL BE CHECKED REGULARLY FOR WEATHER-RELATED OR OTHER DAMAGE. ANY NECESSARY REPAIRS SHALL BE MADE IMMEDIATELY. CARE SHALL BE TAKEN TO SECURE ALL ACCESS POINTS (GATES) AT THE END OF EACH WORKING DAY. ALL LOCKING DEVICES SHALL BE REPAIRED OR REPLACED AS NECESSARY.

IF A LARGE RAIN EVENT IS EXPECTED, ALL E&SC BMPs SHALL BE INSPECTED BEFORE AND IMMEDIATELY AFTER THE RAIN EVENT TO VERIFY THAT EACH BMP IS IN ADEQUATE OPERATIONAL CONDITION. REPAIRS SHALL BE MADE AS NECESSARY.

12. CALCULATIONS FOR TEMPORARY EROSION AND SEDIMENT CONTROL
THE TEMPORARY E&SC BMP MEASURES DESCRIBED AND REFERENCED WITHIN THE STANDARDS AND SPECIFICATIONS OF THE VESCH DO NOT REQUIRE CALCULATIONS. STORMWATER RUNOFF OCCURRING DURING STABILIZATION ACTIVITIES SHALL BE MANAGED ON-SITE THROUGH THE USE OF THE E&SC BMPs DESCRIBED.

13. STORMWATER RUNOFF CONSIDERATIONS AND MAINTENANCE
STORMWATER RUNOFF DURING STABILIZATION ACTIVITIES SHALL BE MANAGED ON-SITE THROUGH THE USE OF THE E&SC BMPs DESCRIBED. STRUCTURES SUCH AS SILT FENCES AND COFFERDAMS SHALL MITIGATE THE POTENTIAL FOR SEDIMENT-LADEN STORMWATER FROM LEAVING THE SITE. THE SITE SHALL BE RESTORED TO THE GREATEST EXTENT POSSIBLE TO SIMILAR COVER TYPES THAT WERE PRESENT PRIOR TO BANK REMOVAL AND RESTORATION / STABILIZATION ACTIVITIES. INCREASES IN STORMWATER RUNOFF PEAK RATES OR VOLUMES UNDER POST-STABILIZATION ACTIVITIES WILL BE CONSIDERED MINIMAL (FROM NEWLY CONSTRUCTED ACCESS FOOTPATHS). THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF PERMANENT EROSION AND SEDIMENT CONTROLS STARTING FROM THE CONCLUSION OF FINAL BANK STABILIZATION ACTIVITIES THROUGH THE NEXT DORMANT SEASON (1 YEAR FOLLOWING PROJECT COMPLETION).

14. WATER QUALITY AND OTHER STATE REQUIREMENTS
THIS PROJECT IS IN COMPLIANCE WITH THE WATER QUALITY CRITERIA PRESENTED IN 9VAC25-870, SECTION 63 OF THE VIRGINIA ADMINISTRATIVE CODE. THE PROPOSED IMPROVEMENTS SHALL NOT INCREASE THE TOTAL PERCENT IMPERVIOUS COVER AT THE SITE. NO POLLUTANT LOAD EVALUATION IS NECESSARY.

THIS PROJECT IS IN COMPLIANCE WITH THE STREAM CHANNEL EROSION AND FLOODING CRITERIA PRESENTED IN 9VAC25-870, SECTIONS 97 AND 98 OF THE VIRGINIA ADMINISTRATIVE CODE. ALL DOWNSTREAM AREAS OF THE SITE SHALL BE PROTECTED DURING BANK STABILIZATION ACTIVITIES THROUGH THE USE OF SILT FENCES AND COFFERDAMS. AFTER BANK STABILIZATION ACTIVITIES, DISTURBED AREAS SHALL BE STABILIZED WITH PERMANENT STRUCTURAL AND VEGETATIVE COVER, INCLUDING TOE ROCK, SEEDING, TREE / SHRUB PLANTING, AND INSTALLATION OF SLOPE AND VEGETATIVE STREAMBANK STABILIZATION MEASURES. THE PERCENT IMPERVIOUS COVER UNDER POST-STABILIZATION CONDITIONS SHALL NOT BE GREATER THAN UNDER PRE-STABILIZATION CONDITIONS. DOWNSTREAM AREAS SHALL NOT EXPERIENCE EROSION DAMAGE DUE TO CHANGES IN RUNOFF RATE OR VOLUME, VELOCITY, FREQUENCY, DURATION, OR PEAK FLOW RATE OF STORMWATER AS A RESULT OF BANK RESTORATION / STABILIZATION ACTIVITIES.

VESCH EROSION & SEDIMENT CONTROL MINIMUM STANDARDS (MS1-19) - 9VAC25-840-40	
MS-1:	PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
MS-2:	DURING CONSTRUCTION OF THE PROJECT, SOIL STOCK PILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.
MS-3:	A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.
MS-4:	SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.
MS-5:	STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
MS-6:	SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN. (A) THE MINIMUM STORAGE CAPACITY OF A SEDIMENT TRAP SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE TRAP SHALL ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES. (B) SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A 25-YEAR STORM OF 24-HOUR DURATION. RUNOFF COEFFICIENTS USED IN RUNOFF CALCULATIONS SHALL CORRESPOND TO A BARE EARTH CONDITION OR THOSE CONDITIONS EXPECTED TO EXIST WHILE THE SEDIMENT BASIN IS UTILIZED.
MS-7:	CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.
MS-8:	CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME, OR SLOPE DRAIN STRUCTURE.
MS-9:	WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.
MS-10:	ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED OR REMOVED OF SEDIMENT.
MS-11:	BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.
MS-12:	WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NON-ERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NON-ERODIBLE COVER MATERIALS.
MS-13:	WHEN A LIVE WATERCOURSE MAY BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NON-ERODIBLE MATERIAL SHALL BE PROVIDED.
MS-14:	ALL APPLICABLE FEDERAL, STATE, AND LOCAL REQUIREMENTS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.
MS-15:	THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.
MS-16:	UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA: A. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME. B. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES. C. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICES (OR BOTH) BEFORE BEING DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY. D. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION. E. RE-STABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THIS CHAPTER (9VAC28-840). F. APPLICABLE SAFETY REQUIREMENTS SHALL BE COMPLIED WITH.
MS-17:	WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT

BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS PROVISION SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.

- MS-18:

ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE VESCH AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
- MS-19:

PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DISPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CRITERIA. STREAM RESTORATION AND RELOCATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN CONCEPTS ARE NOT MAN-MADE CHANNELS AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS.

EROSION AND SEDIMENT CONTROL MINIMUM STANDARDS CHECKLIST

PROJECT NAME: ALLIED READY MIX BMAS
SUBMITTAL NUMBER:
PLANS DATED:

YES / NO / NA	
☐ ☐ ☐	MS-1 HAVE TEMPORARY AND PERMANENT STABILIZATION BEEN ADDRESSED IN THE NARRATIVE: ☐ ARE PRACTICES SHOWN ON THE PLAN: ☐ TEMPORARY AND PERMANENT SEED SPECIFICATIONS: ☐ LIME AND FERTILIZER: ☐ MULCHING: ☐ BLANKETS/MATTING: ☐ PAVEMENT/CONSTRUCTION ROAD STABILIZATION: ☐
☐ ☐ ☐	MS-2 HAS STABILIZATION OF SOIL STOCKPILES, BORROW AREAS, AND DISPOSAL AREAS BEEN ADDRESSED IN THE NARRATIVE AND ON THE PLAN: ☐ HAVE SEDIMENT TRAPPING MEASURES BEEN PROVIDED: ☐
☐ ☐ ☐	MS-3 HAS THE ESTABLISHMENT AND MAINTENANCE OF PERMANENT VEGETATIVE STABILIZATION BEEN ADDRESSED: ☐
☐ ☐ ☐	MS-4 DOES THE PLAN SPECIFICALLY STATE THAT SEDIMENT-TRAPPING FACILITIES SHALL BE CONSTRUCTED AS A FIRST STEP IN LAND-DISTURBING ACTIVITIES: ☐
☐ ☐ ☐	MS-5 DOES THE PLAN SPECIFICALLY STATE THAT STABILIZATION OF EARTHEN STRUCTURES IS REQUIRED IMMEDIATELY AFTER INSTALLATION: ☐ IS THIS NOTED FOR EACH MEASURE ON THE PLAN: ☐
☐ ☐ ☐	MS-6 ARE SEDIMENT TRAPS AND SEDIMENT BASINS SPECIFIED WHERE NEEDED AND DESIGNED TO THE STANDARD AND SPECIFICATION: ☐
☐ ☐ ☐	MS-7 HAVE THE DESIGN AND TEMPORARY/PERMANENT STABILIZATION OF CUT AND FILL SLOPES BEEN ADEQUATELY ADDRESSED: ☐ IS SURFACE ROUGHENING PROVIDED FOR SLOPES STEEPER THAN 3:1: ☐
☐ ☐ ☐	MS-8 HAVE ADEQUATE TEMPORARY OR PERMANENT CONVEYANCES (PAVED FLUMES, CHANNELS, SLOPE DRAINS) BEEN PROVIDED FOR CONCENTRATED STORMWATER RUNOFF ON CUT AND FILL SLOPES: ☐
☐ ☐ ☐	MS-9 HAS WATER SEEPING FROM A SLOPE FACE BEEN ADDRESSED (E.G., SUBSURFACE DRAINS): ☐
☐ ☐ ☐	MS-10 IS ADEQUATE INLET PROTECTION PROVIDED FOR ALL OPERATIONAL STORM DRAIN AND CULVERT INLETS: ☐
☐ ☐ ☐	MS-11 ARE ADEQUATE OUTLET PROTECTION AND/OR CHANNEL LININGS PROVIDED FOR ALL STORMWATER CONVEYANCE CHANNELS AND RECEIVING CHANNELS: ☐ IS THERE A SCHEDULE INDICATING: DIMENSIONS OF THE OUTLET PROTECTION: ☐ LINING: ☐ SIZE OF RIPRAP: ☐ CROSS SECTION AND SLOPE OF THE CHANNELS: ☐ TYPE OF LINING: ☐ SIZE OF RIPRAP, IF USED: ☐
☐ ☐ ☐	MS-12 ARE IN-STREAM PROTECTION MEASURES REQUIRED SO THAT CHANNEL IMPACTS ARE MINIMIZED: ☐
☐ ☐ ☐	MS-13 ARE TEMPORARY STREAM CROSSINGS OF NON-ERODIBLE MATERIAL REQUIRED WHERE APPLICABLE: ☐
☐ ☐ ☐	MS-14 ARE ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES BEING FOLLOWED: ☐
☐ ☐ ☐	MS-15 HAS IMMEDIATE RESTABILIZATION OF AREAS SUBJECT TO IN-STREAM CONSTRUCTION (BED AND BANKS) BEEN ADEQUATELY ADDRESSED: ☐
☐ ☐ ☐	MS-16 HAVE DISTURBANCES FROM UNDERGROUND UTILITY LINE INSTALLATIONS BEEN ADDRESSED: ☐ NO MORE THAN 500 LINEAR FEET OF TRENCH OPEN AT ONE TIME: ☐ EFFLUENT FROM DEWATERING FILTERED OR PASSED THROUGH A SEDIMENT-TRAPPING DEVICE: ☐ PROPER BACKFILL, COMPACTION, AND RESTABILIZATION: ☐
☐ ☐ ☐	MS-17 IS THE TRANSPORT OF SOIL AND MUD ONTO PUBLIC ROADWAYS PROPERLY CONTROLLED (I.E., CONSTRUCTION ENTRANCES, WASH RACKS, TRANSPORT OF SEDIMENT TO A TRAPPING FACILITY, CLEANING OF ROADWAYS AT THE END OF EACH DAY, NO WASHING BEFORE SWEEPING AND SHOVELING): ☐
☐ ☐ ☐	MS-18 HAS THE REMOVAL OF TEMPORARY PRACTICES BEEN ADDRESSED: ☐ HAVE THE REMOVAL OF ACCUMULATED SEDIMENT AND THE FINAL STABILIZATION OF THE RESULTING DISTURBED AREAS BEEN ADDRESSED: ☐
☐ ☐ ☐	MS-19 ARE PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT ADEQUATELY PROTECTED FROM SEDIMENT DEPOSITION, EROSION, AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY, AND PEAK FLOW RATE OF STORMWATER RUNOFF: ☐ HAVE ADEQUATE CHANNELS BEEN PROVIDED ON-SITE: ☐



PROJECT

ALLIED READY MIX
PROPERTY BMAS

SOUTH RIVER, RIGHT BANK, RRMS 1.33 TO 1.59
AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

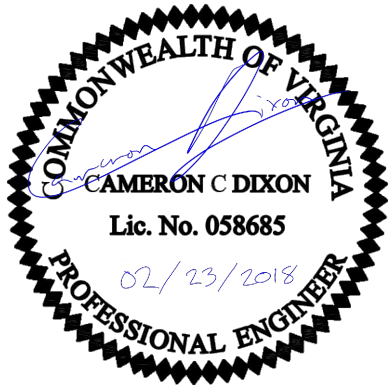
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0	02-23-2018	100% DESIGN
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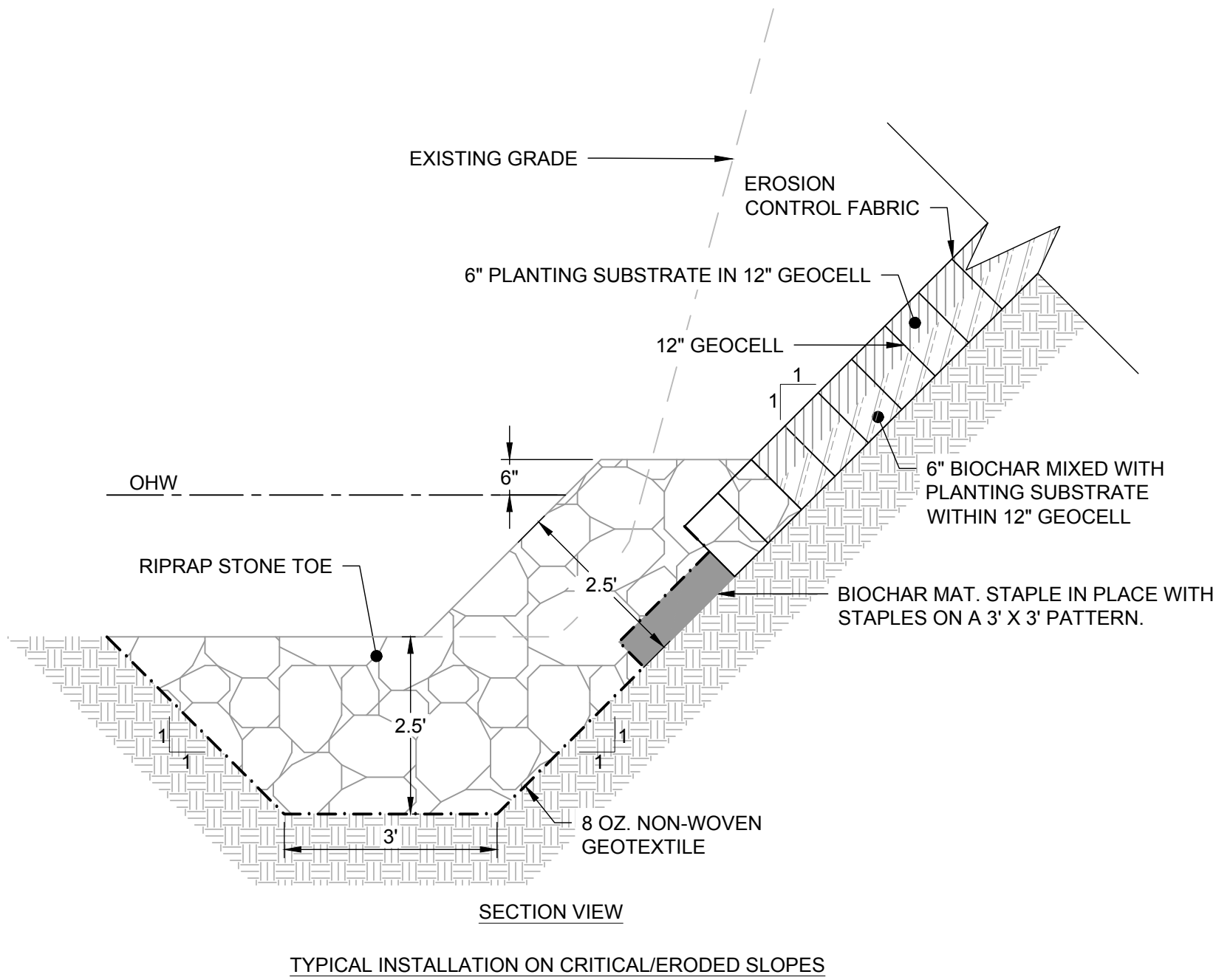
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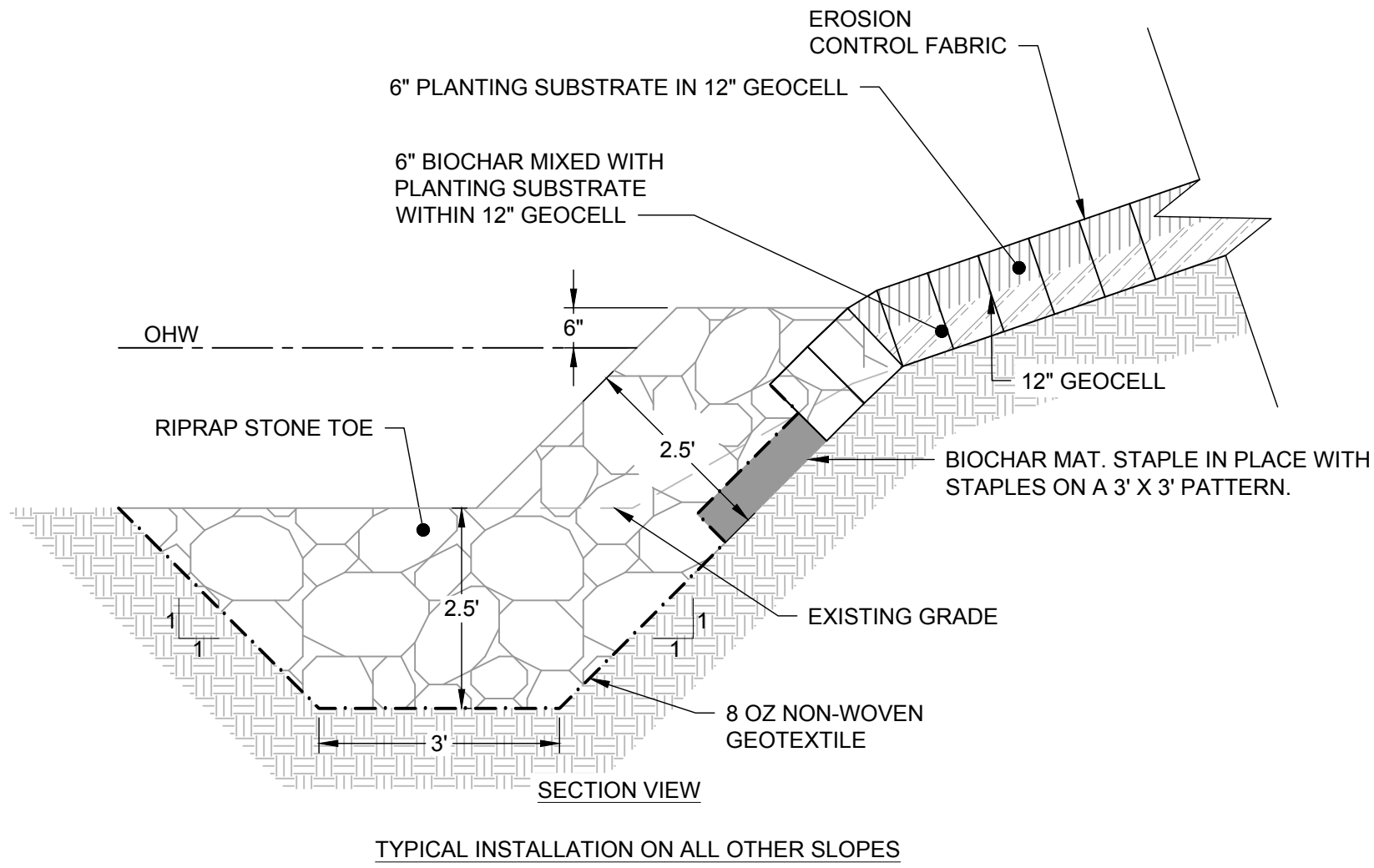
SITE PREPARATION AND
EROSION CONTROL NOTES

SHEET NUMBER

D-105



SECTION VIEW
TYPICAL INSTALLATION ON CRITICAL/ERODED SLOPES

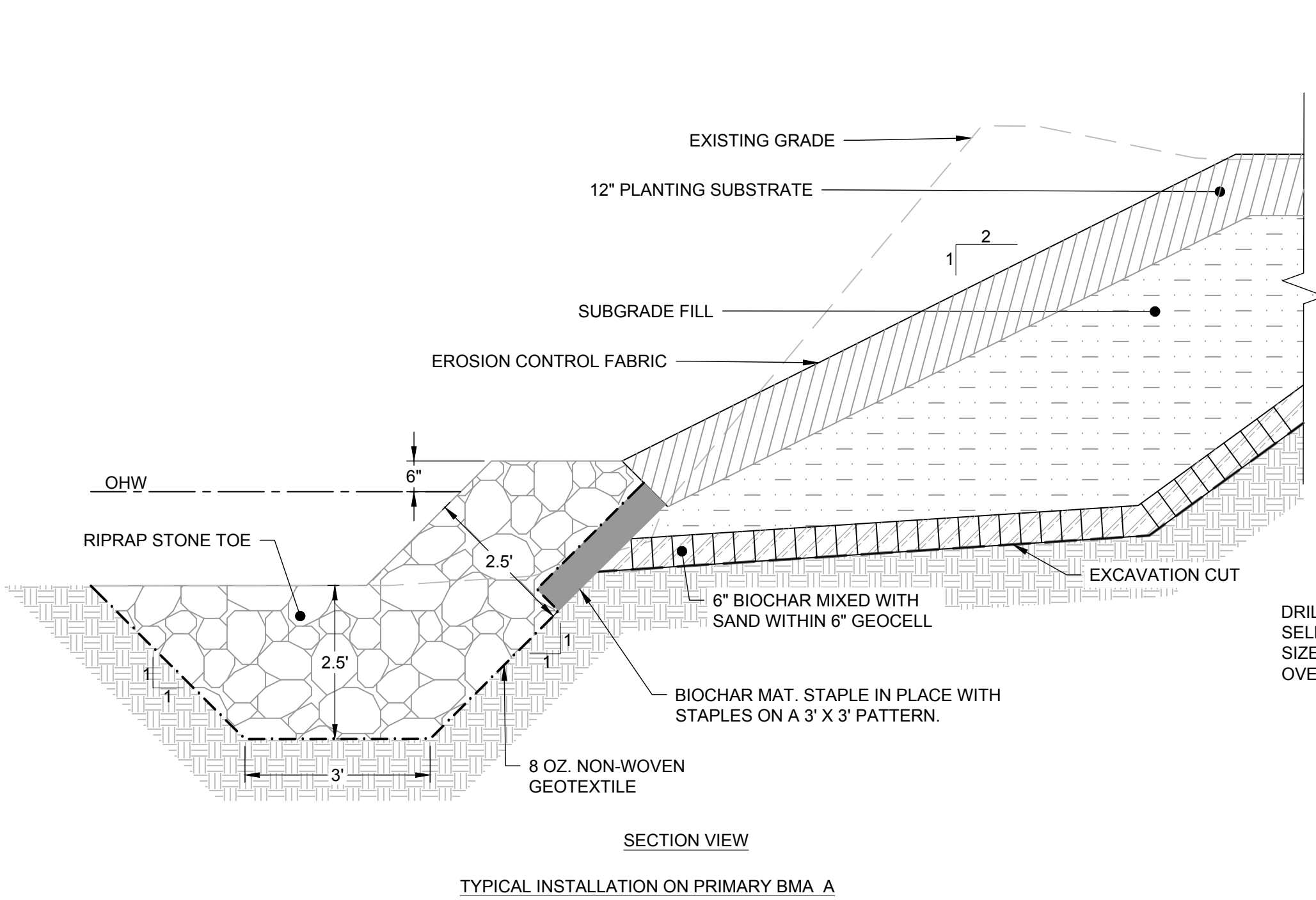


SECTION VIEW
TYPICAL INSTALLATION ON ALL OTHER SLOPES

1 RIPRAP STONE TOE IN STABILIZATION AREA
VESCH STD 3.19 NTS

RIPRAP STONE TOE IN STABILIZATION AREA NOTES:

- WHERE 12" GEOCELL MEETS RIPRAP, A MINIMUM OF 2 ROWS OF GEOCELL SHALL BE BURIED UNDER RIPRAP STONE TOE.
- FOR TYPICAL INSTALLATION ON BEDROCK, EXISTING GRADE SHALL VARY. FINAL GRADE AND RESPECTIVE PLACEMENT OF 12" GEOCELL SHALL MEET REQUIREMENTS OF TYPICAL INSTALLATION ON CRITICAL/ERODED SLOPES AND TYPICAL INSTALLATION ON ALL OTHER SLOPES RESPECTIVE TO THE AREA THAT THE BEDROCK WAS DETECTED IN.
- WHERE BEDROCK IS DETECTED, CONTRACTOR SHALL DISCUSS RIPRAP STONE TOE PLACEMENT AND INSTALLATION WITH AECOM ENGINEER PRIOR TO BEGINNING PLACEMENT OF RIPRAP.
- STEEL BARS SHALL BE NO. 8 STEEL REINFORCING RODS. RODS SHALL BE AT LEAST 3 FEET LONG AND SHALL BE GROUTED IN PLACE IN HOLES THAT HAVE BEEN DRILLED INTO THE BEDROCK. LARGER SIZED RIPRAP SHALL BE PLACED ALONG THE OUTER EDGE OF THE TOE FOR INSTALLATION ON BEDROCK. HOLES SHALL BE DRILLED INTO SELECTED LARGER SIZED RIPRAP AND FIT OVER STEEL REINFORCING RODS. SPACE BETWEEN GROUTED BARS SHALL VARY DEPENDING UPON SIZE OF RIPRAP.

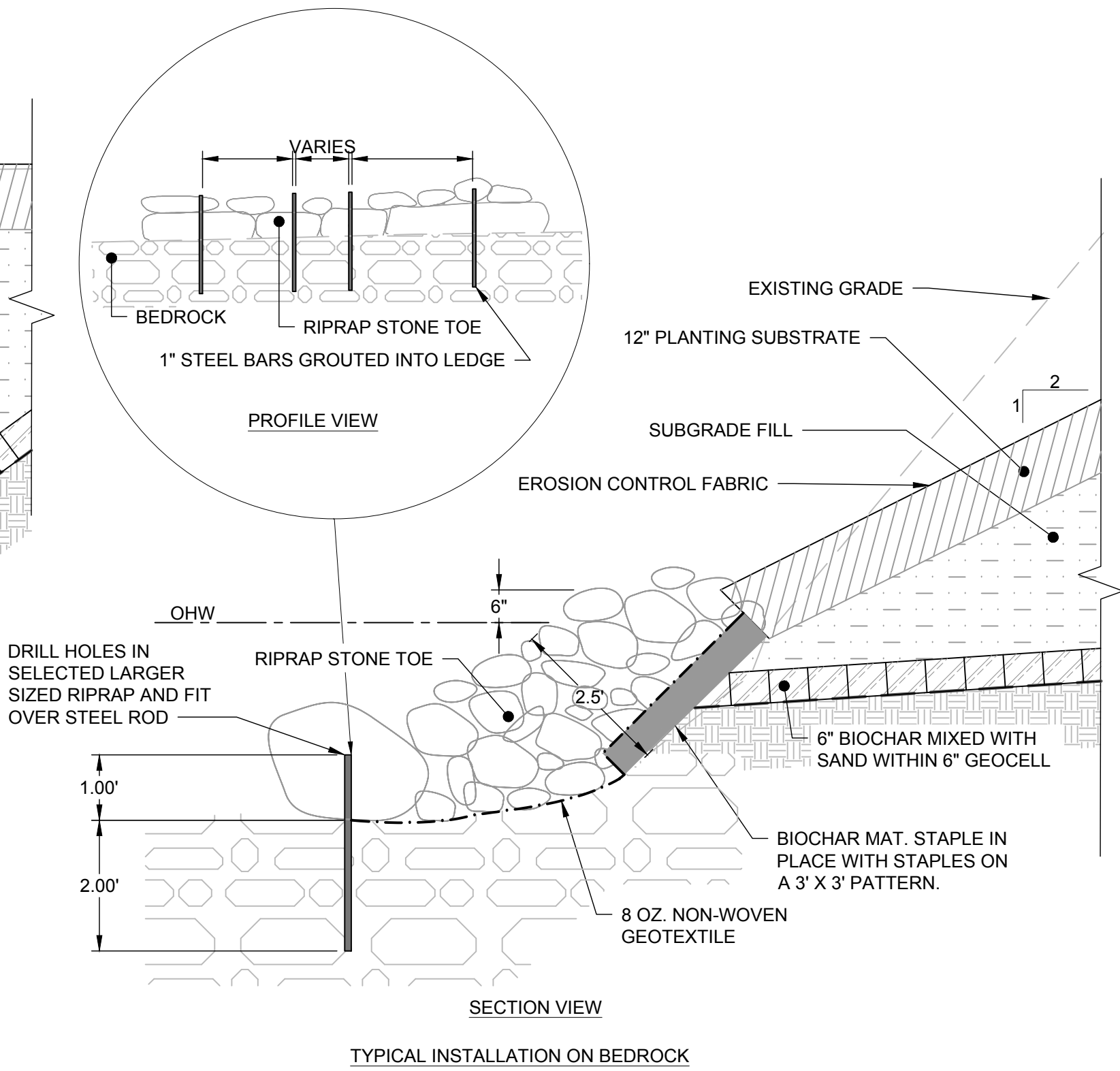


SECTION VIEW
TYPICAL INSTALLATION ON PRIMARY BMA A

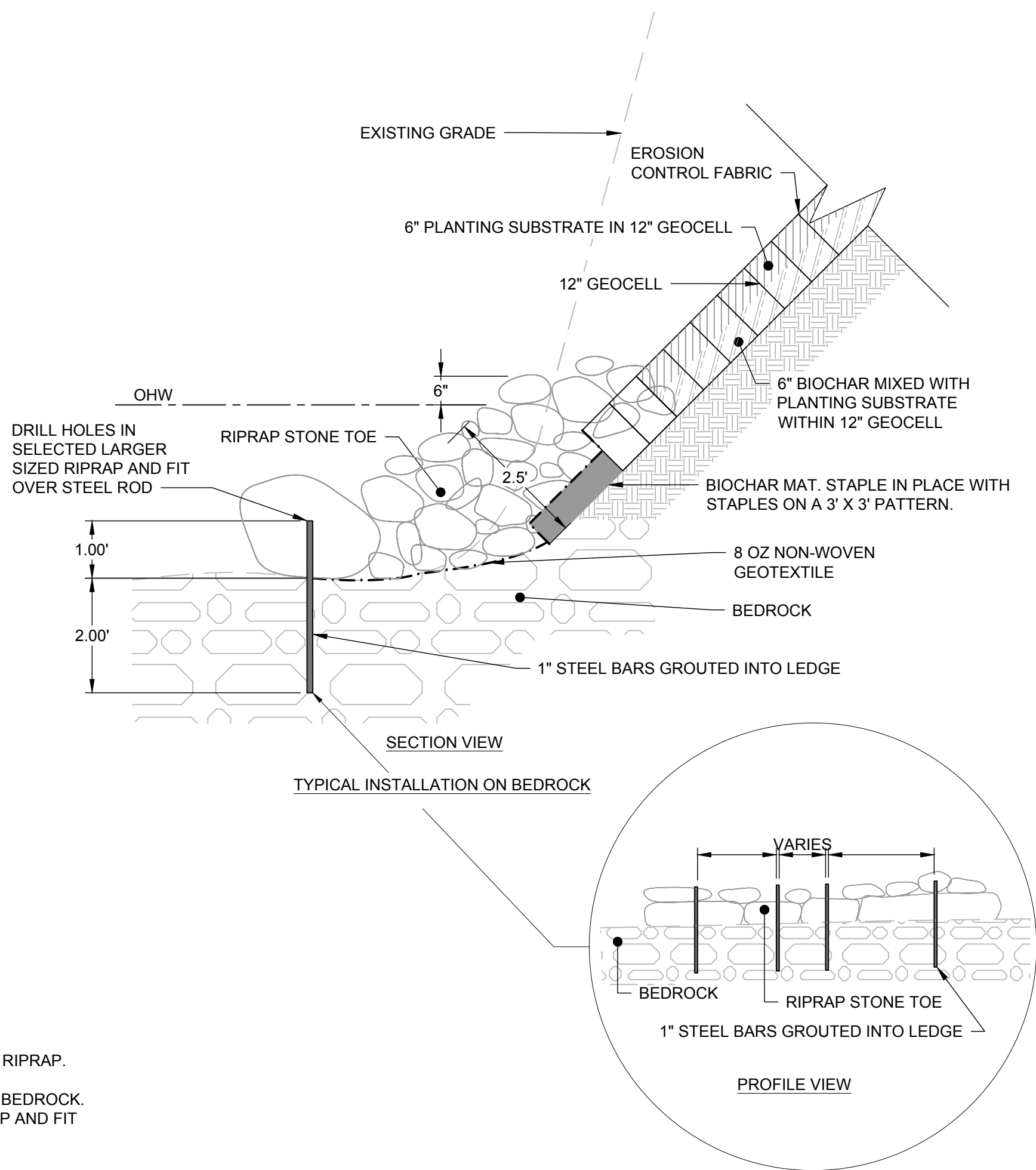
2 RIPRAP STONE TOE IN EXCAVATION AREA
VESCH STD 3.19 NTS

RIPRAP STONE TOE IN EXCAVATION AREA NOTES:

- WHERE BEDROCK IS DETECTED, CONTRACTOR SHALL DISCUSS RIPRAP STONE TOE PLACEMENT AND INSTALLATION WITH AECOM SITE REPRESENTATIVE PRIOR TO BEGINNING PLACEMENT OF RIPRAP.
- STEEL BARS SHALL BE NO. 8 STEEL REINFORCING RODS. RODS SHALL BE AT LEAST 3 FEET LONG AND SHALL BE GROUTED IN PLACE IN HOLES THAT HAVE BEEN DRILLED INTO THE BEDROCK. LARGER SIZED RIPRAP SHALL BE PLACED ALONG THE OUTER EDGE OF THE TOE FOR INSTALLATION ON BEDROCK. HOLES SHALL BE DRILLED INTO SELECTED LARGER SIZED RIPRAP AND FIT OVER STEEL REINFORCING RODS. SPACE BETWEEN GROUTED BARS SHALL VARY DEPENDING UPON SIZE OF RIPRAP.



SECTION VIEW
TYPICAL INSTALLATION ON BEDROCK



SECTION VIEW
TYPICAL INSTALLATION ON BEDROCK

3 GEOTEXTILE INSTALLATION DETAILS
NTS

GEOTEXTILE INSTALLATION DETAIL NOTES:

- SLOPE SURFACE SHALL BE FREE OF ROCKS, CLOUDS, STICKS, AND GRASS. GEOTEXTILE SHALL HAVE GOOD SOIL CONTACT.
- GEOTEXTILE SHOULD BE INSTALLED VERTICALLY DOWNSLOPE.
- GEOTEXTILE SHALL BE ROLLED IN A CONTROLLABLE FASHION. FABRIC SHALL NOT BE ALLOWED TO ROLL DOWN THE SLOPE ON ITS OWN.
- ALL EXCESS GEOTEXTILE SHALL BE WRAPPED UNDER OTHER MATERIAL, BURIED, OR TRIMMED FROM SIGHT WHERE ADEQUATELY COVERED.

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FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

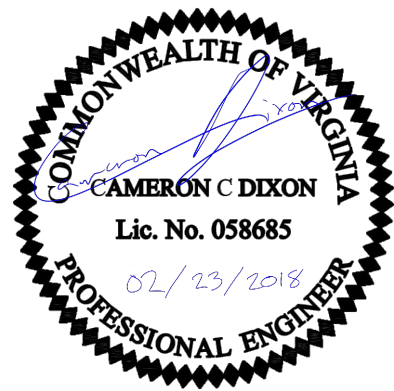
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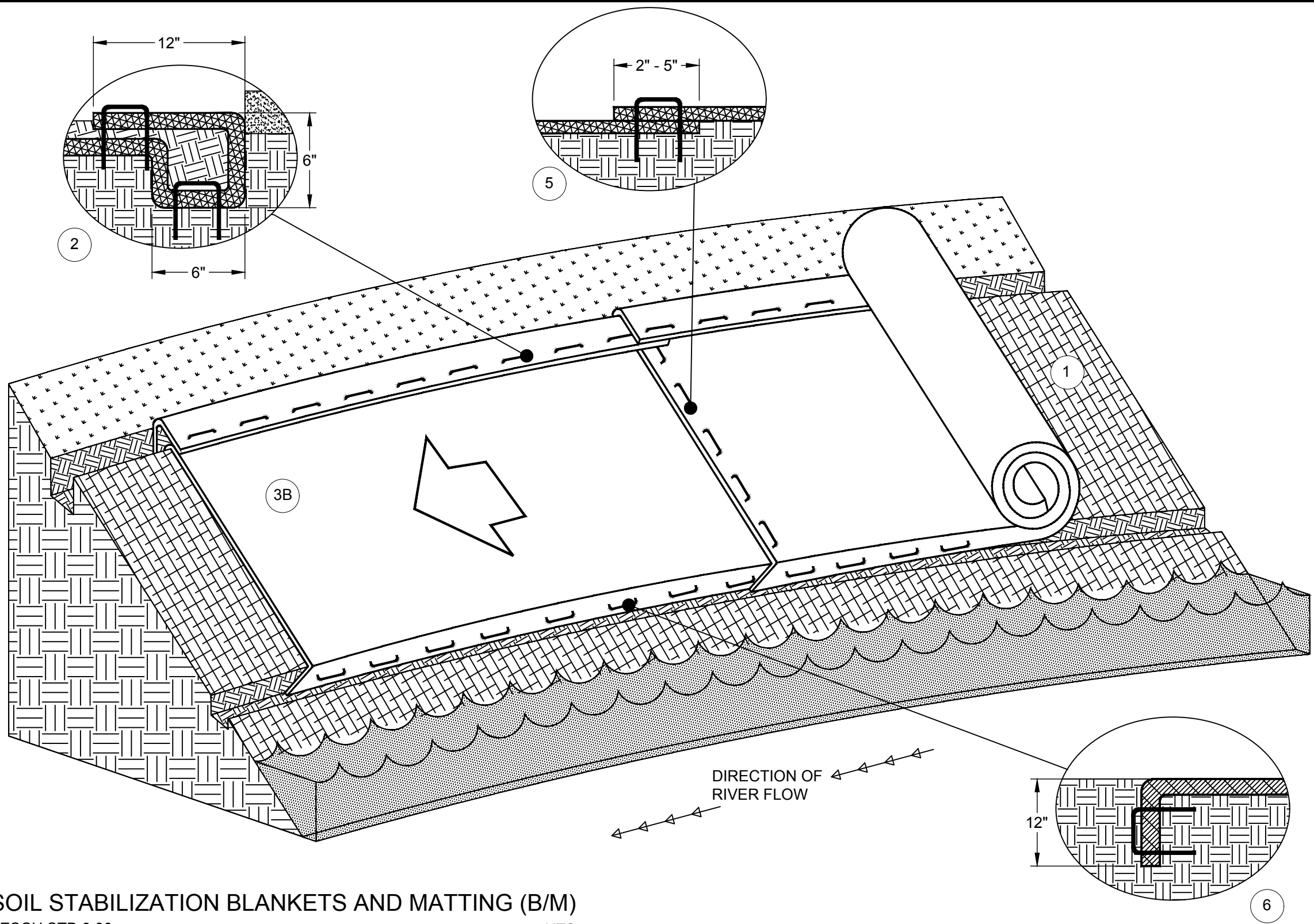
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RESTORATION DETAILS

SHEET NUMBER

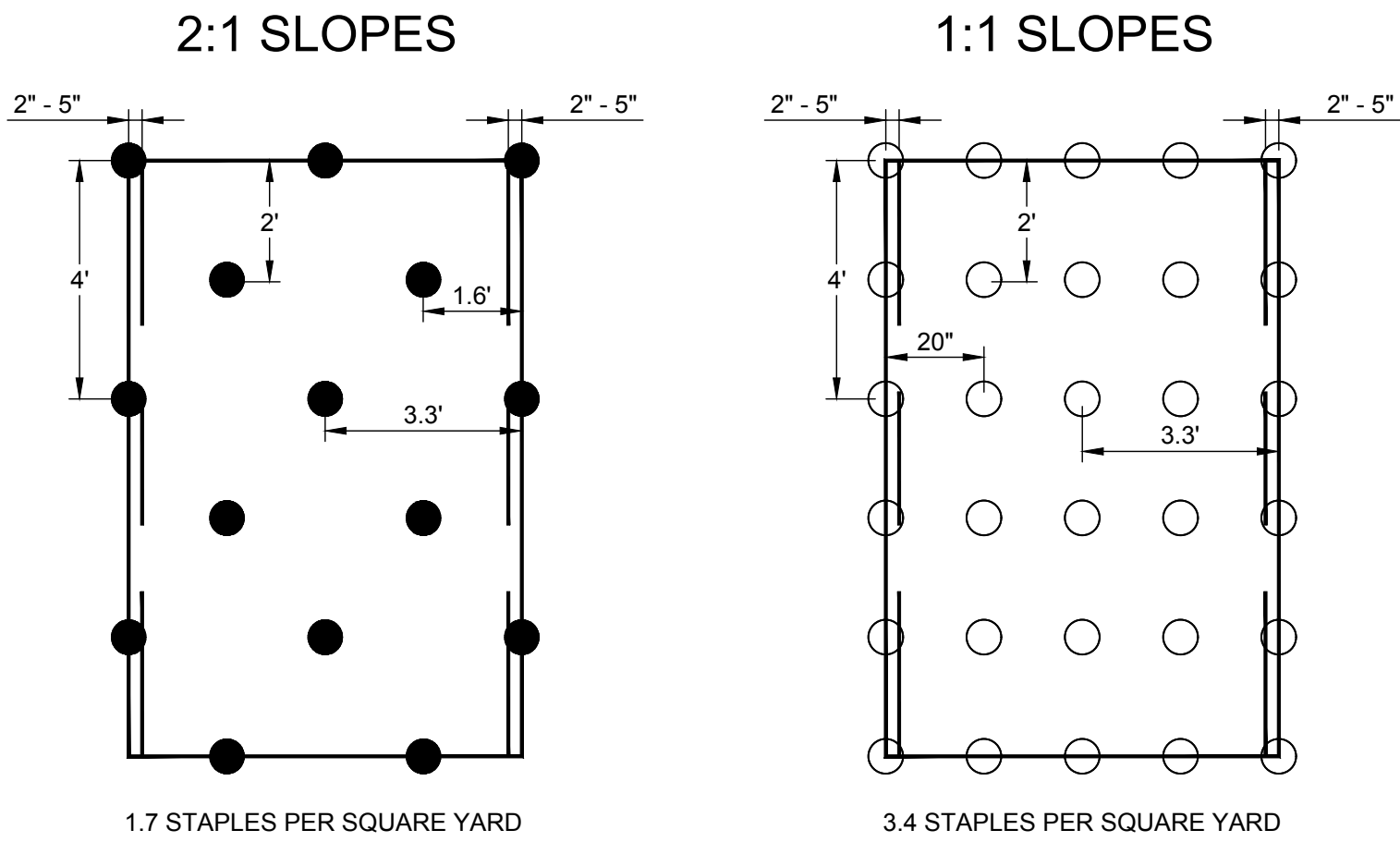
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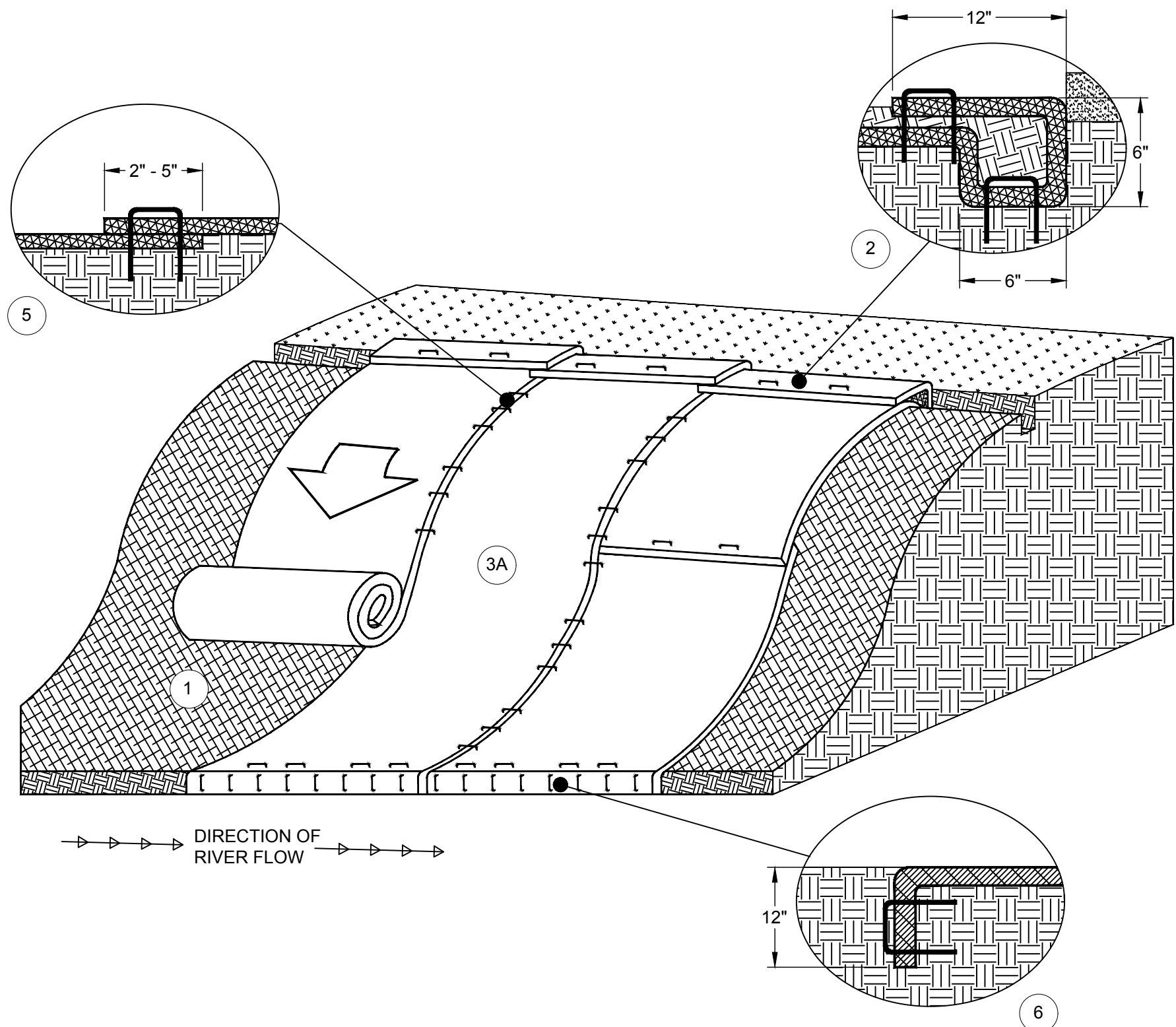
4 SOIL STABILIZATION BLANKETS AND MATTING (B/M)
- VESCH STD 3.36 NTS

SOIL STABILIZATION BLANKETS AND MATTING (B/M) NOTES:
VESCH STD & SPEC 3.36

- SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS. PREPARE SOIL INCLUDING ANY NECESSARY APPLICATION OF SOIL AMENDMENTS SUCH AS LIME OR FERTILIZER.
- BEGIN AT THE TOP OF THE SHORELINE BY ANCHORING THE B/M IN A 6 INCH DEEP BY 6 INCH WIDE TRENCH WITH APPROXIMATELY 12 INCHES OF B/M EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE B/M WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12 INCHES APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. COMPACT SOIL AND FOLD REMAINING 12 INCH PORTION OF B/M BACK OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12 INCHES ACROSS THE WIDTH OF THE B/M.
- CONTRACTOR AND ENGINEER SHALL DISCUSS WHETHER TO ROLL THE B/M VERTICALLY DOWN THE SLOPE (3A) OR ACROSS THE SHORELINE SLOPE (3B) PRIOR TO INSTALLATION. B/M SHALL BE ROLLED IN A CONTROLLED FASHION. B/M SHALL NOT BE ALLOWED TO ROLL DOWN THE SLOPE ON ITS OWN. LAY B/M LOOSELY AND STAKE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH. ALL B/M MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
- INSTALL B/M OVER ENTIRE PLANTING AREA. AVOID EXISTING TREES AND EXISTING STUMPS.
- PLACE CONSECUTIVE B/M END OVER END (SHINGLE STYLE) WITH A 2 INCH TO 5 INCH OVERLAP. SEAM OVERLAPS SHOULD BE SHINGLED IN THE PREDOMINANT FLOW DIRECTION. STAPLE/STAKE THROUGH OVERLAPPED AREAS, APPROXIMATELY 12 INCHES APART ACROSS ENTIRE B/M WIDTH.
- THE EDGES OF THE B/M AT OR BELOW ORDINARY HIGH WATER MUST BE ANCHORED BY PLACING THE B/M IN A 12 INCH DEEP BY 6 INCH WIDE ANCHOR TRENCH. ANCHOR THE B/M WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12 INCHES APART IN THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

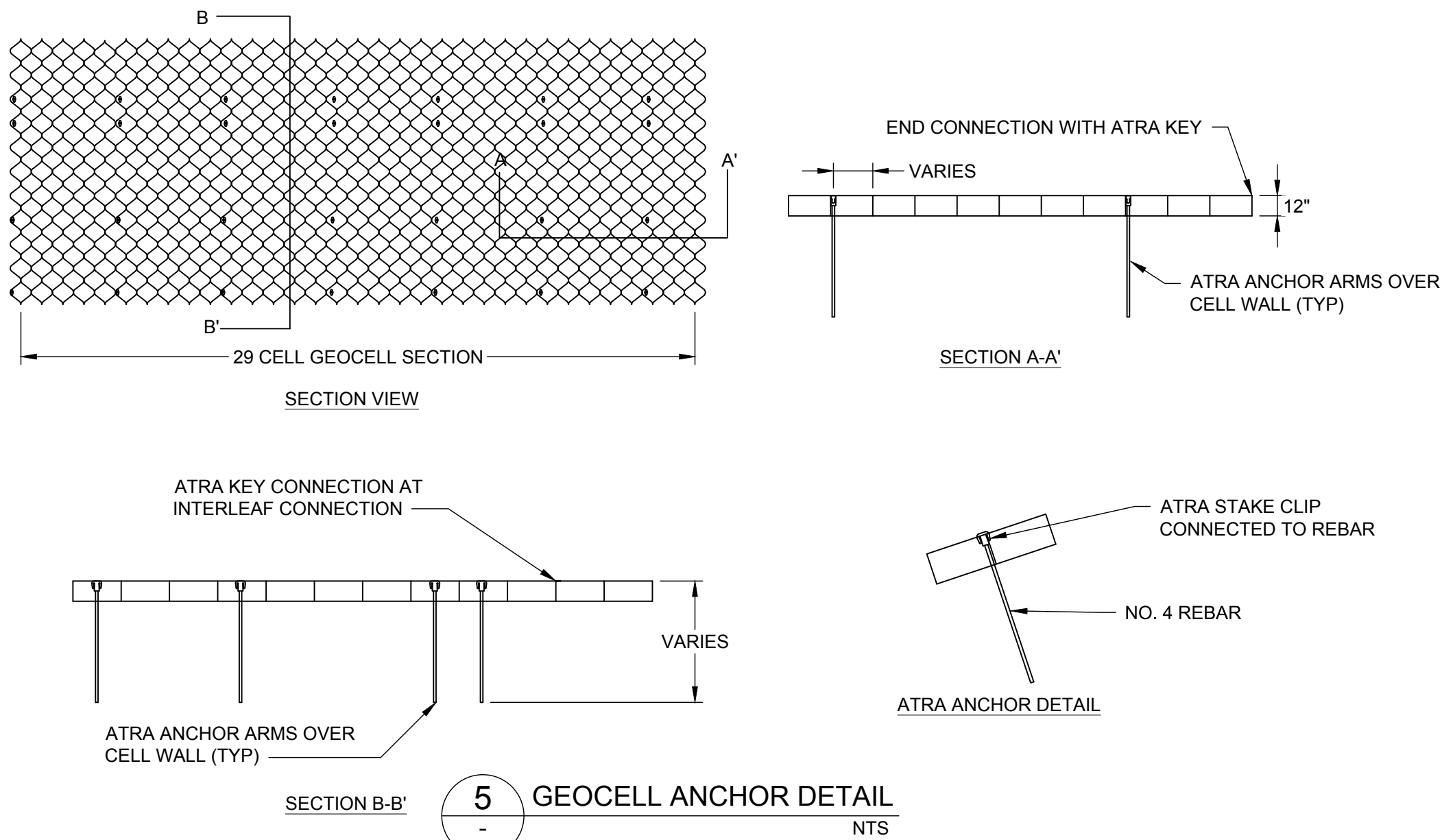


STAPLE PATTERN GUIDE



STAPLE PATTERN NOTES:

- THE AECOM SITE REPRESENTATIVE AND CONTRACTOR SHALL SELECT THE APPROPRIATE STAPLE/STAKE TYPE AND LENGTH. STAPLES/STAKES SHALL BE SELECTED TO HOLD THE MAT IN INTIMATE CONTACT WITH THE SOIL SUBGRADE AND RESIST PULLOUT.
- STAPLES AND/OR STAKES SHOULD BE AT LEAST 6 INCHES IN LENGTH AND WITH SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER STAPLES AND/OR STAKES MAY BE NEEDED IN LOOSER SOILS.



GEOCELL ANCHOR DETAIL NOTES:

- STEPS:
 - POSITION ANCHOR NEXT TO UP-SLOPE CELL WALL.
 - DRIVE ANCHOR INTO THE GROUND UNTIL ARM OF STAKE CLIP IS ABOVE CELL WALL.
 - ENGAGE ARM OF CLIP TO CELL WALL AND DRIVE UNTIL TIGHT.
- ANCHOR LENGTH AND SPACING VARY ACCORDING TO DESIGN REQUIREMENTS.
- ENSURE ANCHOR STAKE CLIP ARM ENGAGES WITH THE TIP OF THE GEOCELL WALL.

6 GEOCELL TERMINATION DETAIL: FROM RESTORATION AREA TO NATURAL BANK
- NTS

GEOCELL TERMINATION DETAIL NOTES:

- FOLLOW MANUFACTURER'S GUIDANCE TO DETERMINE THE LENGTH OF GEOCELL THAT SHOULD BE BURIED AND THE DEPTH TO WHICH IT SHOULD BE BURIED.

AECOM

PROJECT

ALLIED READY MIX
PROPERTY BMAS

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AREA OF CONCERN 4 - IRM
FORMER DUPONT WAYNESBORO SITE
WAYNESBORO, VA

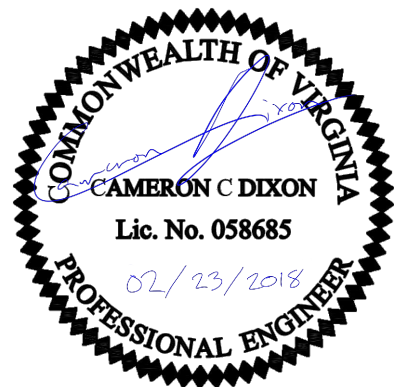
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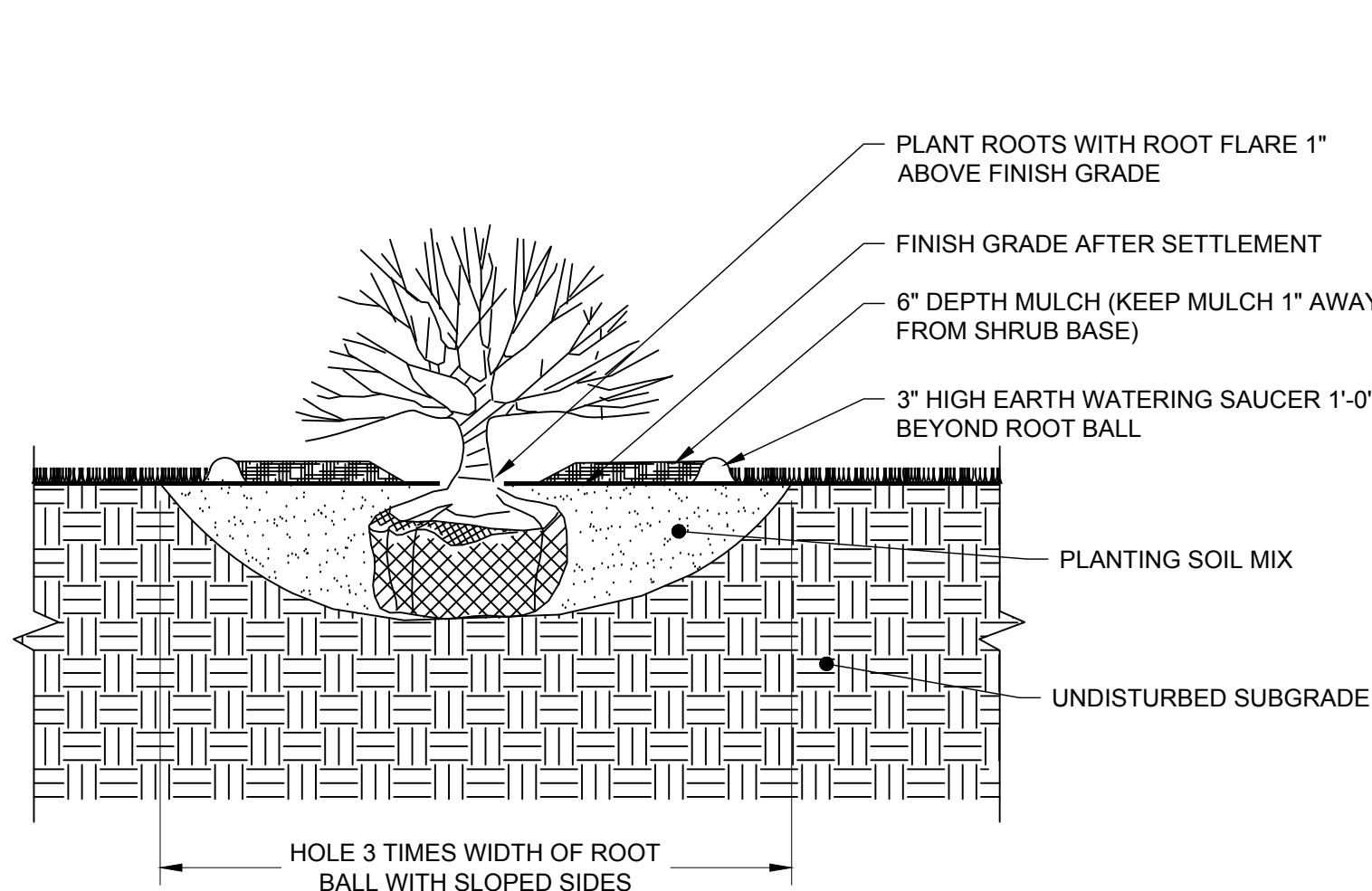
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RESTORATION DETAILS

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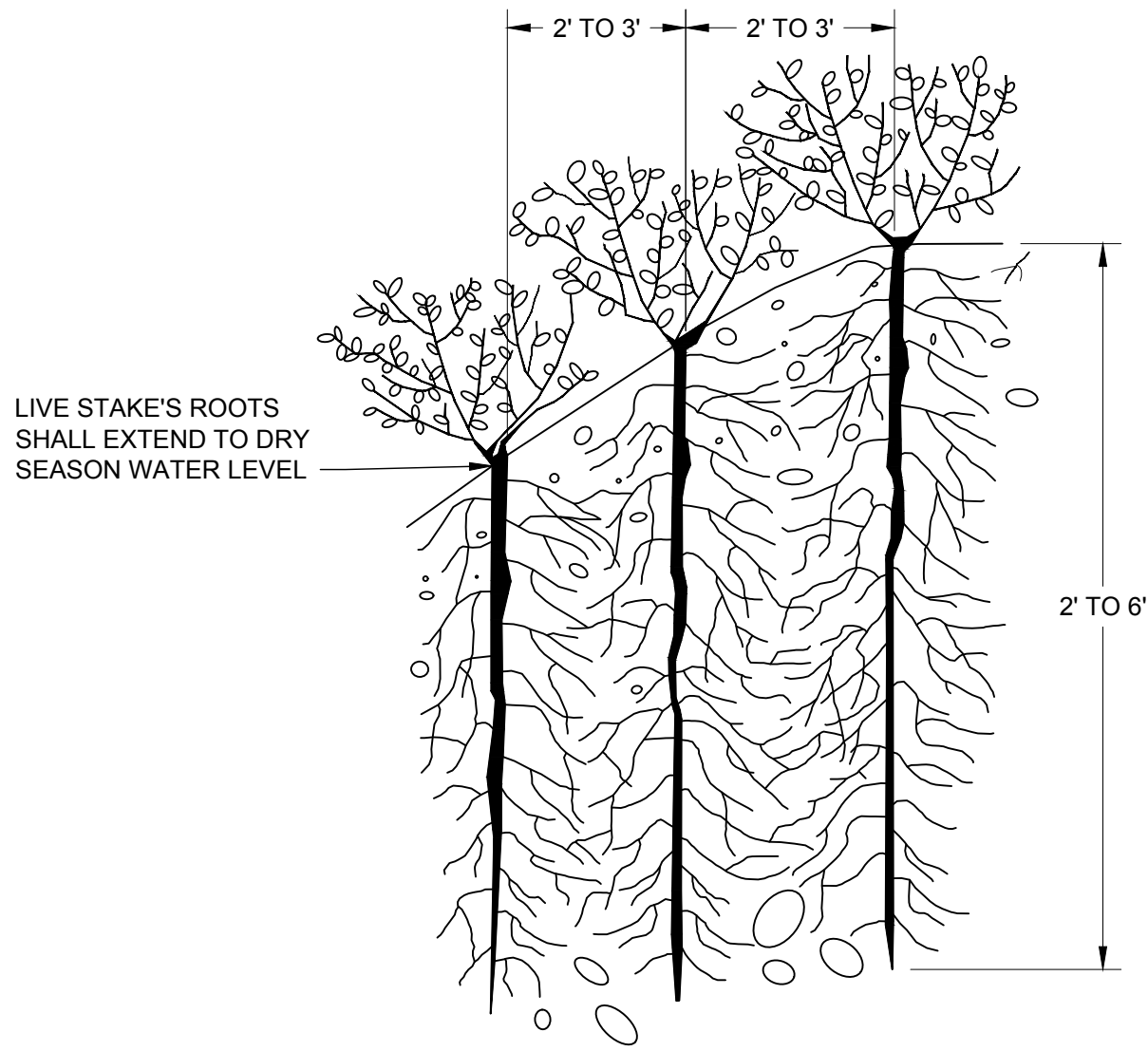
D-202



1 SMALL TREE AND SHRUB PLANTING
- VESCH STD 3.37 NTS

SMALL TREE AND SHRUB PLANTING NOTES:
VESCH STD & SPEC 3.37

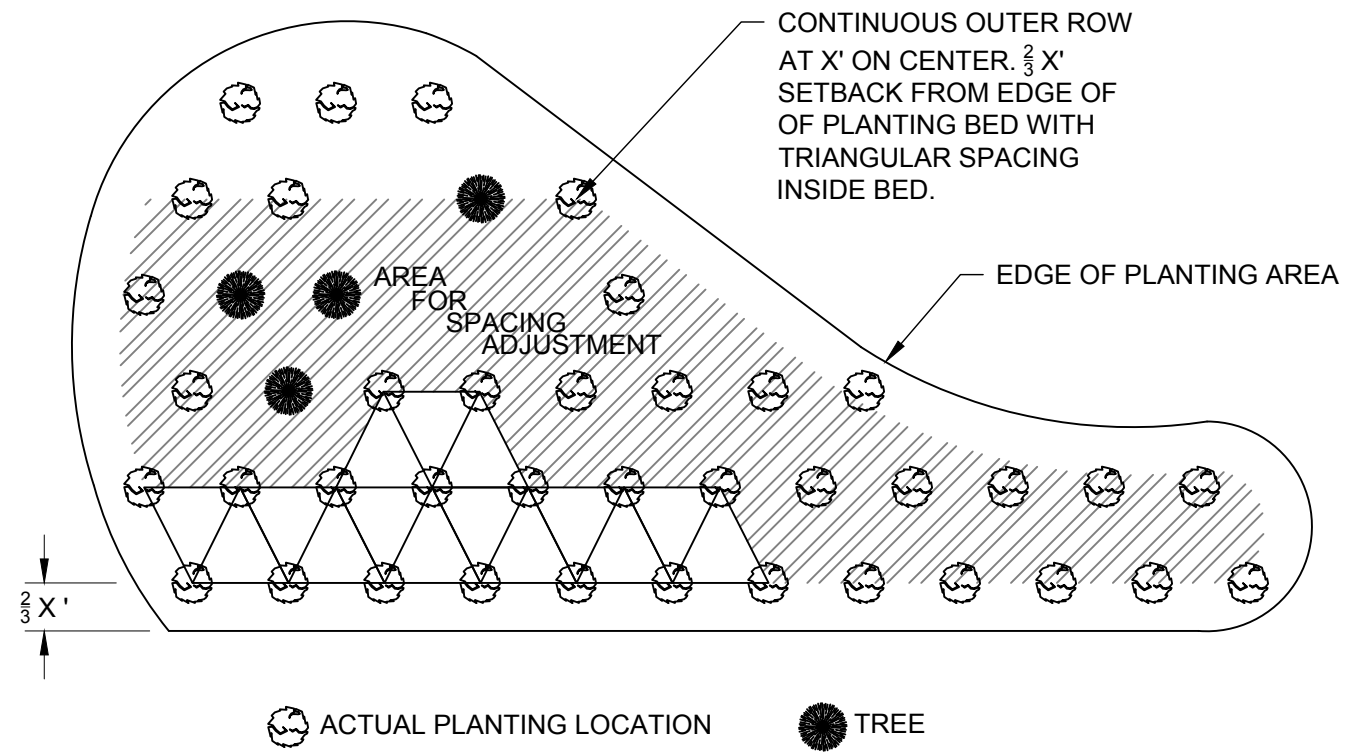
- EXCAVATE TO REQUIRED DEPTH AND BACKFILL WITH PLANTING SOIL MIX.
- RAISE AND REPLANT ANY PLANTS THAT SETTLE MORE THAN 3 INCHES AFTER PLANTING AND WATERING.
- WATER BY FLOODING TWICE IN FIRST TWO HOURS AFTER PLANTING. WATER AND MAINTAIN AS SPECIFIED.
- IN THE BANK STABILIZATION AREAS, PLANT TREES PRIOR TO INSTALLING THE GEOCELL. APPLY MULCH AS SHOWN IMMEDIATELY AFTER GEOCELL INSTALLATION.
- IN THE BANK STABILIZATION AREAS, PLANT SHRUBS WITHIN OPENING OF THE GEOCELL. APPLY MULCH AS SHOWN AROUND THE PLANTED CELL.



2 LIVE STAKES
- VESCH STD 3.37 NTS

LIVE STAKES NOTES:
VESCH STD & SPEC 3.37

- ROOTED, LEAFED CONDITION OF PLANT MATERIAL IS NOT REPRESENTATIVE OF THE TIME OF INSTALLATION.
- LIVE STAKES SHALL BE 1 TO 2 INCHES IN DIAMETER AND 2 TO 6 INCHES LONG. NO LEAF BUDS SHALL HAVE INITIATED GROWTH BEYOND 1/4 INCH, AND THE CAMBIUM LAYER SHALL BE MOIST AND GREEN.
- LIVE STAKES SHALL BE INSERTED BY HAND INTO PILOT HOLES. PILOT HOLES SHALL BE CREATED USING A DIBBLE, IRON BAR, OR SIMILAR TOOL. A MINIMUM OF 4 INCHES AND TWO LIVE BUDS SHALL BE EXPOSED ABOVE THE GROUND SURFACE. AT LEAST HALF THE LENGTH OF THE STAKE SHALL BE INSERTED INTO THE SOIL.



3 TYPICAL WOODY SPECIES PLANTING PATTERN
- VESCH STD 3.37 NTS

TYPICAL WOODY SPECIES PLANTING PATTERN NOTES:
VESCH STD & SPEC 3.37

- SEE PLANTED PLAN FOR RECOMMENDED SPACING.

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PROJECT

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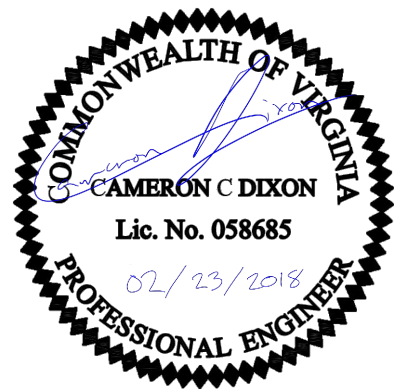
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KEY PLAN

PROJECT NUMBER

60552472

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PLANTING DETAILS

SHEET NUMBER

D-301

Appendix B

Analytical Data

Appendix B
Summary of Analytical Data
Technical Execution Plan – Allied Ready BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Transect	Surficial/ Boring	Sample ID	Depth Interval (feet) ¹	THg (mg/kg)
Surficial				
ORBH-6-A	Surficial	WSR-S-ORBH-6-A(0-1)	0-1	1.32
		WSR-S-ORBH-6-A(1-2)	1-2	1.10
		WSR-S-ORBH-6-A(2-3)	2-3	8.71
		WSR-S-ORBH-6-A(3-4)	3-4	5.42
		WSR-S-ORBH-6-A(4-5)	4-5	26.5
RB03-4	Surficial	WSR-S-RB03-4(0-1.2)	0-1.2	817
		WSR-S-RB03-4(1.2-2.4)	1.2-2.4	41.9
		WSR-S-RB03-4(2.4-3.6)	2.4-3.6	18.1
		WSR-S-RB03-4(3.6-4.8)	3.6-4.8	12.4
		WSR-S-RB03-4(4.8-6)	4.8-6	13.1
RB04-1	Surficial	WSR-S-RB04-1(0-2)	0-2	4.79
		WSR-S-RB04-1(2-4)	2-4	2.92
		WSR-S-RB04-1(4-6)	4-6	5.16
		WSR-S-RB04-1(6-8)	6-8	3.52
		WSR-S-RB04-1(8-10)	8-10	2.85
		WSR-S-RB04-1(10-12)	10-12	2.64
RB05-1	Surficial	WSR-S-RB05-1(0-2)	0-2	3.94
		WSR-S-RB05-1(2-4)	2-4	5.97
		WSR-S-RB05-1(4-6)	4-6	4.90
		WSR-S-RB05-1(6-8)	6-8	2.37
		WSR-S-RB05-1(8-10)	8-10	8.15
		WSR-S-RB05-1(10-12)	10-12	2.10
RB05-2	Surficial	WSR-S-RB05-2(0-2)	0-2	1.55
		WSR-S-RB05-2(2-4)	2-4	2.36
		WSR-S-RB05-2(4-6)	4-6	2.44
		WSR-S-RB05-2(6-8)	6-8	3.04
		WSR-S-RB05-2(8-10)	8-10	2.39
RBH-12-100	Surficial	SS4Q13-RBH-12-100-1.6	0-1.6	15.1
		SS4Q13-RBH-12-100-3.2	1.6-3.2	7.99
		SS4Q13-RBH-12-100-4.8	3.2-4.8	5.79
		SS4Q13-RBH-12-100-6.4	4.8-6.4	8.84
		SS4Q13-RBH-12-100-8	6.4-8	13.2
RBH-12-101	Surficial	SS4Q13-RBH-12-101-10	8-10	25.8
		SS4Q13-RBH-12-101-12	10-12	8.86
		SS4Q13-RBH-12-101-2	0-2	8.82
		SS4Q13-RBH-12-101-4	2-4	71.3
		SS4Q13-RBH-12-101-6	4-6	75.3
		SS4Q13-RBH-12-101-8	6-8	69.8
RBH-12-A	Surficial	WSR-S-RBH-12-A(0-2)	0-2	12.8
		WSR-S-RBH-12-A(2-4)	2-4	103
		WSR-S-RBH-12-A(4-6)	4-6	119
		WSR-S-RBH-12-A(6-8)	6-8	11.2
		WSR-S-RBH-12-A(8-10)	8-10	16.0

Appendix B
Summary of Analytical Data
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Former DuPont Waynesboro Site
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Transect	Surficial/ Boring	Sample ID	Depth Interval (feet)¹	THg (mg/kg)
RBH-12-B	Surficial	WSR-S-RBH-12-B(0-2)	0-2	35.5
		WSR-S-RBH-12-B(2-4)	2-4	74.9
		WSR-S-RBH-12-B(4-6)	4-6	14.4
		WSR-S-RBH-12-B(6-8)	6-8	4.16
		WSR-S-RBH-12-B(8-10)	8-10	6.12
RBH-12-C	Surficial	WSR-S-RBH-12-C(0-2)	0-2	8.48
		WSR-S-RBH-12-C(2-4)	2-4	46.0
		WSR-S-RBH-12-C(4-6)	4-6	7.63
		WSR-S-RBH-12-C(6-8)	6-8	2.75
		WSR-S-RBH-12-C(8-10)	8-10	4.95
RBH-13-100	Surficial	SS4Q13-RBH-13-100-10	8-10	8.29
		SS4Q13-RBH-13-100-2	0-2	172
		SS4Q13-RBH-13-100-4	2-4	2.14
		SS4Q13-RBH-13-100-6	4-6	19.0
		SS4Q13-RBH-13-100-8	6-8	16.0
RBH-13-101	Surficial	SS4Q13-RBH-13-101-10	8-10	224
		SS4Q13-RBH-13-101-2	0-2	92.8
		SS4Q13-RBH-13-101-4	2-4	275
		SS4Q13-RBH-13-101-6	4-6	79.3
		SS4Q13-RBH-13-101-8	6-8	67.3
RBH-13-102	Surficial	SS4Q13-RBH-13-102-10	8-10	4.51
		SS4Q13-RBH-13-102-12	10-12	5.90
		SS4Q13-RBH-13-102-14	12-14	3.52
		SS4Q13-RBH-13-102-16	14-16	3.63
		SS4Q13-RBH-13-102-18	16-18	3.46
		SS4Q13-RBH-13-102-2	0-2	9.92
		SS4Q13-RBH-13-102-20	18-20	3.51
		SS4Q13-RBH-13-102-4	2-4	21.1
		SS4Q13-RBH-13-102-6	4-6	9.06
		SS4Q13-RBH-13-102-8	6-8	5.69
RBH-13-103	Surficial	SS4Q13-RBH-13-103-10	8-10	4.37
		SS4Q13-RBH-13-103-2	0-2	5.46
		SS4Q13-RBH-13-103-4	2-4	2.34
		SS4Q13-RBH-13-103-6	4-6	6.33
		SS4Q13-RBH-13-103-8	6-8	4.60
RBH-14-100	Surficial	SS4Q13-RBH-14-100-1	0-1	9.35
		SS4Q13-RBH-14-100-2	1-2	15.7
		SS4Q13-RBH-14-100-3	2-3	18.5
		SS4Q13-RBH-14-100-4	3-4	16.2
RBH-14-101	Surficial	SS4Q13-RBH-14-101-1.2	0-1.2	115
		SS4Q13-RBH-14-101-2.4	1.2-2.4	275
		SS4Q13-RBH-14-101-3.6	2.4-3.6	494
		SS4Q13-RBH-14-101-4.8	3.6-4.8	197
		SS4Q13-RBH-14-101-6	4.8-6	98.0

Appendix B
Summary of Analytical Data
Technical Execution Plan – Allied Ready BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Transect	Surficial/ Boring	Sample ID	Depth Interval (feet) ¹	THg (mg/kg)
RBH-15-A	Surficial	WSR-S-RBH-15-A(0-2)	0-2	1.03
		WSR-S-RBH-15-A(2-4)	2-4	0.577
		WSR-S-RBH-15-A(4-6)	4-6	2.37
		WSR-S-RBH-15-A(6-8)	6-8	0.679
		WSR-S-RBH-15-A(8-10)	8-10	0.973
RBH-15-B	Surficial	WSR-S-RBH-15-B(0-2)	0-2	0.027
		WSR-S-RBH-15-B(2-4)	2-4	0.080
		WSR-S-RBH-15-B(4-6)	4-6	0.23
		WSR-S-RBH-15-B(6-8)	6-8	1.05
		WSR-S-RBH-15-B(8-10)	8-10	1.61
Subsurface				
RB03-4	NA	SC4Q13-RB03-4-1	0-1	13.6
		SC4Q13-RB03-4-2	1-2	47.6
		SC4Q13-RB03-4-3	2-3	259
RB04-1	NA	SC4Q13-RB04-1-1	0-1	3.01
RB05-2	NA	SC4Q13-RB05-2-1	0-1	5.14
RBH-12-100	NA	SC4Q13-RBH-12-100-1	0-1	44.1
		SC4Q13-RBH-12-100-2	1-2	144
		SC4Q13-RBH-12-100-3	2-3	111
RBH-12-B	NA	SC4Q13-RBH-12-B-1	0-1	39.3
		SC4Q13-RBH-12-B-2	1-2	121
		SC4Q13-RBH-12-B-3	2-3	213
		SC4Q13-RBH-12-B-4	3-4	231
RBH-13-100	NA	SC4Q13-RBH-13-100-1	0-1	291
		SC4Q13-RBH-13-100-2	1-2	405
		SC4Q13-RBH-13-100-3	2-3	18.5
		SC4Q13-RBH-13-100-4	3-4	1.64
RBH-13-103	NA	SC4Q13-RBH-13-103-1	0-1	4.39
		SC4Q13-RBH-13-103-2	1-2	10.5
RBH-14-101	NA	SC4Q13-RBH-14-101-1	0-1	280
RBH-15-A	NA	SC4Q13-RBH-15-A-1	0-1	13.2
		SC4Q13-RBH-15-A-2	1-2	2.57
		SC4Q13-RBH-15-A-3	2-3	0.133
RBH13-200	A	SC031016-RBH13-200A-(0-1)	0-1	8.26
		SC031016-RBH13-200A-(1-2)	1-2	44.0
		SC031016-RBH13-200A-(1-2)-D	1-2	40.0
		SC031016-RBH13-200A-(2-2.5)	2-2.5	40.8
	B	SC031016-RBH13-200B-(0-1)	0-1	61.1
		SC031016-RBH13-200B-(1-2)	1-2	48.1
	C	SC031016-RBH13-200C-(0-1)	0-1	42.6
		SC031016-RBH13-200C-(1-1.5)	1-1.5	37.2

Appendix B
Summary of Analytical Data
Technical Execution Plan – Allied Ready BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Transect	Surficial/ Boring	Sample ID	Depth Interval (feet) ¹	THg (mg/kg)
RBH13-201	A	SC031016-RBH13-201A-(0-1)	0-1	194
		SC031016-RBH13-201A-(0-1)-D	0-1	202
		SC031016-RBH13-201A-(1-2)	1-2	247
		SC031016-RBH13-201A-(2-3)	2-3	17.5
		SC031016-RBH13-201A-(3-4)	3-4	0.011
	B	SC031016-RBH13-201B-(0-1)	0-1	56.5
		SC031016-RBH13-201B-(1-1.5)	1-1.5	9.74
	C	SC031016-RBH13-201C-(0-1)	0-1	8.72
RBH13-202	A	SC031116-RBH13-202A-(0-1)	0-1	11.3
		SC031116-RBH13-202A-(1-2)	1-2	295
		SC031116-RBH13-202A-(1-2)-D	1-2	371
		SC031116-RBH13-202A-(2-2.5)	2-2.5	144
	B	SC031116-RBH13-202B-(0-1)	0-1	131
		SC031116-RBH13-202B-(1-2)	1-2	251
		SC031116-RBH13-202B-(2-3)	2-3	15.3
	C	SC031116-RBH13-202C-(0-1)	0-1	5.27
		SC031116-RBH13-202C-(1-2)	1-2	18.1
		SC031116-RBH13-202C-(2-2.5)	2-2.5	6.91
RBH13-203	A	SC031116-RBH13-203A-(0-1)	0-1	11.9
		SC031116-RBH13-203A-(1-2)	1-2	88.8
		SC031116-RBH13-203A-(2-3)	2-3	6.48
		SC031116-RBH13-203A-(3-4)	3-4	1.44
	B	SC031116-RBH13-203B-(0-1)	0-1	57.2
	C	SC031116-RBH13-203C-(0-0.5)	0-0.5	10.8
RBH13-204	A	SC031416-RBH13-204A-(0-1)	0-1	10.5
		SC031416-RBH13-204A-(1-2)	1-2	78.3
		SC031416-RBH13-204A-(1-2)-D	1-2	74.6
		SC031416-RBH13-204A-(2-3)	2-3	80.0
		SC031416-RBH13-204A-(3-4)	3-4	1.58
	B	SC031416-RBH13-204B-(0-1)	0-1	15.3
		SC031416-RBH13-204B-(1-2)	1-2	7.32
	C	SC031416-RBH13-204C-(0-1)	0-1	140
RBH13-205	A	SC031416-RBH13-205A-(0-1)	0-1	0.027
		SC031416-RBH13-205A-(1-2)	1-2	22.9
		SC031416-RBH13-205A-(2-3)	2-3	117
		SC031416-RBH13-205A-(3-4)	3-4	709
	B	SC031416-RBH13-205B-(0-1)	0-1	16.1
		SC031416-RBH13-205B-(1-2)	1-2	68.7
		SC031416-RBH13-205B-(2-3)	2-3	603
		SC031416-RBH13-205B-(3-4)	3-4	906

Appendix B
Summary of Analytical Data
Technical Execution Plan – Allied Ready BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Transect	Surficial/ Boring	Sample ID	Depth Interval (feet) ¹	THg (mg/kg)
RBH13-206	A	SC031516-RBH13-206A-(0-1)	0-1	21.5
		SC031516-RBH13-206A-(1-2)	1-2	203
		SC031516-RBH13-206A-(2-3)	2-3	1080
		SC031516-RBH13-206A-(2-3)-D	2-3	830
		SC031516-RBH13-206A-(3-4)	3-4	1000
	B	SC031516-RBH13-206B-(0-1)	0-1	16.5
		SC031516-RBH13-206B-(1-2)	1-2	162
		SC031516-RBH13-206B-(2-3)	2-3	2470
	C	SC031516-RBH13-206C-(0-1)	0-1	862
RBH13-207	A	SC031516-RBH13-207A-(0-1)	0-1	27.6
		SC031516-RBH13-207A-(1-2)	1-2	340
		SC031516-RBH13-207A-(2-3)	2-3	1570
	B	SC031516-RBH13-207B-(0-1)	0-1	8.80
		SC031516-RBH13-207B-(1-2)	1-2	17.6
		SC031516-RBH13-207B-(2-3)	2-3	270
	C	SC031516-RBH13-207C-(0-1)	0-1	10.0
RBH13-208	A	SC062117-RBH13-208A-(0-1)	0-1	5.89
	B	SC062117-RBH13-208B-(0-1)	0-1	4.96
		SC062117-RBH13-208B-(1-2)	1-2	9.67
	C	SC062117-RBH13-208C-(0-1)	0-1	5.73
		SC062117-RBH13-208C-(1-2)	1-2	8.43
RBH13-209	A	SC062117-RBH13-209A-(0-1)	0-1	4.85
		SC062117-RBH13-209A-(0-1)-D	0-1	5.55
		SC062117-RBH13-209A-(1-2)	1-2	8.81
	B	SC062117-RBH13-209B-(0-1)	0-1	7.06
		SC062117-RBH13-209B-(1-2)	1-2	10.6
		SC062117-RBH13-209B-(2-3)	2-3	17.4
	C	SC062117-RBH13-209C-(0-1)	0-1	6.56
		SC062117-RBH13-209C-(1-1.75)	1-1.75	10.5
RBH14-200	A	SC031516-RBH14-200A-(0-1)	0-1	3.48
		SC031516-RBH14-200A-(1-2)	1-2	15.9
		SC031516-RBH14-200A-(2-3)	2-3	24.5
	B	SC031516-RBH14-200B-(0-0.5)	0-0.5	23.7
	C	SC031516-RBH14-200C-(0-1)	0-1	7.82
		SC031516-RBH14-200C-(0-1)-D	0-1	5.51
RBH14-201	A	SC031516-RBH14-201A-(0-1)	0-1	170
		SC031516-RBH14-201A-(1-2)	1-2	261
		SC031516-RBH14-201A-(1-2)-D	1-2	284
	B	SC031516-RBH14-201B-(0-1)	0-1	371
	C	SC031516-RBH14-201C-(0-1)	0-1	231

Appendix B
Summary of Analytical Data
Technical Execution Plan – Allied Ready BMAs
Area of Concern (AOC) 4
Former DuPont Waynesboro Site
Waynesboro, Virginia

Transect	Surficial/ Boring	Sample ID	Depth Interval (feet) ¹	THg (mg/kg)
RBH14-202	A	SC031516-RBH14-202A-(0-1)	0-1	3.07
		SC031516-RBH14-202A-(1-2)	1-2	0.739
		SC031516-RBH14-202A-(2-3)	2-3	0.779
		SC031516-RBH14-202A-(3-4)	3-4	1.34
	B	SC031516-RBH14-202B-(0-1)	0-1	2.20
		SC031516-RBH14-202B-(1-2)	1-2	0.28
		SC031516-RBH14-202B-(2-3)	2-3	1.06
	C	SC031516-RBH14-202C-(0-1)	0-1	0.728

Notes:

1. Surficial soil depth interval refers to the distance starting from the top of the bank [zero (0)] down to the wetted edge of the bank along the surficial bank face; subsurface depth interval refers to the vertical core depth starting from the soil surface [zero (0)].

BMAs - Bank Management Areas

mg/kg = milligram per kilogram

THg = Total Mercury

Appendix C

Technical Specifications

SECTION 00 31 32
GEOTECHNICAL DATA

PART 1 – GENERAL**1.01 SECTION INCLUDES**

- A. Material Testing Information
- B. Jones Hollow Property borrow material
- C. Exploratory Excavation Information
- D. Jones Hollow Property

1.02 RELATED WORK

Not used

1.03 DEFINITIONS

- A. Acronym
 - 1. DSR – DuPont Site Representative

1.04 REFERENCES

- A. Not used

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Contractor may rely upon the accuracy of the “technical data” contained in the provided reports and Contract Drawings, but such reports and Contract Drawings are not Contract Documents.
- B. Contractor may not rely upon or make any claim with respect to:
 - 1. The completeness of provided report and drawing for Contractor’s purposes, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs.
 - 2. Other data, interpretations, opinions, and information contained in provided reports or shown or indicated in provided Contract Drawings.
 - 3. Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.
 - 4. Utility locations

SECTION 00 31 32 GEOTECHNICAL DATA

- C.** Promptly notify DSR in writing, before further disturbing the subsurface or physical conditions or performing any Work in connection therewith, about any subsurface or physical condition that is uncovered or revealed that Contractor believes:
- 1.** Is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely is materially inaccurate.
 - 2.** Is of such a nature as to require a change in the Contract Documents.
 - 3.** Differs materially from that shown or indicated in the Contract Documents.
 - 4.** Is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.
- D.** Do not further disturb such condition or perform any work in connection therewith, except in an emergency, until receipt of written order to do so.
- E.** DSR’s Review: After receipt of written notice, the DSR will promptly review the pertinent condition, determine the necessity of DuPont’s obtaining additional exploration or tests with respect thereto, and advise DuPont in writing (with a copy to Contractor) of DSR’s findings and conclusions.

PART 2 – PRODUCTS

- A.** Not used

PART 3 – EXECUTION

3.01 ATTACHMENTS

- A.** Jones Hollow Borrow Source Site Plan and Approximate Area of Potential Excavation Limits
- B.** Jones Hollow Geotechnical Test Data report completed April 2016

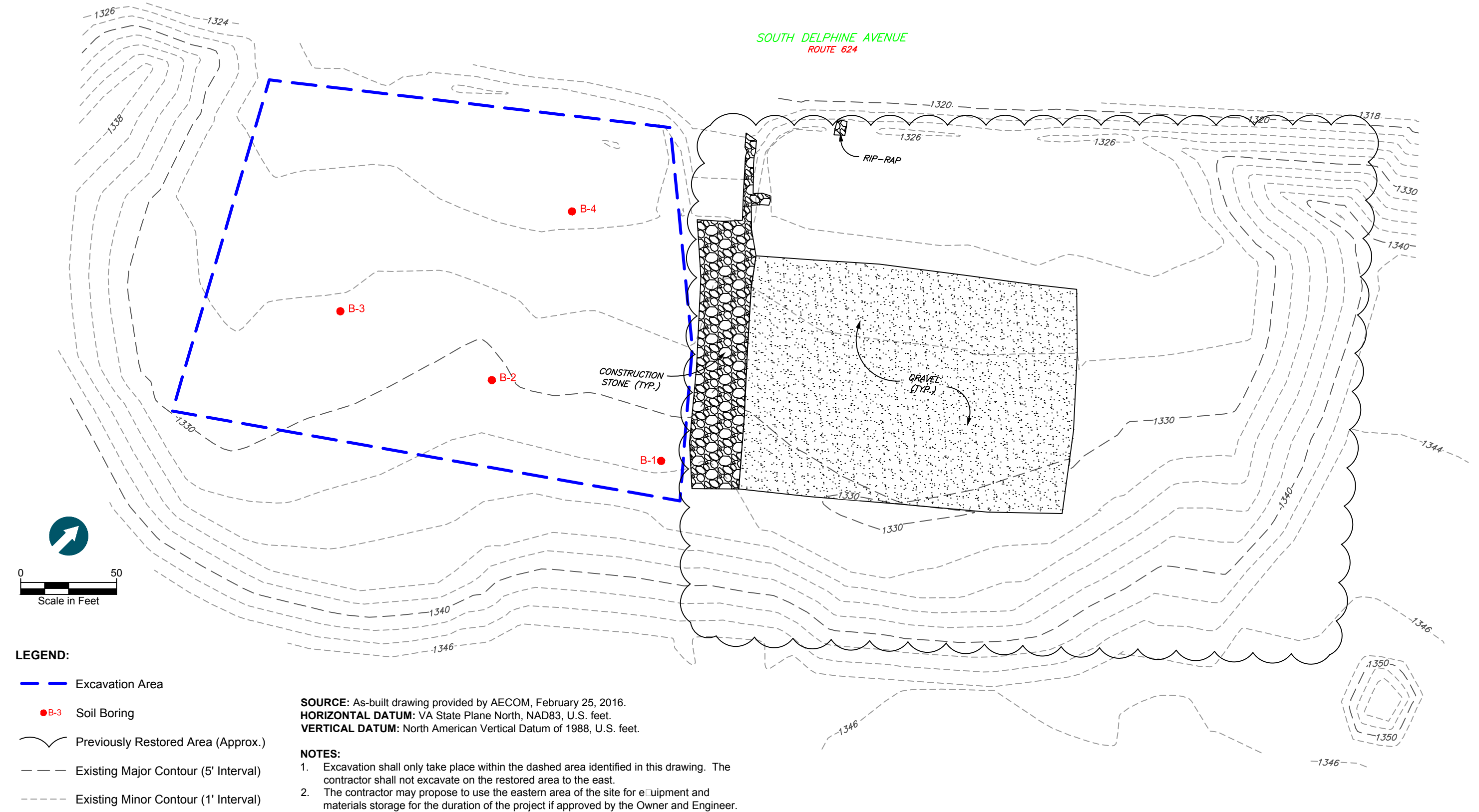
END OF SECTION

ATTACHMENT A

**JONES HOLLOW BORROW SOURCE SITE PLAN AND APPROXIMATE AREA OF POTENTIAL
EXCAVATION LIMITS**



K:\Projects\0952-DuPont\South River Phase 1 Interim Remedial Mea\0952-RP-020 Jones Hollow.dwg Figure X
Apr 27, 2016 1:33pm epipkin



ATTACHMENT B

JONES HOLLOW GEOTECHNICAL TEST DATA REPORT COMPLETED APRIL 2016

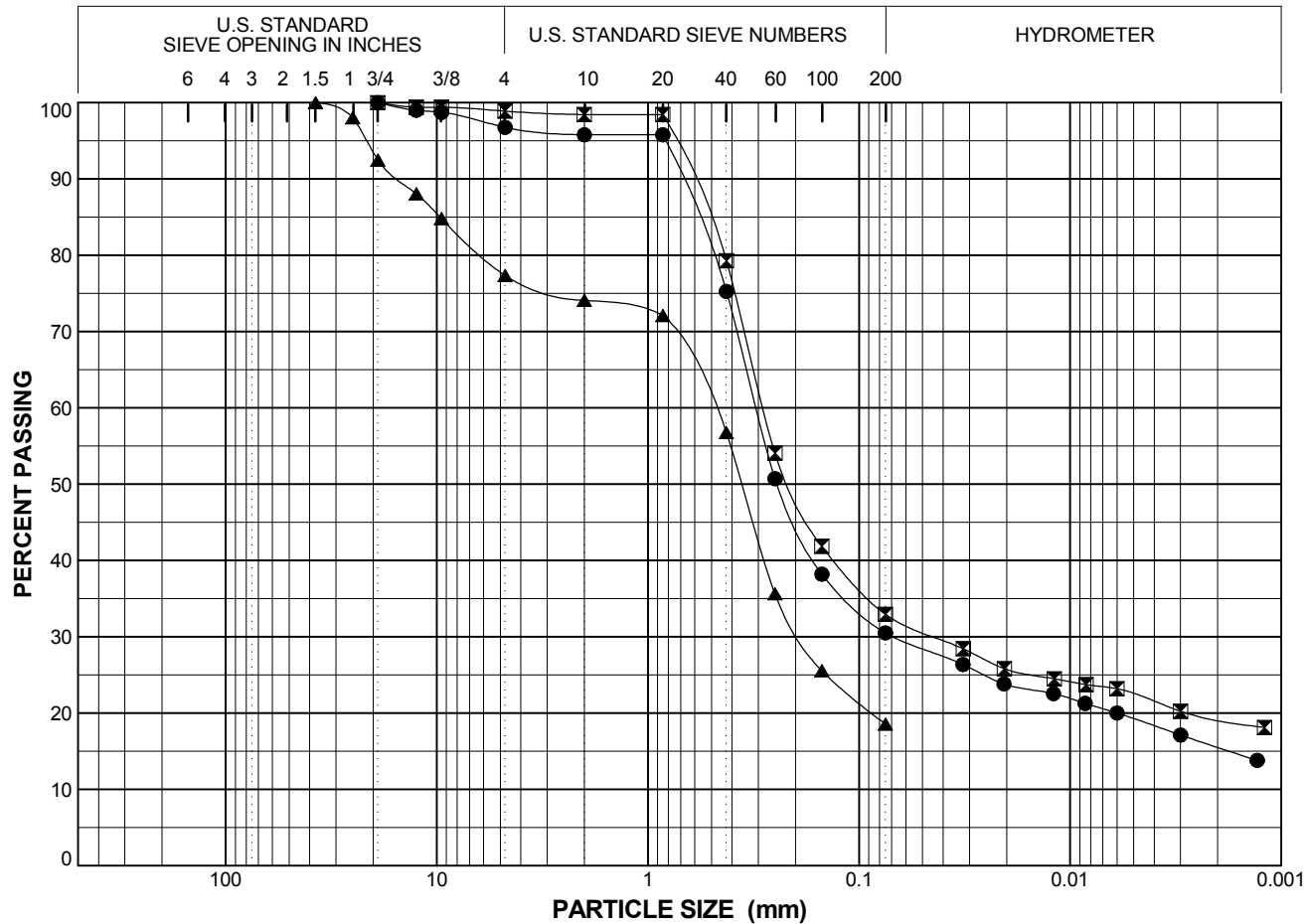
Project: South River: Jones Hollow
Project No.: 60390328



SUMMARY OF LABORATORY TEST RESULTS

Boring and Sample Number	Depth (feet)	Classification	USCS Symbols	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits		Specific Gravity	Organic Content (%)	Grain Size		Compaction	Consolidation	Direct Shear	Analytical Results (ppm)			Unconfined Compression		Resistivity (Ohm-cm)	pH
						Liquid Limit	Plastic Limit			<#200 (%)	<2µ (%)				Chloride	Sulfate	Sulfide	Stress (psi)	Strain (%)		
B-1	0.0-12.0	Brown CLAYEY SAND	SC	15.4		27	18	2.69		31	16	*		*							6.2
B-2	0.0-12.0	Brown CLAYEY SAND	SC	18.1		29	17			33	19										
B-3	0.0-12.0	Brown SILTY SAND with GRAVEL	SM	12.9				2.68		19		*									
B-4	0.0-12.0	Brown SILTY SAND	SM	17.1						34											

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



SYMBOL	●	☒	▲
Boring	B-1	B-2	B-3
Sample Spec			
Depth (in)	0.0-12.0	0.0-12.0	0.0-12.0
% +3"	0.0	0.0	0.0
% Gravel	3.2	1.1	22.7
% Sand	66.2	65.9	58.8
% Fines	30.5	32.9	18.6
% -2 μ	15.5	19.3	
Cc			
Cu			
LL	27	29	
PL	18	17	
PI	9	12	
USCS	SC	SC	SM
w (%)	15.4	18.1	12.9

Particle Size (Sieve #)	PERCENT FINER		
	●	☒	▲
2"			
1 1/2"			100.0
1"			98.0
3/4"	100.0	100.0	92.5
1/2"	99.0	99.4	88.1
3/8"	98.7	99.4	84.8
4	96.8	98.9	77.3
10	95.8	98.4	74.1
20	95.8	98.4	72.1
40	75.3	79.3	56.8
60	50.7	54.1	35.6
100	38.2	41.8	25.6
200	30.5	32.9	18.6

SYMBOL	DESCRIPTION AND REMARKS
●	Brown CLAYEY SAND (SC)
☒	Brown CLAYEY SAND (SC)
▲	Brown SILTY SAND with GRAVEL (SM)

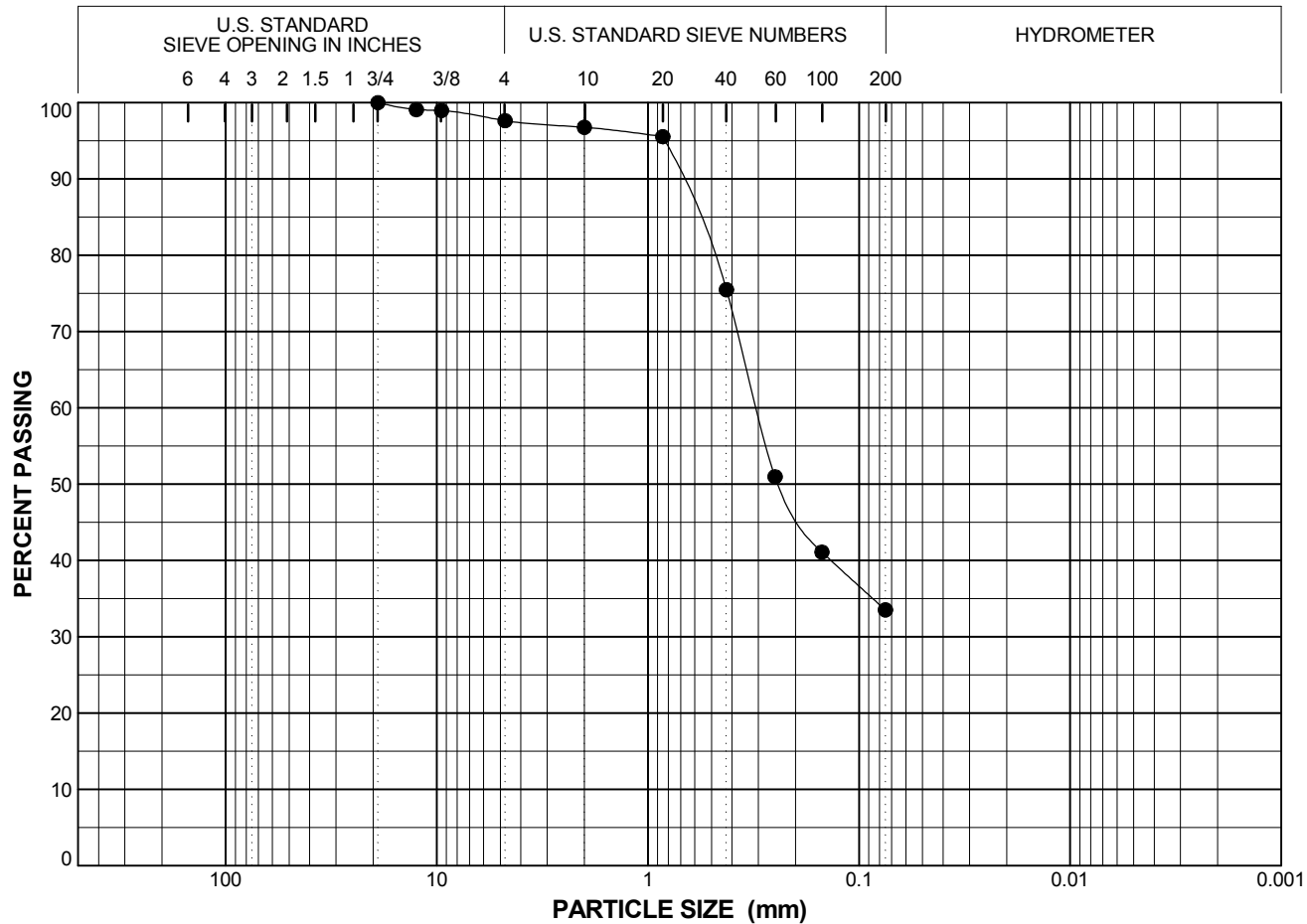
PARTICLE SIZE DISTRIBUTION

South River: Jones Hollow

Project Number 60390328	April 2016	Figure 1
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AECOM

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



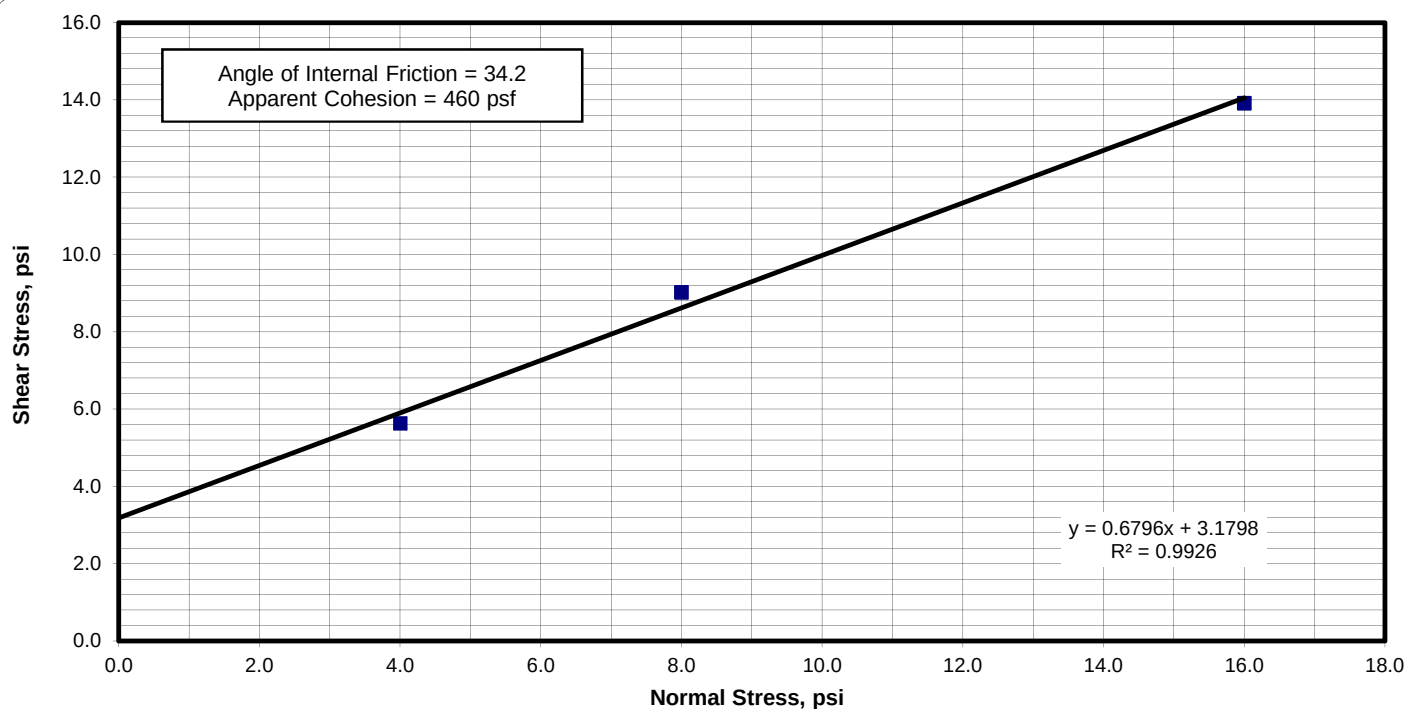
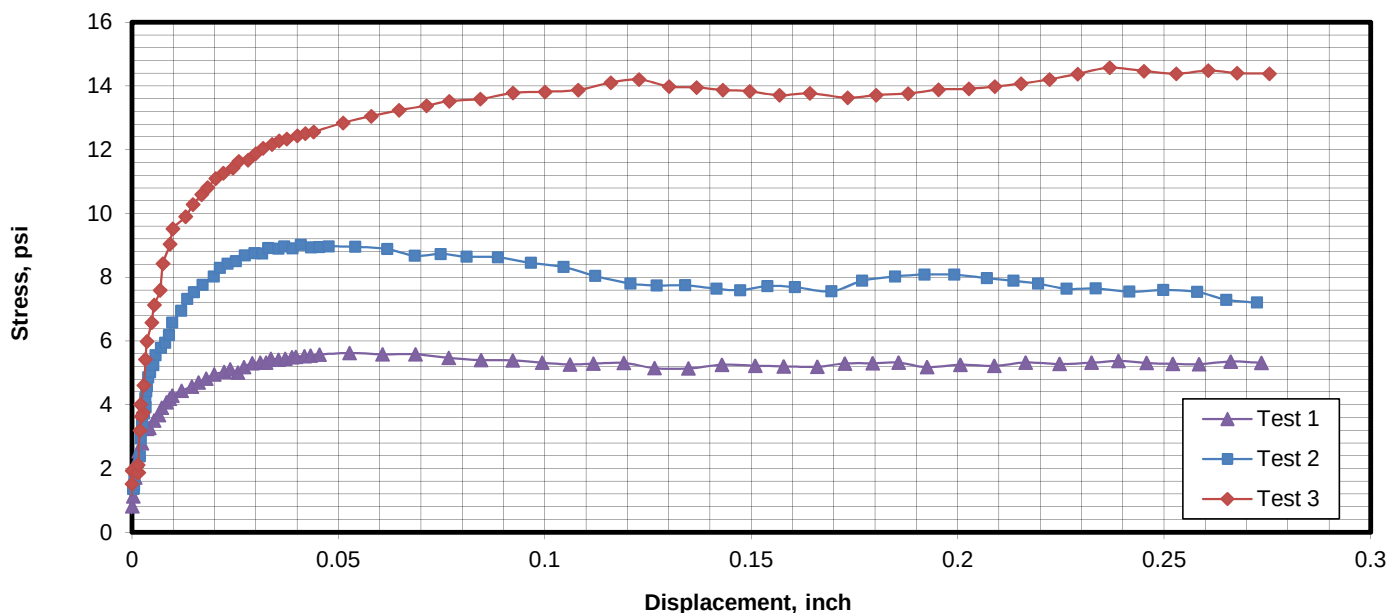
SYMBOL	●		
Boring Sample Spec	B-4		
Depth (in)	0.0-12.0		
% +3"	0.0		
% Gravel	2.4		
% Sand	64.1		
% Fines	33.5		
% -2 μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM		
w (%)	17.1		

Particle Size (Sieve #)	PERCENT FINER		
2"			
1 1/2"			
1"			
3/4"	100.0		
1/2"	99.1		
3/8"	99.0		
4	97.6		
10	96.8		
20	95.5		
40	75.5		
60	51.0		
100	41.1		
200	33.5		

SYMBOL	DESCRIPTION AND REMARKS
●	Brown SILTY SAND (SM)

PARTICLE SIZE DISTRIBUTION		
South River: Jones Hollow		
Project Number 60390328	April 2016	Figure 2
AECOM		

Project No.	60390328	Test No.	1	2	3	4
Project Name	South River: Jones Hollow	Initial Water Content, %	14.6	14.0	14.5	
Boring No.	B-1	Dry Density, pcf	111.4	111.5	111.5	
Sample No.	--	% Compaction	92.1	92.2	92.2	
Depth, ft.	0.0-12.0	Normal Stress, psi	4.0	8.0	16.0	
Liquid Limit	27	Initial Saturation, %	77.2	74.7	77.4	
Plastic Limit	18	Initial Void Ratio	0.507	0.506	0.506	
Plastic Index	9	Final Water Content, %	17.8	16.7	17.3	
Specific Gravity	2.69	Final Void Ratio	0.494	0.450	0.480	
Description	Brown CLAYEY SAND	Final Saturation, %	96.8	99.7	97.1	
Compaction Method (ASTM):	D1557	Maximum Peak Load, psi	5.63	9.02	13.92	
Maximum Dry Density ρ_d , pcf:	121.0	Displacement at Peak, inch	0.05	0.04	0.20	
Optimum Moisture Content, %:	11.1	Displacement rate, inch/min	0.0019	0.0019	0.0019	

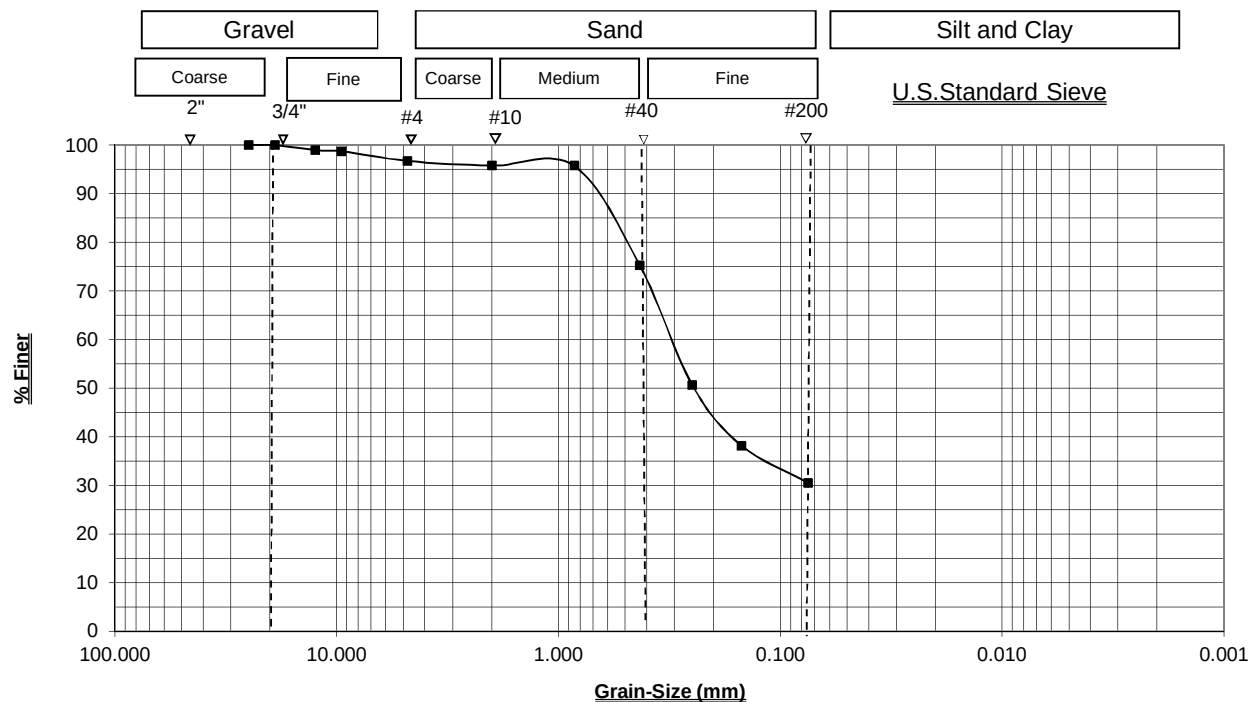
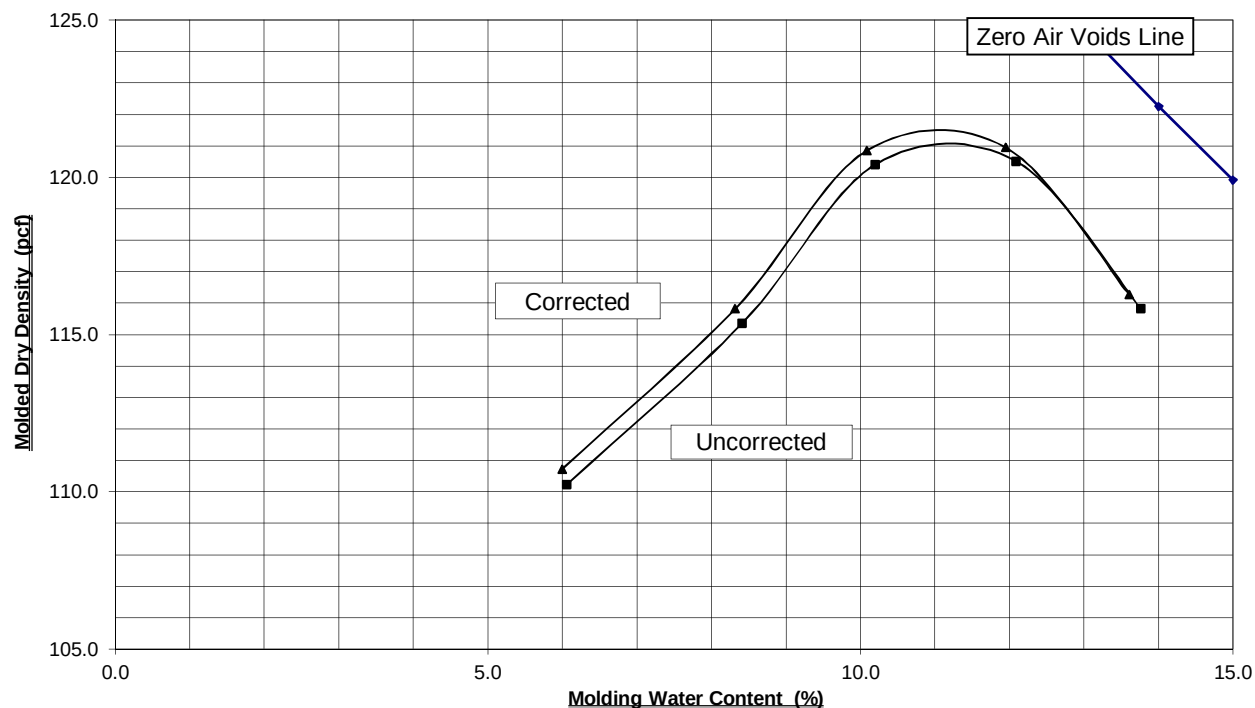




Laboratory Compaction Characteristic of Soil Using Modified Effort (ASTM D 1557-07) Method B

Job No.	60390328	Date	18-Apr-16
File No.	2016-03-11	Assumed Specific Gravity (-10 Sieve Mat.)	2.70
Job Name:	South River: Jones Hollow	Assumed Specific Gravity (+#4 Sieve Mat.)	2.70
Sample	B-1 0.0-12.0'	Average Specific Gravity	2.70
Description	Brown CLAYEY SAND	Maximum Dry Density, pcf	121.0
Liquid Limit	27	Optimum Water Content, %	11.1
Plastic Limit	18	Corrected Max. Dry Density, pcf	121.4
Plastic Index	9	Corrected Optimum Water Content, %	11.0
As-Received Water Content, %	15.4		

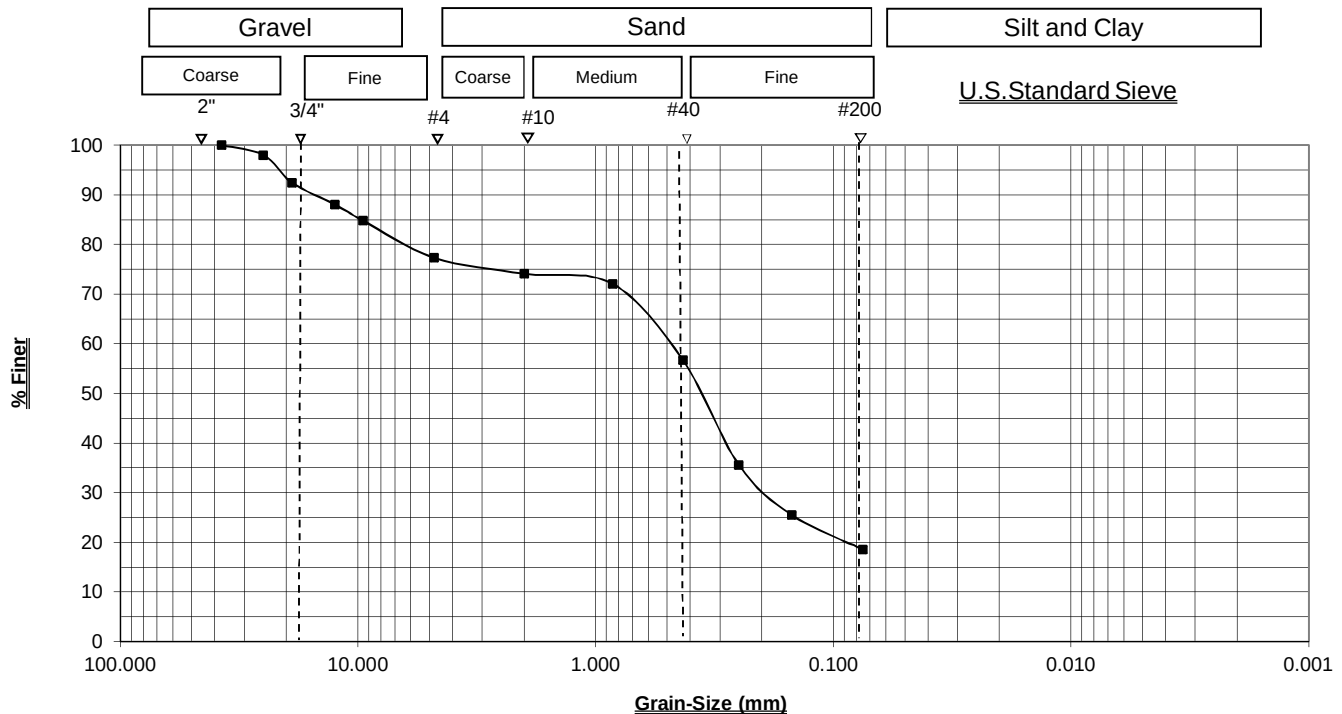
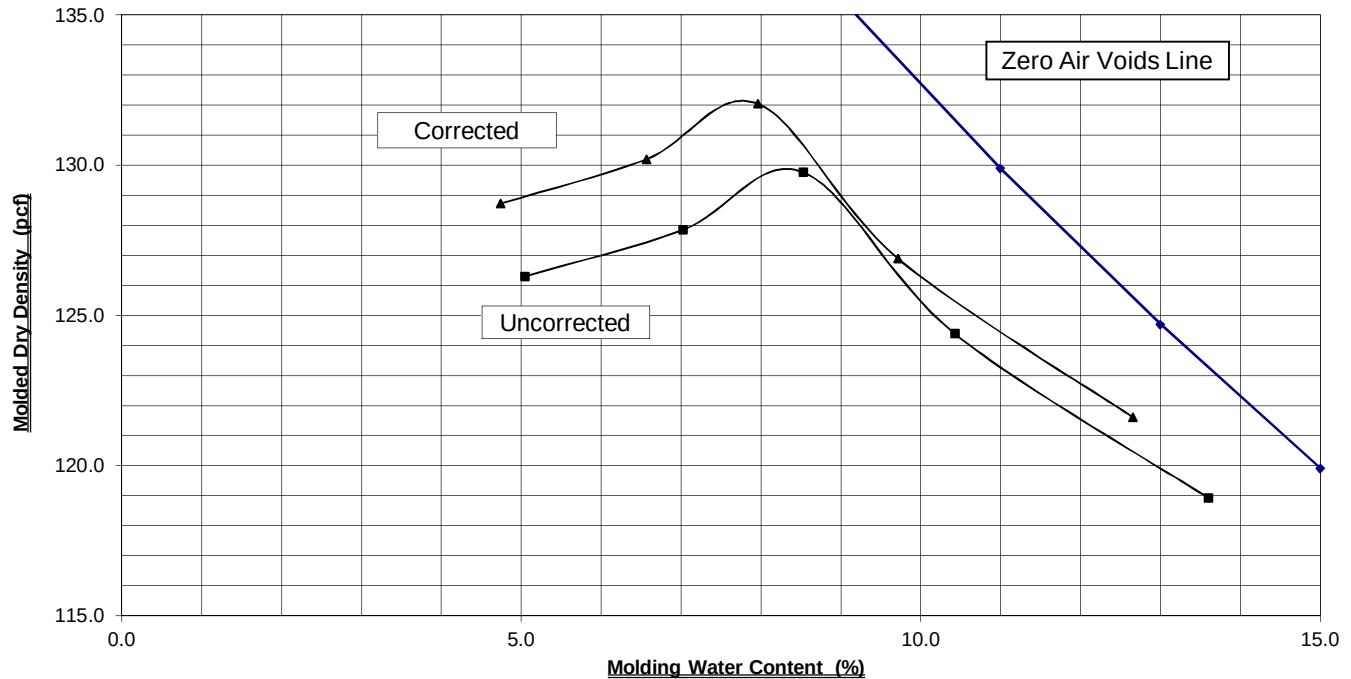
MURFETWASHINGTON\FWashington\Projects\Private-Sector\AGC\19994621\SoilsLab\3. Lab 2016 Projects\60390328 2016-03-11 South River Jones Hollow\Compaction\compact B-1 0-12.XLS\014C-1





Laboratory Compaction Characteristic of Soil Using Modified Effort (ASTM D 1557-07) Method C

Job No.	60390328	Date	18-Apr-16
File No.	2016-03-11	Assumed Specific Gravity (-10 Sieve Mat.)	2.70
Job Name:	South River: Jones Hollow	Assumed Specific Gravity (+#4 Sieve Mat.)	2.70
Boring No.:	B-3 0.0-12.0'	Average Specific Gravity	2.70
Description:	Brown SILTY SAND with GRAVEL	Maximum Dry Density, pcf	129.9
Liquid Limit:	NA	Optimum Water Content, %	8.3
Plastic Limit:	NA	Corrected Max. Dry Density, pcf	132.2
Plastic Index:	NA	Corrected Optimum Water Content, %	7.8
As-Received Water Content, %	12.9		
Ref. No.	\\URSFTWASHINGTON\FWashingon\Projects\Private-Sector\AGC\19994621\SoilsLab\3. Lab 2016_Projects\60390328_2016-03-11_South River Jones Hollow\Compaction\compact_B-3_0-12.XLS\014C-1		



Assignment No.:

Project Name: South River: Jones Hollow
Project Manager: Joshua Collins Reviewed By: MHD
Project Number: 60390328.18486308.01630

Date Completed By:

Notes: _____

2016-03-11

**SECTION 01 10 00
SUMMARY OF WORK**

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes
- 1.** A brief description of the major construction activities included under this Contract. Individual activities are more thoroughly described in subsequent sections of the Contract Specifications.

1.02 RELATED WORK

- A.** Section 02 11 40 – Stockpiling
- B.** Section 02 51 00 – Equipment Decontamination and Screening
- C.** Section 02 60 00 – Contaminated Site Material Removal
- D.** Section 31 05 19 – Geosynthetics
- E.** Section 31 11 00 – Clearing and Grubbing
- F.** Section 31 12 00 – Selective Clearing
- G.** Section 31 23 00 – Earthwork and Fill
- H.** Section 31 25 00 – Erosion and Sedimentation Controls
- I.** Section 31 35 00 – Slope Protection
- J.** Section 31 37 00 – Stone Toe Protection
- K.** Section 31 52 00 – Temporary Cofferdams
- L.** Section 32 90 00 – Planting and Habitat Restoration

1.03 DEFINITIONS

- A.** Abbreviations and Acronyms
- 1.** ARM – Allied Ready Mix
 - 2.** BMA – Bank Management Area
 - 3.** DSR – DuPont Site Representative
 - 4.** H:V – horizontal to vertical
 - 5.** NWP – Nationwide Permit

SECTION 01 10 00 SUMMARY OF WORK

6. VDOT – Virginia Department of Transportation

1.04 WORK COVERED BY CONTRACT DOCUMENTS

A. Location of Work

1. The work of this Contract is located on the Allied Ready Mix (ARM) property currently owned by the Eagle Corporation. ARM Bank Management Areas (BMAs) are located along the South River in Waynesboro, Virginia. A location map is provided on the cover of the Contract Drawings.

B. General Requirements

1. Provide equipment, labor, and materials to execute Work activities for final acceptance. Provide materials, equipment, and incidentals that are reasonably and properly inferable and necessary for the proper completion of the work, whether specifically indicated in the Contract documents or not.
2. Comply with federal, state, and local rules and regulations.
3. Notify proper federal, state, and local agencies of the nature and timing of work on-site.
4. Obtain permits required to construct the work except for the following that will be obtained by DuPont.
 - a. Section 404 Permit – NWP 13 (for bank stabilization activities) and/or a NWP 38 (for cleanup of hazardous and toxic waste)
 - b. Section 401 Water Quality Certification
 - c. Virginia Water Protection Program General Permit
 - d. Virginia Marine Resources Commission Permit for Sub-aqueous Encroachment
 - e. Land Disturbance Permit/Erosion and Sediment Control Plan Approval
 - f. Virginia Pollutant Discharge Elimination System General Permit for Discharges of Stormwater from Construction Activities (VAR10)
 - g. Stormwater Management Permit
 - h. City of Waynesboro Site Development Permit (including Entrance Permit)
5. Obtain inspections required by jurisdictional officials.
6. Coordinate with jurisdictional transportation officials; coordinate traffic flow resulting from the work; and repair roads in compliance with the requirements of jurisdictional transportation officials. The Contractor shall submit a traffic control plan(s) showing a method of handling traffic including pedestrian and bicycle

SECTION 01 10 00

SUMMARY OF WORK

traffic. All construction signs, flaggers, spotters or other traffic control devices shall be shown on the traffic control plan(s) except for emergency situations. Traffic control plan(s) shall conform VDOT Road and Bridge Specifications Section 105.14 and Section 512, and VDOT 2007 Road and Bridge Supplemental Specifications (SS) Sections 105.14 and SS Section 512.03.

7. Protect and maintain survey and grid stakes, existing monitoring wells, and Site structures against damage. Repair damage.
8. Protect utility lines and appurtenances that are to remain.
 - a. Contact the national construction alert system for utilities at 811 prior to digging.
 - b. Utility locations shown on the Contract Drawings are based on field geophysical survey and have not been field verified through potholing or using a vacuum truck.
 - c. Locate and verify existing utilities through potholing or using a vacuum truck.
 - d. Repair damage, except when utility is to be abandoned in place.
9. Store and use materials and equipment in a safe manner and meet requirements of applicable codes.
10. If the Contractor identifies a discrepancy between any of the Contract documents, they shall immediately notify the DSR. In general, the more stringent requirement shall take precedence.

C. Description of Work

1. Site Work
 - a. Construct and provide temporary erosion and sediment control structures prior to full-scale earth disturbance and earth-moving activities; maintain controls throughout construction; remove and dispose of controls at the specified time or at the end of the Contract Period, if a time is not specified; and establish vegetation throughout the disturbance area.
 - b. Construct, provide, operate, and maintain temporary stormwater-management structures, equipment, and materials during construction.
 - c. Construct temporary cofferdams in "Primary BMAs" and "Secondary BMAs" and implement water management strategies in accordance with the Contract Drawings and Section 31 52 00 – Temporary Cofferdams.
 - d. Clear and grub disturbance areas and perform selective clearing as noted on the Contract Drawings.

SECTION 01 10 00 SUMMARY OF WORK

- e. Excavate material from the designated “Primary BMAs” as indicated on the Contract Drawings. Consolidate and export the contaminated material to the identified disposal site(s) in accordance with Section 02 60 00 – Contaminated Site Material Removal.
 - f. Excavate material from the designated “Secondary BMAs” as indicated on the Contract Drawings. Consolidate, stockpile, and characterize the excavated material in accordance with Section 02 60 00 – Contaminated Site Material Removal.
 - g. Grade excavated areas to obtain slopes that are no steeper than indicated on the Contract Drawings.
 - h. Excavate, load, transport, and offload soil from the Jones Hollow Property. Manage borrow source operations and maintain slopes that are no steeper than 3H:1V.
 - i. Construct stone toe as indicated on the Contract Drawings. Maintain the finished slope of stone toe no steeper than 1H:1V.
 - j. Construct the excavated bank with geotextile layer, geocell system for blended biochar stabilization, backfill material, geocell system for planting substrate stabilization, and planting substrate material to the grades shown on the Contract drawings.
2. Restoration and Landscaping
- a. Restore vegetated areas disturbed by construction operations at ARM BMAs and Jones Hollow Property.
 - b. Plant herbaceous plants and shrubs and seed enhanced vegetative stabilization areas as indicated on the Contract Drawings and in accordance with Section 32 90 00 – Planting and Habitat Restoration.

D. Incidental Work

- 1. Temporary Site Facilities – Provide and maintain temporary Site facilities, including but not limited to offices, staging areas, access roads, Contractor security and communication operations, personnel and equipment cleaning facilities, and project signs throughout Contract Period.
- 2. Temporary Site Utilities – Provide, operate, and maintain temporary Site utilities, including telephone, electricity, water, and sanitation to the temporary Site facilities throughout Contract Period.
- 3. Plan Submittal – Develop, implement, and revise required Contractor plans.
- 4. Quality Control – Implement the Contractor’s quality control program.
- 5. Safety – Provide, operate, and maintain required personnel, Site safety officer, supplies, materials, and equipment to implement the project Health and Safety Plan.

SECTION 01 10 00
SUMMARY OF WORK

6. Waste Management – Provide, operate, and maintain required personnel, supplies, materials, and equipment to manage Contractor generated waste and sediment filter bags during the Contract Period. All waste material shall be handled in accordance with the project's Waste Management Plan. Equipment decontamination shall be in accordance with Section 02 51 00 – Equipment Decontamination and Screening.
7. Project Documentation – Provide required documentation of the work, including construction activities, health and safety activities, quality control activities, field engineering activities, and preparation of record survey and documents.
8. Project Closeout – Clean and remove Contractor equipment, remove temporary construction facilities, disconnect temporary utilities, and transfer records, drawings, and other project-related material to the DSR.

1.05 WORK BY DUPONT

- A. No work will be furnished or provided by DuPont.

1.06 PROJECT UTILITY SOURCES

- A. Utilities are not available within the work area.
- B. Obtain permission from the DSR and the local utility company, and provide utility connections for Contractor's use.

1.07 WORK RESTRICTIONS

- A. Access to Site
 1. Limit Site access to:
 - a. Contractor employees directly involved with the work
 - b. Deliveries required to complete the work
 - c. DuPont and City of Waynesboro, personnel
 - d. DuPont Corporate Remediation Group or other DuPont personnel approved by the DSR
 - e. Regulatory Agencies
 - f. Visitors approved by the DSR
 2. Personnel entering the Site must receive the appropriate level of orientation prior to entrance. Visitors must be escorted continuously.

SECTION 01 10 00 SUMMARY OF WORK

3. Time Restrictions for Performing Work
 - a. Construction activity will be limited to 10 hours per day between 6:00 a.m. and 4:30 p.m. Do not conduct work overnight, unless otherwise approved by the DSR.
 - b. Do not conduct work on Saturdays, Sundays, or holidays unless written approval is provided by the DSR. Contractor may propose Saturday work in their bid for consideration by the DSR.
 - c. Requests to perform Work outside of these hours must be provided with a minimum of 48 hours advanced written notice to the DSR.

B. Coordination with Occupants

1. Coordinate with property owner occupants at the Site.
2. Cooperate with DuPont to minimize conflict and to facilitate the property owner occupants. Coordinate activities with DuPont and their authorized representatives.
3. Secure the Site to protect the public from construction activities.

C. Use of Site

1. Contractor will not have complete and exclusive use of the Site for execution of the work. Share the Site with DuPont property owner occupants, and their authorized representatives, including the DSR, and regulatory authorities who have received prior approval for Site entrance by DuPont.
2. Limit construction operations to the indicated Limit of Disturbance noted on the Contract Drawings.
3. Obtain DSR approval of temporary Site facility, staging and laydown area, and office facility locations prior to using the Site.
4. No construction activity will be allowed until the Contractor's submittals for that activity have been accepted by the DSR as required by the individual sections of these Contract Specifications.
5. Assume full responsibility for the protection and safekeeping of equipment and materials located on-site.
6. Assume full responsibility for the health and safety of on-site personnel under Contractor's control.

PART 2 – PRODUCTS

Not used

**SECTION 01 10 00
SUMMARY OF WORK**

PART 3 – EXECUTION

Not used

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes:
 - 1.** The measurement and payment criteria applicable to portions of the work performed under a lump sum and unit price payment method.
 - 2.** Lump sum schedule payment items.
 - 3.** Unit price schedule payment items for changes in scope of work.
- B.** Include in the contract price on the Bid Form full compensation for the labor, materials, tools, equipment, and incidentals necessary to complete the work as shown on the Contract Drawings and specified in the Contract Documents.
- C.** Include in the contract price an amount adequate to cover the Contractor's indirect costs, including, but not limited to, applicable taxes, insurance fees, management and Site supervision, overhead, and profit for each separately identified item.
- D.** Coordination
 - 1.** Contractor is authorized to take measurements and compute quantities.
 - 2.** Coordinate with the DuPont Site Representative (DSR) prior to performing work to verify measurements taken and quantities computed by the Contractor as basis for computing values for progress payments under a lump sum payment method.
 - 3.** The authority of the DSR to assess defects in the work is final. Replace the work and portions of the work not conforming to specified requirements.

1.02 RELATED WORK

- A.** Section 00 31 32 –Geotechnical Data (Jones Hollow) – Attachment 1
- B.** Section 01 10 00 – Summary of Work
- C.** Section 01 33 00 – Submittal Procedures
- D.** Section 31 35 00 – Slope Protection
- E.** Section 31 37 00 – Stone Toe Protection
- F.** Section 32 90 00—Planting and Habitat Restoration
- G.** Related Documents

SECTION 01 29 00

PAYMENT PROCEDURES

1. The provisions and intent of the Contract, including the Bid Proposal Form, General Conditions, Supplementary Conditions, and General Requirements, apply to this work as if specified in this Section.

1.03 DEFINITIONS

A. Acronyms

1. DSR – DuPont Site Representative
2. HASP – Health and Safety Plan
3. PSA – Personnel Support Activity

1.04 REFERENCES

- ##### A. Waste Management Plan – Appendix C

1.05 MEASUREMENT AND PAYMENT

A. Lump Sum Payment Items

1. Payment items for the work of this contract for which contract lump sum payments will be made are listed on the Bid Form and described in Section 1.05 E. Include costs for items of work that are not specifically mentioned to be included in a particular lump sum or unit price payment item in the listed lump sum item most closely associated with the work involved. The lump sum price and payment made for each item listed in Section 1.05 E constitutes full compensation for furnishing plant, labor, materials, and equipment, and performing associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing work required for which separate payment is not otherwise provided.

B. Unit Prices

1. Unit Price Measurement

- a. Take measurements and calculate quantities and submit to the DSR to serve as the basis for computing values for payments under a unit price payment method or as requested by DuPont to verify completed items of the work.
- b. The methods of measurement for the work of this contract on which the contract unit price payment will be made are described in the Schedule of Unit Prices.

2. Unit Price Payment

- a. Payment items for the work of this contract on which the contract unit price payments will be made are listed in the Bid Form and described in the Schedule of Unit Prices.

SECTION 01 29 00

PAYMENT PROCEDURES

- b.** The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

C. Indirect Costs

Include contract requirements not directly associated with specific work items in the contract price.

- 1.** Installation Indirect Costs
 - a.** Permits, plans, and associated work products
 - b.** Quantity Variations
 - i.** Waste, overlaps, damaged materials, repairs, or materials used for the convenience of the Contractor
- 2.** Product Indirect Costs
 - a.** Air and weather monitoring equipment
 - b.** Dust control, odor control, vector control, and traffic control
 - c.** Collection and disposal of sanitary sewage and construction wastes
 - d.** Required trailers and supplies
 - e.** Utility bills
- 3.** Time Allowances
 - a.** Implementation and updating of special procedures required by the Contractor to complete the work.
 - b.** PSA – Include an allowance of 2 hours per person for the Project Manager, Superintendent, and designated safety personnel for completion of the PSA. Include an additional allowance of one hour per employee working on the Site for review of the PSA upon the first day that the employee reports to the Site.
 - c.** Preparation and obtaining DuPont authorization of daily work permits, confined space entry permits, excavation permits, and other special work permits identified in the HASP as required by DuPont.
 - d.** Daily “tailgate meetings,” Project meetings, and progress reporting.
 - e.** Construction scheduling and preparation and updating of schedules.

SECTION 01 29 00
PAYMENT PROCEDURES

- f.** Maintaining and preparing Project record documents and drawings.

D. Unit Prices

1. Unit Price Measurement

- a.** Take measurements and calculate quantities and submit to the DSR to serve as the basis for computing values for payments under a unit price payment method or as requested by DuPont to verify completed items of the work.
- b.** The methods of measurement for the work of this contract on which the contract unit price payment will be made are described in the Schedule of Unit Prices.

2. Unit Price Payment

- a.** Payment items for the work of this contract on which the contract unit price payments will be made are listed in the Bid Form and described in the Schedule of Unit Prices.
- b.** The unit price and payment made for each item listed shall constitute full compensation for furnishing all plant, labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, tests and reports, and for performing all work required for each of the unit price items.

E. Schedule of Prices

1. Pay Item 1 – General Conditions (Lump Sum)

- a.** Work Included:
 - i.** Project Management and Coordination: Providing Project management and Site supervision, providing representation at and coordinating Project meetings, and participating in safety audits.
 - ii.** Construction Progress Documentation: Providing Project schedules, construction progress surveys, submittal schedules, submittals, equipment delivery schedules, and construction progress reporting.
 - iii.** Health, Safety, and Emergency Response Procedures: Developing and executing the HASP and Overhead and Underground Obstructions Plan, submitting safety data forms, executing and reporting health and safety activities, providing health and safety staff, personal protective equipment, traffic control and protection, and work zone control.

SECTION 01 29 00

PAYMENT PROCEDURES

- iv. Environmental Protection Procedures: Developing the pre-construction condition survey and implementing environmental protection requirements, spill and discharge response procedures, and corrective action procedures.
 - v. Quality Requirements: Providing quality control staff and developing and implementing the Contractor's Quality Control Plan.
 - vi. Temporary Facilities and Controls: Providing temporary construction facilities and utilities, construction of access points, access roads, parking areas, staging and storage areas; providing protocol for restricting public access to the Site and security for Contractor's assets and construction materials.
 - vii. Examination and Preparation: Mobilization, inspecting existing conditions, construction layout, field survey and engineering, and subsurface utility location and identification.
 - viii. Site Maintenance and Final Cleaning: Routine and final cleaning of the Site and maintaining construction facilities.
 - ix. Closeout Procedures: Completing punch-out inspection, pre-final inspection, final inspection, and demobilization.
 - x. Closeout Submittals: Preparing and submitting record documents and executing warranties.
- b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.
2. Pay Item 2 – Mobilization/Demobilization (Lump Sum)
- a. Work Included: Work required to mobilize and demobilize equipment, personnel, and materials to the site, participation in the pre-construction meeting with the Engineer and DSR, and all necessary site-specific personnel training.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.
3. Pay Item 3 - Temporary Erosion, Stormwater, and Sediment Control (Lump Sum)
- a. Work Included: Procurement (initial and replacement materials), placing, constructing, inspecting, maintaining through Final Acceptance of work, and removing and disposing of temporary sediment traps, silt fence, construction access and stabilized entrances, tire wash, inlet protection, temporary seeding, and other temporary stormwater, erosion and sediment control structures shown on the Contract Drawings, pumping,

SECTION 01 29 00

PAYMENT PROCEDURES

filtering water through sediment filter bags, and discharging of pre-excavation water within the temporary cofferdam to the South River .

- b. Payment: Based on the submitted Schedule of Values for completion of the installation and removal of the erosion and sediment control measures as determined by the DSR with 80 percent of the payment to follow completion and acceptance of the installation and 20 percent to follow the completion and acceptance of the removal.
- 4. Pay Item 4 – Bank Management Areas – Site Preparation (Lump Sum)
 - a. Work Included: Installing tree protection measures to protect trees that need to be protected as indicated on the Contract Drawings, clearing the Site of vegetation and debris, removing and reinstalling fence in designated areas or as necessary to facilitate construction, processing and stockpiling cleared materials for beneficial reuse (i.e., salvaged trees) within approved on-site areas, and disposing of remaining cleared material in accordance with the Waste Management Plan (provided separately)).
 - b. Payment: Based on the submitted Schedule of Values following completion and acceptance by the DSR of the work.
- 5. Pay Item 5 – Excavation (Unit Price)
 - a. Work Included: Earthwork, control of surface water, and other incidentals necessary to complete the following work.
 - i. Excavating of bank soils to construct intermediate grades prior to restoration.
 - ii. Storage, loading, and testing (if required) of bank soils prior to disposal.
 - iii. Construction of permanent ditches and outlet structures.
 - b. Measurement: Cubic yards removed based on the existing topographic survey and final excavation elevations performed by a Virginia State licensed land surveyor.
 - c. Payment: Paid for at the contract unit price per cubic yard.
- 6. Pay Item 6 – Construction Water Management (Lump Sum)
 - a. Work Included: Management of water generated during construction.
 - i. Procure materials needed for conducting water management activities.
 - ii. Installation and removal of temporary cofferdams in the river.

SECTION 01 29 00**PAYMENT PROCEDURES**

- iii. Collection, filtering (pre-excavation water only), and discharging pre-excavation construction water (collected from with the temporary cofferdams) to the surrounding river.
 - iv. Collection, storage, and testing (if required) of construction water generated during or after excavation.
 - v. Collecting, storage, treatment (if required), testing (if required) of any stormwater that collects in the excavation due to inadequate controls at the excavation perimeter.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.
7. Pay Item 7 – Borrow for Backfill (Unit Price)
- a. Work Included: Excavate, load, transport, offload, and test (if required) additional unclassified borrow material from the Jones Hollow Property to the South River Remediation Site for out of scope work.
 - b. Measurement: Cubic yard in place at Jones Hollow, computed by the average end area method from cross sections taken from the excavation or embankment location before and after the backfill operations, when the material is acceptably utilized as herein specified. The measurement will not include the volume of subgrade material or other material that is scarified or plowed and reused in-place, and will not include the volume excavated without authorization or the volume of material used for purposes other than directed. The measurement will not include the volume of excavation performed prior to the taking of elevations and measurements of the undisturbed grade.
 - c. Payment: Paid for at the contract unit price per cubic yard for unclassified borrow.
8. Pay Item 8 – Backfill Placement and Compaction (Unit Price)
- a. Work Included: Placement, grading, and compaction of subgrade fill (from Jones Hollow or other approved source) to construct intermediate grades (prior to restoration) and restored embankment to final grades.
 - b. Measurement: Cubic yard in place, computed by the average end area method from cross sections taken from the excavation or embankment location before and after the backfill operations, when the material is acceptably utilized as herein specified.
 - c. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.
9. Pay Item 9 - Geosynthetic Filter Fabric Installation (Unit Price)

SECTION 01 29 00

PAYMENT PROCEDURES

- a. Work Included: Testing, supplying, staging, installing, and certifying geotextile in accordance with Section 31 05 19 – Geosynthetics, Section 31 37 00 – Stone Toe Protection, any other related Contract Specifications and the Contract Drawings.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

- 10. Pay Item 10 – Stone Toe Armor Installation (Unit Price)
 - a. Work Included: Purchasing, staging and constructing stone toe protection in accordance with Section 31 3 700 – Stone Toe Protection, any other related Contract Specifications and the Contract Drawings.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

- 11. Pay Item 11– Geocell Panels (Unit Price)
 - a. Work Included: Testing, supplying, staging, installing, and certifying geocell system in accordance with Section 31 05 19 – Geosynthetics, Section 31 35 00 – Slope Protection, Section 31 37 00 – Stone Toe Protection, Section 32 90 00 – Planting and Habitat Restoration, and any other related Contract Specifications and the Contract Drawings.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

- 12. Pay Item 12 – Biochar (Unit Price)
 - a. Work Included: Purchasing, conditioning, staging, preparing, and installing biochar/subgrade fill mix and biochar/planting substrate mix in accordance with Section 31 23 00 – Earthwork and Fill, Section 31 37 00 – Stone Toe Protection, any other related Contract Specifications and the Contract Drawings.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

- 13. Pay Item 13 – Planting Substrate Placement (Unit Price)
 - a. Work Included: Purchasing, conditioning, staging, preparing, and installing planting substrate in accordance with Section 31 23 00 – Earthwork and Fill, Section 32 90 00 – Planting and Habitat Restoration, any other related Contract Specifications, and the Contract Drawings.

SECTION 01 29 00
PAYMENT PROCEDURES

- b.** Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

14. Pay Item 14 – Coir Fabric (Woven) (Unit Price)

- a.** Work Included: Testing, supplying, staging, installing, and certifying geotextile in accordance with Section 31 05 19 – Geosynthetics, Section 31 35 00 – Slope Protection, any other related Contract Specifications, and the Contract Drawings.
- b.** Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

15. Pay Item 15 - Restoration – Planting and Hydroseeding (Lump Sum)

- a.** Work Included: Procure, prepare, , and plant herbaceous plants and shrubs, testing soil prior to planting, procure, prepare, and place seed, fertilizer, and mulch in restored and disturbed areas as indicated on the Contract Drawings and in accordance with Section 31 35 00 – Slope Protection, 32 90 00 – Planting and Habitat Restoration, and any other related Contract Specifications.
- b.** Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

16. Pay Item 16 – Jones Hollow Property Restoration (Lump Sum)

- a.** Work Included: Earthwork, control of surface water, and other incidentals necessary to complete the following work.
 - i.** Grading of borrow material from within the boundaries as shown in Section 00 31 32 –Geotechnical Data (Jones Hollow) – Attachment 1 to obtain final restoration grades. Final grade elevations shall be dependent on volume of material required, but shall not be deeper than twelve feet below existing grade as noted in Section 00 31 32 –Geotechnical Data (Jones Hollow) – Attachment 1.
- b.** Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

17. Pay Item 17 – BMA Site Cleanup and Closeout (Lump Sum)

- a.** Work Included: Removal of all personnel, equipment, and materials from the site at the completion of the work.

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PAYMENT PROCEDURES

- i. Removal of temporary controls including dust, odor, erosion and sediment controls, removal and disposal of construction debris, temporary roads, stockpile and decontamination areas, temporary cofferdams, decontamination of construction equipment, transportation and disposal of decontamination liquids and residues, restoration of site to a clean, neat, and orderly condition including repair of any damaged asphalt, as approved by the DSR.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.
- 18. Pay Item 18 – Trucking and Disposal at Landfill (Unit Price)
 - a. Work Included: Storage, loading, transporting, testing (if required), and disposal of bank soils to an approved waste disposal facility in accordance with Section 02 60 00 – Contaminated Site Removal, any other related Contract Specifications, and the Contract Drawings.
 - b. Payment: Progress basis in accordance with the submitted Schedule of Values and acceptance by the DSR of the percentage of the work completed.

F. Options

- 1. Options are not specified for this Contract.

1.06 PAYMENT PROCEDURES

A. Schedule of Values

- 1. Data Required
 - a. Within 15 calendar days of the effective date of the Agreement, prepare and deliver to DuPont a schedule of values on 8½-inch by 11-inch or 11-inch by 17-inch white paper. DuPont will consider Contractor's standard forms and automated printout for approval upon Contractor's request.
 - b. Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices.
 - c. Include the following identification information on the Schedule of Values
 - d. Title of Project and location
 - e. Project Number
 - f. Name and Address of Contractor
 - g. Contract Designation

SECTION 01 29 00
PAYMENT PROCEDURES

- h.** Date of Submission
- i.** Schedule Instructions
- j.** Payments will not be made until the Schedule of Values has been submitted to and accepted by DuPont.
- k.** List on the Schedule of Values the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values of items whose quantity is determined using lump sum measurement for progress payments during construction. At a minimum, use the line items listed on the Bid Form.
- l.** Identify each line item with the number and title of the respective major section of the Contract Specifications.
- m.** For each major line item, list sub-values of major products or operations under the item.
- n.** Ensure the sum of all values listed in the schedule equals the Total Contract Sum.
- o.** Use the accepted Schedule of Values as the basis for progress payments of items whose quantity is determined using lump sum measurement on the Contractor's Applications for Payment.

B. Progress Payment Procedures

- 1.** No payment will be made for the following:
 - a.** Products wasted or disposed of in a manner that is not acceptable
 - b.** Products determined as unacceptable before or after placement
 - c.** Products not completely unloaded from the transporting vehicle
 - d.** Products placed beyond the lines and levels of the required work
 - e.** Products remaining on hand after completion of the work
 - f.** Loading, hauling, and disposing of rejected Products
- 2.** Final payment for work will be made upon the acceptance of the work by the DSR on the basis of the contract price and approved change orders. Final invoices not accompanied by Release of Liens and Claims will be considered incomplete and will be returned to the Contractor.
 - a.** Liquidated damages will be assessed in accordance with the Special Conditions of the Contract.

SECTION 01 29 00
PAYMENT PROCEDURES

1.07 SUBMITTALS

DSR review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor Quality Control approval and are to be submitted to DSR for information only. Submit the following in accordance with Section 013300 – Submittal Procedures.

- A. Action Submittals
 - 1. Schedule of Values
- B. Informational Submittals: Not used
- C. Closeout Submittals: Not used
- D. Maintenance Material Submittals: Not used

1.08 REFERENCES

- A. Not used

PART 2 – PRODUCTS

- A. Not used

PART 3 – EXECUTION

- A. Not used

END OF SECTION

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes
 - 1.** General administrative requirements.
 - 2.** Requirements for coordination between Project participants.
 - 3.** Project meetings and weekly field safety audit requirements.

1.02 RELATED WORK

- A.** Section 01 32 00 – Construction Progress Documentation.
- B.** Section 01 33 00 – Submittal Procedures
- C.** Section 01 78 00 – Closeout Submittals

1.03 DEFINITIONS

- A.** Acronyms
 - 1.** AASHTO -- American Association of State Highway and Transportation Officials
 - 2.** ANSI – American National Standards Institute
 - 3.** ASCE – American Society of Civil Engineers
 - 4.** CRG – DuPont Corporate Remediation Group
 - 5.** DuPont – E. I. du Pont de Nemours Company
 - 6.** DSR – DuPont Site Representative
 - 7.** Engineer – Engineer of Record or a Representative appointed by Engineer of Record
 - 8.** EPA – Environmental Protection Agency
 - 9.** GRI – Geosynthetic Research Institute
 - 10.** GSI – Geosynthetic Institute
 - 11.** HASP – Health and Safety Plan
 - 12.** NARA – U.S. National Archives and Records Administration
 - 13.** NIOSH – National Institute for Occupational Safety and Health

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

- 14. OSHA – Occupational Safety and Health Administration
- 15. PSA – Project Safety Analysis
- 16. QC – Quality Control
- 17. SSHO –Contractor Site Safety and Health Officer
- 18. USDA – U.S. Department of Agriculture
- 19. VDCR – Virginia Department of Conservation and Recreation
- 20. VDOT – Virginia Department of Transportation
- 21. VOSH – Virginia State Occupational Safety and Health Program

B. Definitions

- 1. Contract Administrator – the designated representative of DuPont for contract administration and contract administration support.
- 2. Contractor – The general contractor or subcontractor at any tier. This section and the section in which it is used provide context for defining Contractor.
- 3. CRG – DuPont organization undertaking the Work through the Contractor, DSR, and Engineer.
- 4. DSR – The on-site representative of DuPont, or their designee, responsible for daily on-site construction monitoring, coordination with DuPont or other DuPont representatives, and quality assurance.
- 5. Engineer –The developer of the Contract Drawings and Specifications for DuPont and will be responsible for review of appropriate submittals for conformance with the Contract documents during construction.
- 6. Furnish – Supply required items.
- 7. Provide – Furnish and install complete, in place and ready for operation and use.
- 8. PSA – A process to identify project safety and health hazards that may be known or anticipated and the associated control measures that will be implemented while planning for the implementation of the project.
- 9. Site – The area of the Work including the existing grounds, proposed additions to the grounds, staging areas, storage areas, and access roads.

1.04 REFERENCE STANDARD

A. Reference Standards

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

1. DuPont Corporate Remediation Group (CRG)
 - a. CRG Standard Operating Procedure SHE-O-03 Field Audits
 - b. CRG Standard Operating Procedure SHE-O-14 Work Permit & Safety Briefing Procedure

B. Reference Citations

1. Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, title, and date.
2. The document number used in the citation is the number assigned by the standards producing organization. When the standards producing organization has not assigned a number to a document, the reference is identified by the standards producing organization abbreviation and title.
3. When a publication date is not referenced, use the most recent edition of the publication.

C. Ordering Information

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Order documents listed in the specifications without numbers assigned by the standards producing organization from the source by title and publication date, if provided.

1. American Association of State Highway and Transportation Officials (AASHTO)
 444 North Capital Street, NW
 Suite 249
 Washington, DC 20001 Phone: 202-624-5800 Fax: 202-624-5806 E-Mail: info@aaashto.org Internet: <http://www.aashto.org>
2. American National Standards Institute (ANSI)
 1819 L Street, NW
 11th Floor
 Washington, DC 20036
 Ph: 202-293-8020 Fax: 202-293-9287 E-mail: info@ansi.org
 Internet: <http://www.ansi.org/>
3. American Society of Civil Engineers (ASCE)
 1801 Alexander Bell
 Drive Reston, VA 20191-4400
 Ph: 703-295-6300 and 1-800-548-2723 Fax: 703-295-6333
 E-mail: member@asce.org
 Internet: <http://www.asce.org>

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4. ASTM International (ASTM)
100 Barr Harbor Drive
P.O. Box C700
West Conshohocken, PA 19428-2959 Ph: 610-832-9585
Fax: 610-832-9555
E-mail: service@astm.org
Internet: <http://www.astm.org>
5. Geosynthetic Institute (GSI)/Geosynthetic Research Institute (GRI)
475 Kedron Avenue Folsom, PA 19033 1208
Ph: 610-522-8440
Fax: 610-522-8441
E-mail: mvashley@verizon.net
Internet: <http://www.geosynthetic-institute.org>
6. National Institute for Occupational Safety and Health (NIOSH)
Mail Stop C-34 4676 Columbia Parkway
Cincinnati, OH 45226 Ph: 513-533-8611 Fax: 513-533-8285
E-mail: nioshdocket@cdc.gov
Internet: <http://www.cdc.gov/nchs/products.htm>
7. State of Virginia Department of Transportation (VDOT)
1401 E. Broad St.
Richmond, VA 23219
Ph: 800-367-7623
Internet: <http://www.virginiadot.org/>
8. U.S. Department of Agriculture (USDA) Order AMS Publications from:
Agricultural Marketing Service (AMS) Seed Regulatory and Testing Branch
801 Summit Crossing Place
Suite C
Gastonia, NC 28054-2193
Ph: 704-810-8871 Fax: 704-852-4189
E-mail: seed.ams@usda.gov
Internet: <http://www.ams.usda.gov/lsg/seed.htm>

Order Other Publications from:

U.S. Department of Agriculture Rural Utilities Service
14th and Independence Avenue, SW
Room 4028-S
Washington, DC 20250
Ph: 202-720-2791
Fax: 202-720-2166
Internet: <http://www.usda.gov/rus>

9. U.S. Environmental Protection Agency (EPA)
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20004 Ph: 202-272-0167 for Fax and E-mail see below;
Internet: <http://www.epa.gov>

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10. Some EPA documents are available only from:
National Technical Information Service (NTIS)
5301 Shawnee Road
Alexandria, VA 22312
Ph: 703-605-6050 or 1-688-584-8332 Fax: 703-605-6900 E-mail: info@ntis.gov;
Internet: <http://www.ntis.gov>
11. U.S. National Archives and Records Administration (NARA)
8601 Adelphi Road
College Park, MD 20740-6001
Ph: 866-272-6272 Fax: 301-837-0483 E-mail: contactcenter@gpo.gov;
Internet: <http://www.archives.gov>
12. Order documents from:
Superintendent of Documents U.S. Government Printing Office (GPO)
732 North Capitol Street, NW
Washington, DC 20401
Ph: 202-512-1800 Fax: 202-512-2104 E-mail: contactcenter@gpo.gov;
Internet: <http://www.gpoaccess.gov>
13. Virginia Department of Conservation and Recreation (VDCR)
600 E. Main St., 24th Floor
Richmond, VA 23219
Ph: 804-786-6124 Email: pco@dc.virginia.gov;
Internet: <http://www.dcr.virginia.gov/>

D. Reference Standards

1. The publications listed below form a part of this Contract Specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1.05 ADMINISTRATIVE REQUIREMENTS**A. Coordination**

1. Contractor shall coordinate with the Contract Administrator, DSR and Engineer to
 - a. Furnish documentation supporting pay quantities, applications for payment, and requests for change orders.
 - b. Furnish construction progress documentation in accordance with Section 01 32 00 – Construction Progress Documentation.
 - c. Furnish Contract closeout documents in accordance with Section 01 78 00 – Closeout Submittals.

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PROJECT MANAGEMENT AND COORDINATION

- 2.** Contractor shall coordinate with the DSR and Engineer to
 - a.** Submit list of Contractor and Subcontractor emergency contact personnel, addresses, and telephone numbers. Update list and resubmit as changes occur.
 - b.** Furnish documentation demonstrating adherence to the HASP.
 - c.** Furnish documentation verifying that necessary approvals from regulatory agencies have been obtained.
 - d.** Furnish documentation demonstrating compliance with Contract Documents, Contract Drawings, and Contract Specifications.
 - e.** Furnish documentation demonstrating that the quality control program is in compliance with the Contract Specifications.
 - f.** Furnish daily documentation of work completed under time and materials contract terms including labor hours, materials, and equipment used.
 - g.** Assist with scheduling and attend Project meetings.
 - h.** Furnish submittals for verification of compliance with the Contract Documents.
 - i.** Submit proposed changes or substitutions in specified construction materials or procedures for review.
 - j.** Submit proposed field design changes for review.
 - k.** Respond to design change requests from the DSR and Engineer.

1.06 SUBMITTALS

- A.** DSR and Engineer review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor QC approval and are to be for information only.
- B.** Submit the following in accordance with Section 01 33 00 – Submittal Procedures.
- C.** Action Submittals
 - 1.** Qualification Statements
 - a.** Project Manager resume
 - b.** Project Superintendent resume
- D.** Informational Submittals

SECTION 01 31 00
PROJECT MANAGEMENT AND COORDINATION

- 1.** Special Procedure Submittals
 - a.** List of emergency contacts

- E.** Closeout Submittals: Not used
- F.** Maintenance Material Submittals: Not used

1.07 CONTRACTOR'S RESPONSIBILITIES

- A.** Perform work in accordance with the Contract Documents.
- B.** Coordinate the work and the work of subcontractors, delivery and staging of materials, and access to work locations. Coordinate with other contractors performing work on-site not related to the subject project.
- C.** Supervise and direct the work. Contractor is solely responsible for the means, methods, techniques, procedures, and sequences, except erosion and sediment control sequence of construction. Construct erosion and sediment control in accordance with the erosion and sediment control plan and details, and the Standards for Soil Erosion and Sediment Control in Virginia.

1.08 SUPERVISION

- A.** Furnish qualified individuals for Project Manager, and on-site Project Superintendent with minimum 10 years' experience in management of projects similar in size and complexity to this Project. These individuals shall be approved by DuPont before the Contractor assigns them to the Project.
- B.** Submit resumes for the proposed Project Manager and Project Superintendent describing their experience with references and qualifications.
- C.** DuPont reserves the right to interview the proposed Project Manager and Project Superintendent in order to verify the submitted qualifications.
- D.** Project Manager and Project Superintendent are subject to removal by DuPont for non-compliance with requirements specified in the contract and for failure to manage the Project to ensure timely completion.

1.09 PROJECT MEETINGS

- A.** Attend pre-construction meeting, Site mobilization meeting, periodic progress meetings, and specially called meetings.
- B.** Ensure representatives of Contractor, subcontractors, and suppliers attending meetings are qualified and authorized to act on behalf of the entity each represents.
- C.** Schedule and administer a QC coordination meeting to ascertain work is implemented consistent with the Contract Documents and construction schedules.

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PROJECT MANAGEMENT AND COORDINATION

1.10 PRE-CONSTRUCTION CONFERENCE

- A.** Attend the pre-construction conference scheduled by the DSR. Do not commence work prior to the conference.
- B.** Attendees
 - 1.** Engineer
 - 2.** Required Contractor Participants
 - a.** Project Superintendent
 - b.** SSHO
 - c.** QC Supervisor
 - d.** Major subcontractors
 - 3.** Optional Contractor Participants
 - a.** Major suppliers
 - b.** Utility representatives
- C.** Address project orientation, personnel contact, safety issues, permits, Project coordination issues, schedule, deficiencies, and the location of the Contractor's Site office.
- D.** Attend the "Plan of Action Discussion" and PSA to address specific safety hazards associated with selected construction means and methods and assist DSR in developing plans to mitigate these hazards.

1.11 SITE MOBILIZATION MEETING

- A.** Attend a Site mobilization meeting scheduled by the DSR prior to mobilization activities.
- B.** Attendees
 - 1.** Engineer
 - 2.** Required Contractor Participants
 - a.** Contractor's Superintendent
 - b.** SSHO
 - c.** QC Supervisor
 - d.** Personnel that will be working on Site during each portion of the Project

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- 3.** Optional Contractor Participants
 - a.** Others as appropriate
- C.** Address HASP orientation, PSA review, safety expectations, emergency procedures, and Site conditions.

1.12 PROGRESS MEETINGS

- A.** Attend weekly project meetings scheduled by the DSR. In addition to the regularly scheduled meetings, the DSR may schedule additional meetings at their discretion, at the request of government agency representatives, or at the request of the Contractor. The Contractor may initiate a meeting by addressing a request to the DSR.
- B.** Hold progress meetings at the Project Site.
- C.** Attendees
 - 1.** Engineer
 - 2.** Required Contractor Participants
 - a.** Contractor's Superintendent
 - b.** SSHO
 - c.** QC Supervisor
 - 3.** Optional Contractor Participants
 - a.** Subcontractor representatives
 - b.** Suppliers appropriate to the agenda
- D.** Address
 - 1.** Health and safety issues
 - 2.** Work progress since previous meeting
 - 3.** Projected progress during succeeding work period
 - 4.** Field observations, problems, and conflicts
 - 5.** Problems that impede construction schedule and proposed corrective actions
 - 6.** Revisions to construction schedule
 - 7.** Off-site delivery schedules

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PROJECT MANAGEMENT AND COORDINATION

8. Submittal schedules
9. Quality Control
10. Proposed changes for effect on construction schedule and on completion date, and effect on other contracts of the Project
11. Other business as appropriate

1.13 DAILY SAFETY BRIEFING AND COORDINATION MEETINGS

- A. Daily safety and coordination meetings are for the purposes of reviewing the planned work for the day, identifying and reviewing safety issues and procedures relevant to the work, and obtaining required daily or special work (e.g., hot work, excavation) permits.
- B. Schedule and administer daily safety and coordination meetings at the Project Site throughout the progress of work. Schedule additional meetings to address changes in planned activities.
- C. The DSR may conduct additional meetings at their discretion or at the request of the Contractor.
- D. Attendees
 1. Engineer
 2. Required Contractor Participants
 - a. Contractor's Superintendent
 - b. SSHO
 - c. QC Supervisor
 - d. Personnel that will be working on site that day
- E. Address
 1. Health and safety issues
 2. Work planned for the day
 3. Review of scheduled deliveries and visitors
 4. QC issues
 5. Review and issuance of required work permits
 6. Other business as appropriate

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PROJECT MANAGEMENT AND COORDINATION

- F. Record minutes and include them in the required progress reports in accordance with Section 01 32 00 – Construction Progress Documentation.

1.14 WEEKLY FIELD SAFETY AUDIT

- A. DuPont will schedule and administer field safety audits on a weekly basis throughout the progress of work.
- B. In addition to the regularly scheduled audits, the DSR may conduct additional audits at their discretion.
- C. Ensure Project Superintendent, SSHO, or site personnel are available to participate in these audits.
- D. The CRG safety audit team will record audit results and provide the results to the DSR for review with Contractor

PART 2 – PRODUCTS

- A. Not used

PART 3 – EXECUTION

- A. Not used

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes:
- 1.** Construction progress schedule
 - 2.** Submittal schedule
 - 3.** Survey data
 - 4.** Construction progress reporting

1.02 RELATED WORK

- A.** Section 01 33 00 – Submittal Procedures

1.03 DEFINITIONS

- A.** Acronyms
- 1.** DSR – DuPont Site Representative
 - 2.** DTM – Digital Terrain Models
 - 3.** NAD – North American Datum
 - 4.** NAVD – North American Vertical Datum
 - 5.** NOAA – National Oceanic and Atmospheric Administration
 - 6.** NTP – Notice to Proceed

1.04 REFERENCES

- A.** Horizontal: NAD83; Virginia State Plane Coordinate System
- B.** Vertical: NAVD88

1.05 ADMINISTRATIVE REQUIREMENTS

- A.** Coordination
- 1.** Designate an authorized representative to be responsible for schedule preparation, required activity status updating, and report preparation.
 - 2.** Ensure authorized representative is experienced in scheduling projects similar in nature and complexity to this Project and is experienced in using scheduling software that meets the specified requirements.

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CONSTRUCTION PROGRESS DOCUMENTATION

1.06 SUBMITTALS

- A.** The DSR review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor Quality Control approval and are to be submitted to the DSR for information only. Submit the following in accordance with Section 01 33 00 – Submittal Procedures.
- B.** Action Submittals
 - 1.** Initial project schedule
 - 2.** Initial submittal schedule
- C.** Informational Submittals
 - 1.** Periodic schedule updates
 - 2.** Periodic submittal schedule updates
 - 3.** Equipment delivery schedule
- D.** Closeout Submittals
 - 1.** Record Documentation
 - a.** Record schedule
 - b.** Record submittal schedule
- E.** Maintenance Material Submittals
 - 1.** Not used

1.07 PROJECT SCHEDULE REQUIREMENTS

- A.** General Requirements
 - 1.** Develop and maintain an accurate Project Schedule using the Critical Path Method of network calculation. Ensure consensus with Contractor management personnel, subcontractors, and suppliers.
 - 2.** Show the sequence work will be performed in, and start and completion dates for each schedule activity.
 - 3.** Schedule the entire duration of the Project.
 - 4.** Use the Project Schedule to plan and monitor progress of the work.

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CONSTRUCTION PROGRESS DOCUMENTATION

B. Approved Project Schedule

1. The approved Project Schedule will be used to measure the progress of the work and to aid in evaluating time extensions.
2. The schedule in conjunction with the schedule of values will provide the basis for each progress payment.
3. Failure to submit schedules within the prescribed time will be basis for withholding approval of progress payments until the required schedule is submitted.

C. Schedule Corrective Action

1. Show necessary corrective action to improve progress, including increasing the number of shifts, overtime operations, days of work, and the quantity of construction resources to regain compliance with the approved Project Schedule.
2. Submit for approval supplementary schedule or schedules to demonstrate how the approved rate of progress will be regained.

D. Default Terms

1. Failure to take corrective action to maintain the approved Project Schedule will be grounds for determination that the Contractor is not prosecuting the work with sufficient diligence to ensure completion within the time specified in the Contract.
2. Upon making this determination, the Contractor's right to proceed with the work and each separable part of it may be terminated in accordance with the default terms of the Contract.

E. Level of Detail Required

1. Develop the Project Schedule to the following level of detail.
2. Activity Duration
 - a. Duration that allows the progress of ongoing activities to be accurately determined between update periods.
 - b. Ensure less than 10 percent of non-procurement activities have original duration greater than 20 workdays or 30 calendar days.
3. Procurement Activities
 - a. Activities associated with the submittal, approval, procurement, fabrication, and delivery of long-lead materials, equipment, fabricated assemblies, and supplies.

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- b. Long-lead procurement activities are those with an anticipated procurement sequence of more than 90 calendar days.
 - c. Include submit, approve, procure, fabricate, and deliver activities in the procurement sequence.
 - 4. Mandatory Tasks
 - a. Submission and approval of As-built Drawings
 - b. Performance verification testing
 - c. DSR's pre-final inspection
 - d. Correction of punch list from DSR's pre-final inspection
 - e. DuPont's pre-final inspection
 - f. Correction of punch list from the DuPont's pre-final inspection
 - g. Final inspection
 - 5. DuPont's Activities
 - a. Show DuPont's and other agency activities that could impact progress. Examples: approvals, environmental permit approvals by State regulators, inspections, utility tie-in, DuPont-furnished equipment, and Notice to Proceed (NTP) for phasing requirements.
 - b. Label responsibility for DuPont activities to DuPont or the agency responsible for performing the activity.
 - 6. Contract Changes
 - a. Show activity or sequence of activities added to the schedule as a result of a Contract Modification, at the time the modification is approved.
 - b. Add activities or sequence of activities resulting from alleged constructive changes made by DSR to the current schedule. Addition of these activities does not indicate DSR accepts responsibility or liability for such activities and associated impacts to the schedule, but rather DSR recognizes such activities are appropriately added to the schedule for the purpose of maintaining a realistic and meaningful schedule.
- F. Scheduled Project Completion and Activity Calendars
 - 1. Schedule Interval: From NTP date to the required Contract completion date.

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2. Contract Completion Activity (End Project): Based on the required Contract duration in the accepted Contract proposal, adjusted for approved Contract time extensions.
3. First Scheduled work Period: The day after the Contractor acknowledges NTP.
4. Schedule activities on a calendar to which the activity logically belongs.
5. Activities may be assigned to a 7-day calendar when the Contract assigns calendar day duration for the activity such as a DSR acceptance activity.
6. Schedule physical work less than 7 days per week on a calendar with non-work periods identified, including weekends and holidays.
7. Anticipated Weather Delays
 - a. Use the NOAA's historical monthly averages for the NOAA location closest to the Project Site as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, Saturdays, Sundays, and Federal Holidays as non-work days.
 - b. Assign the Weather Calendar to any activity that could be impacted by adverse weather.
 - c. Evaluation of requests for time extension due to adverse weather delay will be based on the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs, and the adverse weather delayed activities critical to Contract completion.
 - d. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.
8. Work periods not identified as non-work periods indicate that the Contractor intends to perform work during those periods.

1.08 PROJECT SCHEDULE SUBMISSIONS

- A. Initial Project Schedule Submission
 1. Submit the Initial Project Schedule for approval within 14 calendar days after NTP.
 2. Ensure the schedule demonstrates a reasonable and realistic sequence of activities that represents the work through the entire Contract performance period.

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3. Ensure the Initial Schedule presents the level of detail specified in Paragraph Level of Detail Required.
- B. Periodic Schedule Updates**
1. Submit complete updates of the Project Schedule containing approved progress, revisions, and adjustments every 2 weeks.
 2. Updated schedule will be subject to the approval of the DSR.
 3. Address the following items on an activity by activity basis during each progress meeting.
 - a. Start and Finish Dates – Accurately show the status of the Actual Start and/or Actual Finish dates for each activity currently in-progress or completed since the last update. Only assign Actual Start dates when actual progress occurs on an activity.
 - b. Remaining Duration – Update the estimated Remaining Duration for incomplete activities independent of Percent Complete.
 - c. Percent Complete – Update the percent complete for each activity started based on the realistic assessment of earned value.
 - d. Logic Changes – Identify and discuss logic changes pertaining to NTP on change orders, change orders to be incorporated into the schedule, Contractor-proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, and other changes that have been made pursuant to Contract provisions. DSR will only approve logic revisions for the purpose of keeping the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.
 - e. Other Changes – Other changes required due to delays in completion of an activity or group of activities include
 - i. Delays beyond the Contractor's control, such as strikes and unusual weather.
 - ii. Delays encountered due to submittal reviews, DuPont activities, deliveries, or work stoppages that make re-planning the work necessary.
 - iii. Changes correcting a schedule that does not represent the actual or planned prosecution and progress of the work.
 4. Failure or refusal to furnish Project Schedule data necessary to verify the Contractor's progress will be deemed as the Contractor not providing an estimate upon which progress payment can be made.

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CONSTRUCTION PROGRESS DOCUMENTATION

C. Record Schedule

1. Submit the Record Project Schedule for approval within 14 calendar days after approval of As-built Drawings.
2. The Record Project Schedule will be subject to the approval of the DSR and must contain each approved revision and adjustment, Actual Start Dates, Actual Finish Dates, and indicate 100 Percent Complete for each activity.

1.09 REQUESTS FOR TIME EXTENSIONS

- A. Furnish justification, Project Schedule data, and supporting evidence for events that the Contractor believes it is entitled to an extension of the Contract performance period, completion date, or any interim milestone date.
- B. Submission of proof of excusable delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is a condition precedent to any approvals by the DSR.
- C. Submit a schedule impact analysis demonstrating whether or not Engineering Change Requests issued by the DSR impact the critical path.
- D. Justification of Delay
 1. Clearly display that the Contractor has used, in full, the entire float time available for the work involved with the delay request.
 2. The DSR's determination as to the number of allowable days of Contract extension will be based on the Project Schedule updates in effect for the time period in question and other factual information.
 3. Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, will not be a cause for an extension to the performance period, completion date, or any interim milestone date.
- E. Submission Requirements
 1. Submit justification for each request for a change in the Contract completion date of less than 2 weeks based on the most recent schedule update at the time of the NTP or constructive direction issued for the change.
 2. Submit requests in accordance with the requirements of other appropriate Contract Clauses and include, as a minimum
 - a. A list of affected activities, with their associated Project Schedule activity number.
 - b. A brief explanation of the causes of the change.
 - c. An analysis of the overall impact of the changes proposed.

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- d. A sub-network of the affected area.
 - 3. Identify activities impacted in each justification for change by a unique activity code contained in the required data file.
- F. Additional Submission Requirements
 - 1. Provide, within 4 days of the request, an interim update with revised activities for any requested time extension of more than 2 weeks.

1.10 DIRECT CHANGES

- A. Submit proposed schedule revisions for changes in which the NTP is issued prior to settlement of price and time within 2 weeks of the NTP being issued.
- B. Submit proposed revisions to the schedule for approval prior to inclusion of those changes within the Project Schedule.
- C. Failure to submit proposed revisions will be basis for the DSR, at their discretion, to furnish the Contractor with suggested revisions to the Project Schedule. Include DSR-suggested revisions in the Project Schedule until revisions are submitted and final changes and impacts have been negotiated.
- D. Submit objections to the DSR-furnished revisions and proposed alternative within 2 weeks of receipt of the DSR revisions. Continue to update the schedule with the DSR revisions until a mutual agreement in the revisions is reached.
- E. Failure to submit alternative revisions within 2 weeks of receipt of the DSR's proposed revisions will indicate that the Contractor concurs with the DSR's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

1.11 OWNERSHIP OF FLOAT

- A. Float available in the schedule, at any time, will not be considered for the exclusive use of either the DSR or the Contractor.

1.12 SUBMITTAL SCHEDULE REQUIREMENTS

- A. Submit a Project Submittal Schedule showing full coordination with the Project Schedule.
- B. Indicate the proposed submittal number, referenced Contract Specification Section, submittal description, proposed date of submittal, and the due date of the review.
- C. Prioritize and link to the progress schedule, products, and tests under each submittal number.
- D. Periodic Submittal Schedule Updates

SECTION 01 32 00**CONSTRUCTION PROGRESS DOCUMENTATION**

1. Submit a complete update of the Project Submittal Schedule indicating status of review and revisions biweekly.
 2. Update information, including proposed submittal date, actual submittal dates, actual review completion dates, disposition of reviewed submittals, and status of items requiring revision and re-submittal. Clearly indicate submittals that are beyond the allotted review period.
- E. Record Submittal Schedule**
1. Submit the Record Project Submittal Schedule for approval within 14 calendar days after approval of As-built Drawings.
 2. The Record Project Submittal Schedule will be subject to the approval of the DSR and shall contain actual submittal dates, actual review completion dates, and final disposition.

1.13 EQUIPMENT DELIVERY SCHEDULE

- A.** Submit a schedule showing procurement plans for materials and equipment within 14 calendar days after acceptance of the proposed construction schedule.
- B.** Submit the following information
1. Description
 2. Date of the purchase order
 3. Promised shipping date
 4. Name of the manufacturer or supplier
 5. Date delivery is expected
 6. Date the material or equipment is required, according to the current construction schedule
- C.** When the expected delivery date exceeds the date required, submit a description of the effect that delayed delivery date will have on the Contract completion date and a summary of efforts made by the Contractor to expedite the delayed delivery date to bring it in line with the needed delivery date, including efforts made to place the order (or subcontract) with other suppliers.
- D.** Update the equipment delivery schedule at monthly intervals or when the schedule has been revised. Reflect any changes occurring since the last update.
- E.** Submit copies of the purchase orders and confirmation of the delivery dates as directed.

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CONSTRUCTION PROGRESS DOCUMENTATION

1.14 SURVEY DATA REQUIREMENTS

- A.** All survey work shall be conducted in accordance with Section 01 71 23 – Field Engineering.
- B.** Maintain a complete and accurate log of control and survey work as it progresses.
- C.** On completion of major Site improvements, prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and Site work.
- D.** Provide Digital Terrain Models (DTM) at the same scale provided in the Contract Drawings with a 1-foot contour interval corresponding to the United States National Map Accuracy Standards.
- E.** Datum
 - 1.** Horizontal: North American Datum of 1983 (NAD83); Virginia State Plane Coordinate System.
 - 2.** Vertical: North American Vertical Datum (NAVD) of 1988
- F.** The DTM AutoCAD file must be compatible for use with the Autodesk Civil 3D 2015 software package. Provide elevation information at appropriate 3-D elevations. Place each entry on layers named adequately to describe the entity being mapped.
- G.** Provide topographic maps in electronic format and reproduction-quality paper prints.

1.15 CONSTRUCTION PROGRESS REPORTING REQUIREMENTS

- A.** Submit biweekly Progress Reports addressing potential factors of delay, deficiencies, material delivery schedules, submittals, and safety issues.

PART 2 – PRODUCTS

- A.** Not used

PART 3 – EXECUTION

- A.** Not used

END OF SECTION

SECTION 01 33 00 SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes
 - 1. General procedures regarding submittals called for in other sections of the Contract Specifications.

1.02 RELATED WORK

- A. Not used

1.03 DEFINITIONS

- A. Abbreviations and Acronyms
 - 1. DSR – DuPont Site Representative
 - 2. O&M – operations and maintenance
 - 3. QC – quality control
 - 4. SDS –Safety Data Sheet
- B. Definitions
 - 1. Certificates – Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system, or material attesting that product, system, or material meets Contract Specification requirements. Must be dated after award of Project Contract and clearly name the Project. Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor, the purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures and acceptability of methods or personnel qualifications.
 - 2. Closeout Submittals – Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism. Special requirements are necessary to properly close out a construction Contract. For example, Record Drawings, manufacturer's help, and product lines necessary to maintain and install equipment. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase Contract.
 - 3. Design Data – Design calculations, mix designs, analyses, or other data pertaining to a part of work.
 - 4. Manufacturer's Field Reports – Documentation of the testing and verification actions taken by manufacturer's representative at the job Site, in the vicinity of the job Site, or on a sample taken from the job Site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a

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testing laboratory or agency and must state the test results; and indicate whether the material, product, or system has passed or failed the test.

5. Manufacturer's Instructions – Preprinted material describing installation of a product, system, or material, including special notices and SDSs concerning impedances, hazards, and safety precautions.
6. Operation and Maintenance Data – Data that is furnished by the manufacturer, or the system provider, to the equipment operating and maintenance personnel. These data are needed by operation and maintenance (O&M) personnel for the safe and efficient operation, maintenance, and repair of the item. These data are intended to be incorporated in an operations and maintenance manual or control system.
7. Originator – The designated person or organization responsible for producing a submittal and submitting it to the Quality Control (QC) Manager for review.
8. Preconstruction Submittals – Submittals that are required prior to a notice to proceed on a new Contract.
9. Product Data – Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work. Samples of warranty language when the Contract requires extended product warranties.
10. QC Manager – Designated person authorized to approve submittal.
11. Samples – Fabricated or unfabricated physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the Project. Field samples and mock-ups constructed on the Project Site establish standards by which the ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the Project and those which will be removed at conclusion of the work.
12. Shop Drawings – Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the Project. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.
13. Submittals – Data normally submitted for review to establish conformance with the design concept and Contract Documents.
14. Test Reports – Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product, or system to be provided has been tested in accord with specified requirements. (Testing must have been within 3 years of date of Contract award for the Project.) Report that

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includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the Project before shipment to job Site. Report that includes finding of a test made at the job Site, or on sample taken from the job Site, on portion of work during or after installation.

15. Work – As used in this Section, on- and off-site construction required by Contract Documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.04 REFERENCES

- A. Not used

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination

1. Make submittals as required by the Contract Specifications.
2. Furnish submittals in addition to those specified to adequately describe the work covered in the respective sections.
3. Use the same units of weights and measures on submittals as those used in the Contract Drawings.
4. Ensure each submittal is complete and of sufficient detail to allow ready determination of compliance with Contract requirements.
5. Furnish submittals that have been checked, approved, stamped, signed, and dated by the Quality Control (QC) Manager, indicating action taken for each item.
6. Clearly identify proposed deviations from the Contract requirements.
7. Include applicable Contractor's, manufacturer's, or fabricator's drawings; descriptive literature in the form of catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.
8. When the DuPont Site Representative's (DSR's) review is required, obtain DSR review prior to the acquisition of the material or equipment.
9. Pick up and dispose of samples remaining upon completion of the work in accordance with manufacturer's Safety Datasheet (SDS) and in compliance with existing laws and regulations.

- B. Scheduling

1. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.

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2. Except as specified otherwise, allow review period that includes sufficient working days for QC Manager's approval and an additional 10 working days for submittals requiring DSR's review.
3. QC Manager review period begins when the QC Manager receives the submittal from the Originator. DSR review period begins when DSR receives the approved submittal from the QC Manager.
4. Period of review for each re-submittal is the same as for initial submittal.
5. No delay damages or time extensions will be allowed for time lost in late submittals.

1.06 SUBMITTALS

- A. Not used

1.07 PROCEDURES FOR SUBMITTALS

- A. Reviewing, Certifying, Approving Authority

1. Unless otherwise specified for a specific submittal, the QC Manager is responsible for reviewing and approving or certifying that submittals are in compliance with Contract requirements.

- B. Constraints

1. Complete submittals for each definable feature of work. Submit components of definable features, interrelated as a system, at the same time.
2. Submittal will be returned without review when acceptability of the submittal is dependent on conditions, items, or materials included in separate subsequent submittals.
3. Approval of a separate material, product, or component does not imply approval of assembly in which item functions.

- C. Variations

1. Variations from Contract requirements require DSR review and will be considered where advantageous to DuPont.
2. Discuss how functional and quality requirements are met with the DSR prior to submission to minimize rejections and re-submittals.
3. Proposing Variations
 - a. When proposing variation, deliver written request to the DSR with documentation of the nature and features of the variation and why the variation is desirable and beneficial to DuPont.

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- b. If lower cost is a benefit, also include an estimate of the cost savings.
 - c. In addition to documentation required for variation, include the submittals required for the item.
 - d. Clearly mark the proposed variation in each document.
- 4. Warranting that Variations are Compatible
 - a. When delivering a variation for consideration, Contractor warrants that this Contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.
- 5. Review Schedule is Modified
 - a. In addition to normal submittal review period, allow an additional period of 10 working days for consideration by DuPont of submittals with variations.
- D. Originator's Responsibilities
 - 1. Determine and verify field measurements, materials, and field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and Contract Documents.
 - 2. Transmit submittals in accordance with schedule on approved Submittal Register, and to prevent delays in the work, delays to DuPont, or delays to separate Contractors.
 - 3. Indicate variations as required by Paragraph VARIATIONS.
 - 4. Correct and resubmit submittal as directed. When re-submittal is required, provide a copy of the original submittal, including reviewer comments. Direct specific attention in writing or on the submittal to revisions not requested by the reviewers on previous submissions.
 - 5. Furnish additional copies of submittal when requested.
 - 6. Complete work that must be accomplished as basis of a submittal in time to allow submittal to occur as scheduled.
 - 7. Do not initiate work until submittals for that work have been returned as "Furnish As Submitted" or "Furnish As Corrected," except to the extent that a portion of work must be accomplished as basis of submittal.
- E. QC Manager's Responsibilities
 - 1. Note date submittal was received from Originator on each submittal.
 - 2. Review each submittal and check and coordinate each submittal with requirements of Work and Contract Documents.

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3. Review submittals for conformance with Project design concepts and compliance with Contract Documents.
4. Advise DSR of variation, as required by Paragraph VARIATIONS.
5. Act on submittals, determining appropriate action based on review of submittal.
 - a. Take appropriate action on submittal from the possible actions defined in Paragraph Actions Possible.
 - b. When DSR review is required or a variation has been proposed, forward submittal to the DSR with certifying statement or return submittal to the Originator marked "Not Reviewed" or "Revise and Resubmit," as appropriate. The QC Manager's review of submittal determines appropriate action.
6. Ensure written material is clearly legible.
7. Stamp each sheet of each submittal with QC-certifying statement or approving statement, except that data submitted in a bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.
 - a. Certify submittals forwarded to DSR with the following certifying statement

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number [], is in compliance with the Contract Drawings and Contract Specification, can be installed in the allocated spaces, and is submitted for DSR review.

Certified by QC Manager _____, Date _____ (Signature)
 - b. QC Manager will use the following approval statement when returning submittals to Originator as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number [], is in compliance with the Contract Drawings and Contract Specification, can be installed in the allocated spaces, and is approved [as noted] for use.

Approved by QC Manager _____, Date _____ (Signature)
8. Sign certifying statement or approval statement in original ink. Stamped signatures are not acceptable.
9. Update submittal register as submittal actions occur and maintain the submittal register at Project Site until final acceptance of work.

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10. Retain a copy of approved submittals at Project Site, including copy of approved samples.

F. DSR's Responsibilities

1. Note date on which submittal was received from QC Manager on each submittal requiring DSR's review.
2. Review submittals within scheduling period specified and only for conformance with Project design concepts and compliance with Contract Documents.
3. Identify returned submittals with one of the actions defined in Paragraph Actions Possible and with markings appropriate for action indicated.

G. Actions Possible – Submittals will be returned with one of the following notations

1. Submittals marked "Not Reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by the QC Manager, or is not complete. A submittal marked "Not Reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by the QC Manager or for being incomplete, with appropriate action, coordination, or change.
2. Submittals marked "Furnish as Submitted" authorize Contractor to proceed with work covered.
3. Submittals marked "Furnish as Corrected" authorize Contractor to proceed with work as noted provided Contractor takes no exception to the notations.
4. Submittals marked "Revise and Resubmit" indicate submittal is incomplete or does not comply with design concept or requirements of the Contract Documents and must be resubmitted with appropriate changes. Do not proceed with work for this item until re-submittal is reviewed and returned with an action of "Furnish as Submitted" or "Furnish as Corrected."
5. Submittals marked "Rejected" indicate submittal does not comply with design concept or requirements of the Contract Documents. Do not proceed with work for this item until an entirely new submittal is made for review.

1.08 FORMAT OF SUBMITTALS

A. Transmittal Form

1. Transmit each submittal, except sample installations and sample panels, to the QC Manager.
2. Transmit submittals with transmittal form accepted by the DSR and standard for the Project.

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3. On the transmittal form, identify the Originator, indicate date of submittal, and include information prescribed by the transmittal form and required in Paragraph Identifying Submittals.
4. Process transmittal forms to record actions regarding sample panels and sample installations.
5. Except for submittals for which another format is required, submittals shall be provided in a single PDF file that combines all the elements required for the submittal.

B. Identifying Submittals

1. Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on transmittal form.
2. Mark each copy of each submittal identically, with the following
 - a. Project title and location.
 - b. Construction Contract number.
 - c. Section number of the Contract Specification Section by which submittal is required.
 - d. Submittal number of each component of submittal.
 - e. When a resubmission, add alphabetic suffix on submittal description, for example, 10A, to indicate resubmission.
 - f. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other second-tier Contractor associated with submittal.
 - g. Product identification and location in Project.

C. Format for Shop Drawings

1. Submit on not less than 8.5 by 11 inches nor more than 30 by 42 inches.
2. Present 8.5 by 11 inches sized shop drawings as part of the bound volume for submittals required by Section.
3. Present larger drawings in sets.
4. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in Paragraph Identifying Submittals.
5. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of

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measure for shop drawing dimensions as indicated on the Contract Drawings. Identify materials and products for work shown.

6. Indicate nameplate data, size and capacity, applicable federal, military, industry, and technical society publication references.

D. Format of Product Data and Manufacturer's Instruction

1. Present product data submittals for each Section as a complete, bound volume. Include table of contents, listing page and catalog item numbers for product data.
2. Indicate, by prominent notation, each product that is being submitted. Indicate Contract Specification Section number and paragraph number to which it pertains.
3. Supplement product data with material prepared for Project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for Project, with information and format as required for submission of Certificates.
4. Provide product data in English unit dimensions. Where product data are included in preprinted catalogs with metric only, submit English unit dimensions on separate sheet.
5. Include the manufacturer's name, trade name, place of manufacture, catalog model or number, and applicable federal, military, industry and technical society publication references. Submit manufacturer's data requiring supplemental information for clarification as specified for Certificates.
6. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute, American Society for Testing and Materials International, National Electrical Manufacturer's Association, Underwriters Laboratories, and Association of Edison Illuminating Companies, submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and accepted by the DSR. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.
7. Submit manufacturer's instruction prior to installation.

E. Format of Samples

1. Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately same size as specified
 - a. Sample of Equipment or Device: Full size.

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- b. Sample of Materials Less Than 2 by 3 inches: Built up to A4 (8.5 by 11 inches, 297 by 210 mm).
 - c. Sample of Materials Exceeding 8.5 by 11 inches: Cut down to 8.5 by 11 inches and adequate to indicate color, texture, and material variations.
 - d. Sample of Linear Devices or Materials: 10-inch (250 mm) length or length to be supplied, if less than 10 inches (250 mm). Examples of linear devices or materials are conduit and handrails.
 - e. Sample of Non-solid Materials: Pint (750 ml). Examples of non-solid materials are sand and paint.
 - f. Color Selection Samples: 2 by 4 inches (50 by 100 mm).
 - g. Sample Panel: 4 by 4 feet (1200 by 1200 mm).
 - h. Sample Installation: 100 square feet (10 square meters).
- 2. Samples Showing Range of Variation: Where variations are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range.
- 3. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporate samples in undamaged condition at time of use.
- 4. Recording of Sample Installation: Note and preserve the notations of area constituting sample installation but remove notation at final cleanup of Project.
- 5. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- F. Format of Design Data and Certificates
 - 1. Provide design data and certificates on 8.5 by 11 inches (297 by 210-mm) paper. Provide a bound volume for submittals containing numerous pages.
- G. Format of Test Reports and Manufacturer's Field Reports
 - 1. Provide reports on 8.5 by 11 inches (297 by 210-mm) paper in a complete, bound volume.
 - 2. Indicate by prominent notation, each report in the submittal. Indicate Contract Specification number and paragraph number to which it pertains.
- H. Format of O&M Data
 - 1. Comply with the requirements specified in 01 70 00 – Closeout Procedures.

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- I.** Format of Preconstruction Submittals and Closeout Submittals
 - 1.** When submittal includes a document that is to be used in the Project or become part of Project record, other than as a submittal, do not apply Contractor's approval stamp to the document, but to a separate sheet accompanying the document.
 - 2.** Provide dimensions in administrative submittals in English units. Where data are included in preprinted material with metric only, submit English unit dimensions on separate sheet.

1.09 QUANTITY OF SUBMITTALS

- A.** Number of Copies of Shop Drawings
 - 1.** In addition to the number of copies necessary for Contractor use, submit four copies of submittals of shop drawings requiring review and approval only by QC Manager and six copies of shop drawings requiring DSR review.
- B.** Number of Copies of Product Data and Manufacturer's Instructions
 - 1.** Submit in compliance with quantity requirements specified for shop drawings.
- C.** Number of Samples
 - 1.** Submit two samples, or two sets of samples showing range of variation, of each required item. The DSR will retain one approved sample or set of samples, and the QC Manager will retain one approved sample or set of samples.
 - 2.** Submit one sample panel. Include components listed in technical section or as directed.
 - 3.** Submit one sample installation, where directed.
 - 4.** Submit one sample of non-solid materials.
- D.** Number of Copies Design Data and Certificates
 - 1.** Submit in compliance with quantity requirements specified for shop drawings.
- E.** Number of Copies Test Reports and Manufacturer's Field Reports
 - 1.** Submit in compliance with quantity with quality requirements specified for shop drawings.
- F.** Number of Copies of O&M Data
 - 1.** Submit three copies of O&M Data for review.

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SUBMITTAL PROCEDURES

G. Number of Copies of Preconstruction Submittals and Closeout Submittals

1. Unless otherwise specified, submit administrative submittals in compliance with quantity requirements specified for shop drawings.

1.10 SUBMITTAL CLASSIFICATION

A. Action Submittal

1. DSR review is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated in the Contract Specifications.
2. DSR review and DuPont approval is required for any deviations from the Solicitation or Accepted Proposal and other items as designated in the Contract Specifications.

B. Informational Submittal

1. Submittals not requiring DSR review will be for information only.
2. Submittals for information only will generally not be returned.
3. DuPont reserves the right to require the Contractor to resubmit any item found not to comply with the Contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and Contract Specifications; will not prevent DuPont from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the DuPont laboratory or for check testing by DuPont in those instances where the Contract Specifications so prescribe.

C. Closeout Submittals

1. DSR will review Closeout Submittals and O&M Data to verify the submittals comply with the Contract requirements. Submit data specified for a given item within 30 calendar days after the item is delivered to the Site.
2. In the event the Contractor fails to deliver Closeout Submittals and O&M Data within the time limits specified, the DSR may withhold from progress payments 50 percent of the price of the item with which such submittals are applicable.

1.11 ACCEPTED SUBMITTALS

- A. Do not construe submittals accepted as "Furnish as Submitted" or "Furnish as Corrected" as a complete check, but indicate only that the general method of construction, materials, detailing, and other information are satisfactory design, general method of construction, materials, detailing, and other information appear to meet the Solicitation and Accepted Proposal.

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SUBMITTAL PROCEDURES

- B.** Acceptance will not relieve the Contractor of the responsibility for any error which may exist, because the Contractor under the Contractor QC requirements of this Contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of the work.
- C.** After submittals have been accepted, no re-submittal for the purpose of substituting materials or equipment will be considered, unless accompanied by an explanation of why a substitution is necessary.

1.12 DISAPPROVED SUBMITTALS

- A.** Make corrections required by DSR and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal.
- B.** Re-submit "information only" submittals found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal as one requiring "approval" action, requiring DuPont approval.
- C.** If the Contractor considers any correction indicated on the submittals to constitute a change to the Contract, give prompt notice in accordance with the Contract to the DSR.

1.13 WITHHOLDING OF PAYMENT

- A.** Payment for materials incorporated in the work will not be made if required approvals have not been obtained.
- B.** No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

PART 2 – PRODUCTS

- A.** Not used

PART 3 – EXECUTION

- A.** Not used

END OF SECTION

SECTION 01 35 29
HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes
 - 1.** Health and safety requirements, including safety staff organization, qualifications, and responsibilities, Site safety hazard considerations, implementation of the Contractor's Site Safety Program, Site control requirements, and training and medical surveillance requirements.

1.02 RELATED WORK

- A.** Section 01 31 00 – Project Management and Coordination
- B.** Section 01 33 00 – Submittal Procedures
- C.** Section 01 40 00 – Quality Requirements

1.03 DEFINITIONS

- A.** Acronyms
 - 1.** ANSI – American National Standards Institute
 - 2.** CFR – Code of Federal Regulations
 - 3.** HASP – Health and Safety Plan
 - 4.** NARA – U.S. National Archives and Records Administration
 - 5.** NIOSH – National Institute for Occupational Safety and Health
 - 6.** PPE – personal protective equipment
 - 7.** SSHO – Site Safety and Health Officer

1.04 REFERENCES

- A.** Reference Standards

The publications listed below form a part of this Contract Specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- 1.** American National Standards Institute (ANSI)
 - a.** ANSI Z358.1 (2004) Standard for Emergency Eyewash and Shower Equipment

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- 2.** National Institute for Occupational Safety and Health (NIOSH)
 - a.** NIOSH 85-115 (1985) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities
- 3.** U.S. National Archives and Records Administration (NARA)
 - a.** 29 Code of Federal Regulations (CFR) 1904 Recording and Reporting Occupational Injuries and Illnesses
 - b.** 29 CFR 1910 Occupational Safety and Health Standards
 - c.** 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
 - d.** 29 CFR 1926 Safety and Health Regulations for Construction
 - e.** 29 CFR 1926.65 Hazardous Waste Operations and Emergency Response

1.05 ADMINISTRATIVE REQUIREMENTS

- A.** Provide the required personnel and execute the Project in accordance with the Contractor's Site Safety Program and DuPont procedures.
- B.** Develop the Contractor's Site Safety Program in compliance with the requirements detailed in the Health and Safety Plan (HASP), including, but not limited to
 - 1.** Personnel requirements.
 - 2.** Required meetings prior to and during construction activities.
 - 3.** Personal protective equipment levels specific for each work activity.
 - 4.** Development of rigging, fall protection, excavation support, and other safe work practice plans, as necessary, based on the Contractor's proposed means and methods to complete the Work.
- C.** If discrepancies are found between the DuPont and Contractor programs and procedures, the DSR will work with appropriate representatives of DuPont and Contractor to determine the procedure to be used.
- D.** Overhead and Underground Obstructions Plans
 - 1.** Assist the DSR in developing Overhead and Underground Obstructions Plans prior to mobilization.

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2. The Overhead and Underground Obstructions Plans typically include
 - a. List of obstructions (e.g., electrical wires and other overhead utilities, pipe racks and associated piping, low-clearance structures such as roof overhangs and bridges, buried utilities and pipelines, structural foundations, and vibration-sensitive structures and equipment) located in the immediate work area and each potential route of vehicular access to the Site.
 - b. Contractor-provided list of equipment with potential for contacting overhead or underground obstructions (e.g., dump trucks and other equipment with beds capable of being raised, drill rigs, cranes and other rigging equipment, excavators and other bucket type heavy equipment, and high clearance loads, including tanks, columns, storage silos, and treatment systems) in prioritized order by frequency of usage and potential hazard.
 - c. List of the proposed measures (e.g., utility removal or relocation, utility shut-off, locking out of pipelines, temporary shut-down of adjacent processes, and shoring/bracing of adjacent structures) for mitigating each identified hazard.
 - d. List of procedures (e.g., use of “soft dig” technologies, use of spotters and driver duties) to be followed.
 - e. List of the control systems to be used (e.g., isolation of hazards using curbing or barricades, marking traffic routes, use of stop signs, warning signs, warning sensors, electric eyes, warning chains or false work, and additional visual and audible alarms).

1.06 SUBMITTALS

DSR review is required for submittals designated as “Action Submittals.” Submittals not designated as “Action Submittals” are for Contractor Quality Control approval and are to be submitted to the DSR for information only.

- A. Submit the following in accordance with Section 01 33 00 – Submittal Procedures.
 1. Action Submittals
 - a. Submit Subcontractor Safety Data Forms for each subcontractor to the DSR for approval a minimum of 10 working days prior to use of the subcontractor.
 - b. Submit, as part of the daily construction report, a summary of health and safety activities, including the topic discussed at the daily health and safety meeting.

SECTION 01 35 29**HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES**

- 2.** Informational Submittals
 - a.** Special Procedure Submittals
 - i.** Contractor's Corporate Health and Safety Program or at a minimum, each Section that relates to this Project.
 - b.** Qualification Statements
 - i.** Health and Safety Professional
 - ii.** Site Safety and Health Officer (SSHO)
- 3.** Closeout Submittals
 - a.** Not used
- 4.** Maintenance Material Submittals
 - a.** Not used

1.07 QUALIFICATIONS

- A.** Develop an organizational structure that sets forth lines of authority, responsibility, and communication. At a minimum, include the following individuals having the qualifications and responsibilities defined below.
- B.** Health and Safety Professional
 - 1.** Qualifications
 - a.** Possesses a minimum of 5 years of experience in developing and implementing health and safety programs for construction.
 - b.** Has demonstrable experience in supervising professional and technician level personnel.
 - c.** Has working knowledge of applicable state and federal occupational safety and health regulations.
 - 2.** Responsibilities
 - a.** Be responsible for the implementation, oversight, and enforcement of the requirements outlined in this document and the Contractor's Site Safety Program.
 - b.** Conduct initial Site-specific training.
 - c.** Visit the Site at least once per month for the duration of activities.

SECTION 01 35 29**HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES**

- d.** Be available for emergencies.
- e.** Provide on-site consultation as needed to ensure that the Contractor's Site Safety Program is fully implemented.
- f.** Coordinate any necessary modifications to the Contractor's Site Safety Program.
- g.** Serve as a member of the quality control staff as specified in Section 01 40 00 – Quality Requirements.

C. SSHO**1. Qualifications**

- a.** Possesses a minimum of 3 years of experience in developing and implementing health and safety programs for construction.
- b.** Possesses demonstrable experience in construction safety techniques and procedures.
- c.** Has working knowledge of applicable state and federal occupational safety and health regulations.
- d.** Is certified in first aid and CPR by the Red Cross, or equivalent agency.

2. Responsibilities

- a.** Assist and represent the Health and Safety Professional in the on-Site implementation and enforcement of the Contractor's Site Safety Program, Site Conditions, and regulatory health and safety requirements.
- b.** Be assigned to the Site on a full-time basis for the entire duration of field activities. The SSHO may have duties other than those directly related to health and safety, provided that adequate time is made available to complete health and safety duties.
- c.** Ensure each aspect of the Contractor's Site Safety Program is enforced.
- d.** Participate in weekly field safety audits as specified in Section 01 31 00 – Project Management and Coordination.
- e.** Has authority to stop work if unacceptable health or safety conditions exist.
- f.** Consults with and coordinates necessary modifications to the Contractor's Site Safety Program with the Health and Safety Professional and the DSR.

SECTION 01 35 29**HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES****1.08 FIELD CONDITIONS**

- A.** Consider the following Site conditions in performing the work.
- 1.** There are overhead obstructions along access roads leading to the Site and within the Site boundaries. Ensure heavy equipment remains a safe distance and no less than 20 feet from overhead power lines. The HASP contains requirements for working in proximity to overhead obstructions.
 - 2.** Consult and follow the procedures presented in the HASP whenever excavations of six inches or greater are required. The procedure does not apply for excavations that employees physically could not enter (i.e., well borehole).
 - 3.** Consult and follow the procedures presented in the HASP when working adjacent to and over water.
 - 4.** The Project Site is located near natural waterways and wildlife habitats; therefore, biological hazards might be encountered. The primary biological hazards are mosquitoes, and stinging insects, and poisonous plants (e.g., poison ivy). Although unlikely, snakes, fox, rodents, and other feral animals may migrate onto the Site from surrounding areas.
 - 5.** DuPont Corporate lifting guideline restricts lifting by personnel to a maximum 50-pound limit.
- B.** These conditions are given for the benefit of the Contractor and are not intended to be complete or to be the basis for the structuring of the Contractor's Health and Safety Program. Refer to the General Conditions, Supplementary Conditions, and the Site Conditions for additional Site and contract conditions.

1.09 HEALTH AND SAFETY PLAN

- A.** The HASP has been developed in accordance with the DuPont Corporate Remediation Group safety and health standard operating procedures and applicable Occupational Safety and Health Act (OSHA) and other federal and state regulations.
- B.** The DSR has responsibility for implementing and enforcing the HASP. In the event of conflict, the DSR will govern.
- C.** Each participant involved in the Project will be briefed on and afforded the opportunity to question the HASP.
- D.** Develop the Contractor's Site Safety Program in accordance to the requirements in the HASP and other regulatory requirements set forth by the OSHA and other federal and state regulations.

1.10 PERSONAL PROTECTIVE EQUIPMENT

- A.** As part of the Project scope, levels of personal protective equipment (PPE) might vary depending on the specific work tasks and areas.

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- B.** At a minimum, work will be performed in hardhat, safety glasses, shirt with sleeves extending over the shoulder, pants that fully cover the leg, and steel-toe footwear with disposal protective non-permeable boot covers that shall be disposed of daily or whenever workers leave a Site.
- C.** Clearing and grubbing activities where poisonous plants are present will require additional PPE (i.e., Tyvek suites).
- D.** Activities that produce excessive noise, dust, or debris may require additional PPE.
- E.** Task-specific protection requirements are detailed in the HASP.
- F.** Provide employees and subcontractors the required PPE for the task being performed. In addition, the SSHO, with the DSR or his designee, may make modifications to levels of PPE in the field.

1.11 SITE CONTROL

- A.** Inform on-site personnel and visitors of hazardous substances, health hazards, confined spaces, and other risks that they might be exposed to, prior to commencement of the work.
- B.** Escort visitors throughout the duration that they are on-site.
- C.** Limit equipment, operations, and on-site personnel and visitors in accordance with the following work areas.
 - 1.** Work zone: Only authorized personnel are allowed to enter the work zone. On-site personnel and visitors entering the work zone must wear the prescribed level of personal protective equipment.
 - 2.** Support Zone: The function of the Support Zone includes
 - a.** Entry and exit area for on-site personnel, visitors, and equipment to and from the work zone of Site operations.
 - b.** Storage areas for clean safety and work equipment.
 - c.** Field offices, eating and sanitary facilities, and parking.
- D.** The work zone will be clearly delineated using tape, barriers, signs, or whatever means are appropriate for the site.

1.12 SAFETY STATIONS

- A.** The Contractor shall provide easily visible safety stations near each active work area. There must be a minimum of one safety station per acre of active work area.
- B.** Safety stations shall consist of a high visible and weather protected stand which must contain the following items at a minimum:

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HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES

1. Fire Extinguisher
2. Air Horn for Emergency Signaling
3. Standard First Aid Kit
4. Emergency Eye Wash station, with a minimum of two 16 oz bottles of saline solution.
5. When working within 100' of water, a ring buoy.

PART 2 – PRODUCTS

- A. Not used

PART 3 – EXECUTION

- A. Not used

END OF SECTION

SECTION 01 40 00 QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes

1. Contractor quality control (QC) requirements, including QC organization, documentation requirements, enforcement procedure, and notification of noncompliance procedure.

1.02 RELATED WORK

1. Section 01 33 00 – Submittal Procedures
2. Section 01 78 00 – Closeout Submittals

1.03 DEFINITIONS

A. Abbreviations and Acronyms

1. A2LA – American Association for Laboratory Accreditation
2. AASHTO – American Association of State Highway and Transportation Officials
3. CQC – Contractor's Quality Control
4. DFOW – Definable feature of work
5. DSR – DuPont Site Representative
6. GAI – Geosynthetic Accreditation Institute
7. HASP - Health and Safety Plan
8. IAS – International Accreditation Services, Inc.
9. MTC – Materials Testing Center
10. NVLAP – National Voluntary Laboratory Accreditation Program
11. PSA – Project Safety Analysis
12. QC – quality control
13. SDS – Safety Datasheet

1.04 REFERENCES

1. National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology

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2. American Association of State Highway and Transportation Officials (AASHTO)
3. International Accreditation Services, Inc. (IAS)
4. U. S. Army Corps of Engineers Materials Testing Center (MTC)
5. American Association for Laboratory Accreditation (A2LA)
6. Geosynthetic Accreditation Institute (GAI)

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Establish and maintain an effective QC Program consisting of a QC Manager, plans, procedures, and organization necessary to produce an end product that complies with the Contract requirements.
- B. Cover within the QC Program, construction operations, both on-site and off-site, and coordinate with the proposed construction sequence.
- C. Furnish qualified personnel, appropriate facilities, instruments, and testing devices necessary for the performance of the QC function.
- D. No construction work or testing may be performed unless the QC Manager or designated QC Staff is on the work site.
- E. The DuPont Site Representative (DSR) reserves the right to require changes in the QC Program and operations as necessary, including removal of personnel, to ensure the specified quality of Work. The DSR reserves the right to interview members of the QC organization throughout the Contract Time in order to verify the submitted qualifications.
- F. Notify the DSR, in writing, of proposed changes in the QC organization personnel a minimum of 7 calendar days prior to a proposed change. Proposed changes are subject to the acceptance by the DSR.
- G. Complete sufficient inspections and tests of items of Work, including that of subcontractors, to ensure conformance to applicable Contract Drawings and Contract Specifications.

1.06 SUBMITTALS

- A. DSR review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor QC approval and are to be submitted to DSR for information only. Submit the following in accordance with Section 01 33 00 – Submittal Procedures.
- B. Action Submittals
 1. Proposed changes to the QC Program

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QUALITY REQUIREMENTS

C. Informational Submittals

1. Certificates

- a.** Testing laboratory Certificate of Accreditation and Scope of Accreditation
- b.** QC Certifications: As required by Article QC CERTIFICATIONS.
- c.** Qualification Statements
- d.** QC Manager
- e.** QC Staff

D. Closeout Submittals

- 1.** Record Documentation
- 2.** Certificate attesting to the accuracy of the As-built Drawings.

1.07 QUALITY ASSURANCE

A. Regulatory Requirements

- 1.** Comply with applicable federal, state, and local laws, ordinances, rules and regulations, specifications and standards.
- 2.** References to laws, ordinances, rules and regulations, specifications and standards in the Contract Documents imply the latest issue in effect, including amendments and errata at the time bids are taken, unless otherwise stated.
- 3.** Give necessary notices, obtain permits (except as otherwise noted) and pay governmental taxes, fees, and other costs in connection with the work.
- 4.** File necessary plans, prepare documents, and obtain necessary approvals of governmental departments having jurisdiction.
- 5.** Obtain required Certificates of Inspection and Approval for the work and deliver the same to the DSR, except as otherwise noted herein.

B. Qualifications

1. QC Manager

- a.** Provide a QC Manager at the work site to implement and manage the QC Program. The QC Manager may perform the duties of Project Superintendent.
- b.** Submit documentation showing that the QC Manager is qualified to perform the inspection and testing required and has a minimum of 10 years combined experience as a superintendent, inspector, QC

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QUALITY REQUIREMENTS

Manager, Project Manager, or Construction Manager on similar size and type construction contracts that included the major trades that are part of this Contract.

- c. The QC Manager is required to conduct QC meetings, perform the three phases of control (see paragraph 1.08), perform submittal review and approval, ensure testing is performed, and provide QC certifications and documentation required in this Contract.
- d. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by others.

2. Alternate QC Manager

- a. Designate an alternate for the QC Manager, meeting the QC Manager qualifications, to serve in the event of the designated QC Manager's absence.
- b. The period of absence may not exceed 2 weeks at one time, and not more than 30 workdays during a calendar year.

3. QC Staff

- a. Provide QC personnel to ensure coverage of each work phase, work shift, and work crew involved in the construction.
- b. Perform QC activities under the direction of the QC Manager and have no other duties on site.
- c. The actual strength of the QC staff may vary during any specific work period to cover the needs of the work period. Add additional staff when necessary for a proper QC organization.
- d. Submit documentation showing that the QC staff is fully qualified by experience and technical training to perform their assigned QC responsibilities and allow sufficient time to carry out these responsibilities.
- e. Clearly identify the duties and responsibilities of each staff member in the QC Program.
- f. Provide QC staff at the site of work during construction activities and ensure they have the authority to take action necessary to ensure compliance with the Contract.
- g. Fulfillment of the minimum QC staff in no way relieves the Contractor of meeting the basic requirements of quality construction in accordance with this Contract.
- h. QC staff members are subject to acceptance by the DSR.

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4. Testing Laboratory
 - a. Perform testing specified in individual specifications by an approved commercial testing laboratory.
 - b. Provide construction materials testing laboratories accredited by a laboratory accreditation authority and submit a copy of the Certificate of Accreditation and Scope of Accreditation.
 - c. Laboratory Accreditation Authorities include:
 - i. National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology
 - ii. American Association of State Highway and Transportation Officials (AASHTO)
 - iii. ASTM International (ASTM)
 - iv. International Accreditation Services, Inc. (IAS)
 - v. U. S. Army Corps of Engineers Materials Testing Center (MTC)
 - vi. American Association for Laboratory Accreditation (A2LA)
 - vii. Geosynthetic Accreditation Institute (GAI)
 - d. Include in the laboratory's scope of accreditation the appropriate materials and testing standards (e.g., ASTM D3666) listed in the technical sections of the Specifications.
 - e. Ensure laboratories engaged in Hazardous Materials Testing meet the requirements of OSHA and EPA.
 - f. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."
 - g. Capability Check and Recheck
 - i. The DSR retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.
 - ii. If the selected laboratory fails the capability check, the Contractor will be assessed the actual cost for the recheck to reimburse DuPont for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the Contract amount due the Contractor.

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QUALITY REQUIREMENTS

5. Organizational Changes

- a.** Obtain the DSR's approval before replacing any member of the QC staff. Include the names, qualifications, duties, and responsibilities of each proposed replacement in each request.

1.08 THREE PHASES OF CONTROL

- A.** Adequately cover both on-site and off-site work and include the following for each definable feature of work.

B. Preparatory Phase (Phase 1)

- 1.** Conduct the preparatory phase with the superintendent and the foreman responsible for the Definable feature of work (DFOW).
- 2.** Document the results of the preparatory phase actions in the daily report.
- 3.** Perform the following prior to beginning work on each DFOW
- 4.** Review each paragraph of the applicable specification sections.
- 5.** Review the Contract Drawings.
- 6.** Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.
- 7.** Review the testing requirements and ensure that provisions have been made to provide the required QC testing.
- 8.** Examine the work area to ensure the required preliminary work has been completed.
- 9.** Examine the required materials, equipment, and sample work to ensure they are on hand and conform to the approved shop drawings and submitted data.
- 10.** Review the Health and Safety Plan (HASP) and the appropriate PSA to ensure applicable safety requirements are met, and that required Safety Data Sheet (SDS) are submitted.
- 11.** Discuss construction methods and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

C. Initial Phase (Phase 2)

- 1.** Conduct the Initial Phase with the foreman responsible for a DFOW when construction crews are ready to start work on that DFOW.

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QUALITY REQUIREMENTS

2. Observe the initial segment of the work to ensure it complies with Contract requirements.
 3. Document the results of the Initial Phase in the daily report.
 4. Perform the following for each DFOV
 - a. Establish the quality of workmanship required.
 - b. Resolve conflicts.
 - c. Ensure the approved laboratory performs testing.
 - d. Check work procedures for compliance with the HASP and the appropriate PSA to ensure applicable safety requirements are met.
- D. Follow-up Phase (Phase 3)**
1. Perform daily checks to ensure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work.
 2. Record the checks in the Contractor's Quality Control (CQC) documentation.
 3. Conduct final follow-up checks and correct deficiencies prior to the start of additional features of work that may be affected by the deficient work.
 4. Do not build upon nor conceal non-conforming work.
- E. Additional Preparatory and Initial Phases**
1. Conduct additional preparatory and initial phases on the same definable features of work if
 2. The quality of on-going work is unacceptable.
 3. There are changes in the applicable CQC staff, onsite production supervision, or work crew.
 4. Work on a definable feature is resumed after a substantial period of inactivity.
 5. Other problems develop.

1.09 TESTING OF MATERIALS

- A.** Perform required sampling and testing. The DSR and Engineer retain the right to perform additional tests on materials and equipment.
- B.** Submit materials for testing, taking into consideration when the materials will be incorporated in the work and the capabilities and capacities of the testing laboratory.

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- C.** Furnish to the DSR and Engineer duplicate certified copies of routine tests made by the mill, shop, or factory where material or equipment has been fabricated or manufactured for the Project.
- D.** Perform tests specified or required to verify that control measures are adequate to provide a product that conforms to the Contract Specifications. Testing includes operation and acceptance tests when specified.
- E.** Perform the following activities and record and provide the following data

 - 1.** Verify testing procedures comply with Contract requirements.
 - 2.** Verify facilities and testing equipment are available and comply with testing standards.
 - 3.** Check test instrument calibration data against certified standards.
 - 4.** Verify recording forms and test identification control number system, including test documentation requirements, have been prepared.
 - 5.** Record tests taken, both passing and failing, on the QC report for the date taken. Include Contract Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. Actual test reports for tests performed off-site may be submitted later with a reference to the test number and date taken.
- F.** Test Results

 - 1.** Cite applicable Contract requirements, tests, or analytical procedures used.
 - 2.** Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the DSR and Engineer immediately.
 - 3.** Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the Contract Specification requirements, whichever is applicable.
 - 4.** Ensure a testing laboratory representative authorized to sign certified test reports signs the test results.
 - 5.** Furnish the signed reports, certifications, and other documentation to the DSR and Engineer via the QC Manager.
 - 6.** Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this Contract.

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1.10 QC CERTIFICATION**A. Contractor Quality Control Report Certification**

1. Include the following statement on each daily report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the Contract Drawings and Contract Specifications to the best of my knowledge except as noted in this report."

B. Invoice Certification

1. Furnish a certificate to the DSR with each payment request, signed by the QC Manager, attesting that As-built Drawings are current and attesting that the work for which payment is requested, including stored material, is in compliance with Contract requirements.

C. Completion Certification

1. Upon completion of work under this Contract, furnish a certificate from the QC Manager to the DSR and Engineer attesting that "the work has been completed, inspected, tested and is in compliance with the contract."

1.11 DOCUMENTATION**A. Records**

1. Maintain current records of on-site and off-site QC operations, activities, and tests performed, including the work of subcontractors and suppliers.
2. Furnish records on an acceptable form and include factual evidence that required QC activities and/or tests have been performed.
3. Furnish records covering conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract.
4. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract. Prepare and submit one report for every 7 days of no work and on the last day of a no work period. The first report following a day of no work will be for that day only.
5. Fill in every space on forms. Use "N/A" if nothing can be reported in one of the spaces.
6. Ensure the superintendent and the QC Manager prepares and signs the Contractor daily reports, respectively.
7. Use terminology consistent with the construction schedule for reporting of work.

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QUALITY REQUIREMENTS

8. Include pertinent information in the “remarks” section of reports, including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the Contract Drawings or Contract Specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site.
9. For each remark given, identify the Schedule Activity Number that is associated with the remark.

B. Quality Control Validation

1. Establish and maintain the following in a series of divided and tabbed three ring binders.
2. Milestone inspections arranged by Activity/Event Number.
3. A current up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by Contract Specification section.
4. Copies of Contract modifications, arranged in numerical order. Include documentation that modified work was accomplished.
5. A current up-to-date copy of the Rework Items List.
6. Maintain up-to-date copies of punch lists issued by the QC Staff on the Contractor and Subcontractors and punch lists issued by the DSR and Engineer.
7. Ensure binders are readily available to the DSR and Engineer during business hours.

C. As-built Drawings

1. Review the As-built Drawings required by Section 01 78 00 – Closeout Submittals, keep As-built Drawings current on a daily basis and mark to show deviations that have been made from the Contract Drawings.
2. Ensure each deviation has been identified with the appropriate modifying documentation number.
3. Initial each deviation or revision.
4. Upon completion of work, submit a certificate attesting to the accuracy of the As-built Drawings prior to submission to the DSR.

1.12 NOTIFICATION OF NONCOMPLIANCE

- A. The DSR will notify the Contractor of each detected noncompliance with the foregoing requirements.
- B. Immediately take corrective action after receipt of such notice.

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- C.** Such notice, when delivered to the Contractor at the site of the work, will be deemed sufficient for the purpose of notification.
- D.** Failure or refusal to comply promptly might be basis for the DSR to issue an order stopping all or part of the work until satisfactory corrective action has been taken.
- E.** Such stop orders may not be made the basis of a claim for extension of time or for excess costs or damages.

PART 2 – PRODUCTS

- A.** Not used

PART 3 – EXECUTION

- A.** Not used

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes
 - 1.** Temporary construction facilities, utilities, and controls, including, access roads during construction, parking requirements, and temporary buildings.

1.02 RELATED WORK

- A.** Section 02 51 00 – Equipment Decontamination and Screening

1.03 DEFINITIONS

- A.** Abbreviations and Acronyms
 - 1.** ANSI – American National Standards Institute
 - 2.** BMA – Bank Management Area
 - 3.** CFR – Code of Federal Regulations
 - 4.** DSR – DuPont Site Representative
 - 5.** NARA – U.S. National Archives and Records Administration
 - 6.** OSHA – Occupational Safety and Health Act
 - 7.** VDOT – Virginia Department of Transportation

1.04 REFERENCES

- A.** Reference Standards: The publications listed below form a part of this Contract Specification to the extent referenced. The publications are referred to within the text by the basic designation only.
 - 1.** American National Standards Institute (ANSI)
 - a.** ANSI/ISEA Z308.1 Minimum Requirements for Workplace First Aid Kits and Supplies
 - 2.** U.S. National Archives and Records Administration (NARA)
 - a.** 29 CFR 1910.151b Medical Services and First Aid
 - b.** 29 CFR 1926 Safety and Health Regulations for Construction
 - c.** 29 CFR 1926.51 Sanitation
 - d.** 29 CFR 1926.56 Illumination

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

1.05 ADMINISTRATIVE REQUIREMENTS

Not used

1.06 SUBMITTALS

Submit the following in accordance with Section 01 33 00 – Submittal Procedures

A. Action Submittals

1. Shop Drawings

- a. Layout of temporary facilities to be installed at the Jones Hollow Property site including temporary fences, points of access, roads, parking areas, buildings, and staging and storage areas prior to mobilization.
- b. Layout of temporary facilities to be installed at the BMA sites including temporary fences, points of access, roads, parking areas, and staging and storage areas prior to mobilization.

1.07 FIELD OFFICES AND SHEDS AT THE JONES HOLLOW PROPERTY

- A. Provide portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors. Securely fix steps and landings to the structure prior to use.
- B. Provide additional structures as required. Existing structures on the site may not be used by the Contractor without the written consent of DuPont.
- C. Obtain written permission from the DuPont Site Representative (DSR) prior to siting temporary structures on the site. Provide off site facilities for office and storage spaces to meet Contractor's needs.
- D. Fill and grade sites for temporary structures to provide drainage away from buildings.
- E. Construction: Structurally sound, secure, weather-tight enclosures for office and storage spaces with lighting, electrical outlets, heating, cooling, and ventilating equipment as specified.
- F. Size sheds to storage requirements for products of individual sections, allowing for access and orderly provision for maintenance and for inspection of products.
- G. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.
- H. Locate offices and sheds a minimum distance of 30 feet from existing and new structures.
- I. Fire Extinguishers: Provide appropriate type fire extinguisher at each office and each storage area. Minimum required: 10-pound capacity, rated A, B, C.

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

- J.** Fire and Carbon Monoxide Detectors: Provide appropriate fire and carbon monoxide detector at each office.
- K.** Heating, Cooling, and Ventilating for Offices: Provide automatic equipment to maintain comfort conditions in conformance with Article TEMPORARY HEATING, COOLING AND VENTILATION.
- L.** Heating, Cooling, and Ventilating for Storage Spaces: Provide heating and ventilation as needed to maintain products in accordance with Contract Documents; adequate lighting for maintenance and inspection of products in conformance with Article TEMPORARY HEATING, COOLING AND VENTILATION.
- M.** Install office spaces ready for occupancy prior to mobilization.
- N.** Employee Residential Occupancy: Not allowed.
- O.** Contractor Office and Facilities
 - 1.** Size: For Contractor's needs.
 - 2.** Telephone and Fax: For Contractor's needs.
 - 3.** Other Furnishings: Contractor's option.
 - 4.** Equipment: Six adjustable band hard hats, six pairs of side-shield safety glasses with clear lenses, and six Virginia Department of Transportation (VDOT)-compliant, high-visibility safety vests for visitors.
- P.** Provide the following furnishings in an easily accessible area.
 - 1.** One industrial first aid kit conforming to Occupational Safety and Health Act (OSHA) requirements 29 CFR 1910.151b and 29 CFR 1926.50 and containing components in accordance with ANSI/ISEA Z308.1.
 - 2.** One outside thermometer (high/low recording type).
 - 3.** Potable water dispenser with dual temperature (warm/cool) spigots.
- Q.** DSR Office Facilities
 - 1.** Provide one private office at site for the sole use of the DSR with separate entrance door with new lock and two keys.
 - 2.** Telephone
 - a.** Provide, maintain, and pay for telephone service to DSR's field office at time of project mobilization.
 - b.** Provide one dedicated direct-line instrument in the DSR's field office.

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TEMPORARY FACILITIES AND CONTROLS

- c. Provide one pushbutton telephone with speakerphone and wireless handset. Speakerphone application must be clear, audible, and able to perform conference calls.

3. Furnishings

- a. One standard size desk, 3-feet by 5-feet with plastic laminate top and three drawers.
- b. One drafting table: 36-inches by 72-inches by 33-inches high with one equipment drawer.
- c. One metal, double-door storage cabinet to fit under table.
- d. Plan rack to hold working drawings, shop drawings, and record documents.
- e. One standard four-drawer, legal-size metal filing cabinet with locks and two keys per lock.
- f. One rolling, swivel desk chair with adjustable height, back, lumbar support, and armrests.
- g. Two straight chairs.
- h. Wastebasket

- R. Maintain temporary field offices and furnishings.

1.08 ACCESS ROADS FOR JONES HOLLOW PROPERTY AND BMA SITES

- A. Construct temporary all-weather access roads from designated area to serve construction area, of a width and load bearing capacity to provide unimpeded traffic for construction purposes.
- B. Extend and relocate as work progress requires. Provide detours necessary for unimpeded traffic flow.
- C. Provide and maintain access to fire hydrants and control valves free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets (e.g., stabilized construction entrance) from Jones Hollow Property and BMA sites.
- E. Provide means of decontaminating vehicles and equipment before entering streets from project BMA sites. See Section 02 51 00 – Equipment Decontamination and Screening.
- F. Designated existing on-site roads may be used for construction traffic.
- G. Operating tracked vehicles on paved surfaces should be minimized. Use rubber tracks or rubber pads for steel tracks if operating tracked vehicles on paved surfaces. Obtain written permission from the DSR before operating any tracked vehicle on paved surfaces.

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

1.09 PARKING

- A. Improve existing parking areas to accommodate construction personnel.
- B. When site space is not adequate, provide additional off-site parking.

1.10 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 - 1. Enclose the project site with a temporary 6-foot high (minimum) security fence to protect the public from entering the project site.
 - 2. Use jersey barriers to block temporary construction entrances from vehicular traffic during non-work hours.
- B. Provide protection for plants designated to remain. Replace damaged plants.
- C. Protect vehicular traffic, stored materials, site, and structures from damage.

1.11 TEMPORARY ELECTRICITY AND LIGHTING FOR CONSTRUCTION

- A. Comply with National Electric Code, federal, state, and local codes and regulations, and utility company requirements.
- B. Complement existing power service capacity and characteristics as required. Determine actual power requirements associated with site work activities and arrange with the local utilities for installation and service of additional supply or provide portable electrical supply. Coordinate with the Power Company to ensure the system is sufficient and adequate for temporary power needs and that existing power lines and poles are relocated to accommodate excavation and other construction activities.
- C. Installation by personnel familiar with code requirements and qualified for the work to be performed. Install circuit and branch wiring with area distribution boxes located so that power and lighting are available, if required, throughout the construction site by the use of construction-type power cords. Guard, bury, or isolate by elevation temporary wiring to prevent accidental contact by equipment.
- D. Grounding System: Protect circuits with ground fault interrupters.
- E. Lighting: Maintain lighting and provide routine repairs. Provide adequate artificial lighting for work areas when natural light is not adequate for work. Light work areas to not less than the minimum illumination intensities listed in OSHA Standard 29 CFR 1926.56.

1.12 TEMPORARY HEATING COOLING AND VENTILATION

- A. Provide heating, cooling, and ventilation devices and heat, cool, and ventilate as needed to maintain specified conditions for construction operations.

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TEMPORARY FACILITIES AND CONTROLS

- B.** Prior to operation of equipment for temporary heating, cooling, or ventilation purposes, verify that installation is approved for operation, equipment is lubricated, and filters are in place. Provide for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- C.** Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D.** Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.13 TEMPORARY WATER SERVICE

- A.** Provide water for construction purposes. DuPont will not furnish water for Contractor use.
- B.** Provide installation, maintenance, usage, and removal of temporary water lines and equipment.

1.14 TEMPORARY SANITARY FACILITIES

- A.** Provide, at time of project mobilization, and maintain required facilities and enclosures.
- B.** Provide sanitary facilities of the chemical toilet type complying with OSHA Standard 29 CFR 1926.51 unless otherwise accepted by the DSR.
- C.** Collect and remove sanitary wastes from the site in an appropriate manner.
- D.** Remove sanitary facilities from the site after final acceptance unless otherwise directed by the DSR.

1.15 PROTECTION OF INSTALLED WORK

- A.** Protect installed work and provide special protection where specified in individual Contract Specification sections.
- B.** Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C.** Prohibit traffic from landscaped areas.

1.16 SECURITY

- A.** Provide supplemental security and facilities to protect the work and Contractor's operations from unauthorized entry, vandalism, or theft.
- B.** Contact the local emergency response agencies to ascertain the type of response required to potential emergency situations associated with the work and to coordinate the responses of the various units.
- C.** Prepare a list of emergency points of contact, telephone numbers, radio frequencies, and call signs so that dependable responses can be executed.

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TEMPORARY FACILITIES AND CONTROLS

- D.** Maintain program throughout construction period until DuPont acceptance precludes the need for Contractor security.
- E.** Restrict entrance of persons and vehicles into Project site. Allow entrance only to authorized persons with proper identification.
- F.** Maintain a list of accredited persons; submit copy to DSR on request.
- G.** Require personnel to sign in upon entering the site and to sign out when leaving.
- H.** Minimize personnel on-site. Ensure off-duty personnel leave the site as soon as possible.
- I.** Allow no visitors without the approval of the DSR except for properly identified regulatory personnel.
- J.** Do not permit visitors to enter active work areas without the expressed permission of the DSR.
- K.** Maintain log of visitors that includes name, affiliation, and purpose of visit. Make available to DuPont or the DSR on request.
- L.** Require signature of visitors on a form relieving DuPont and the DSR of the liability of any consequences related to potential hazards associated with the site.

1.17 REMOVAL OF FACILITIES, UTILITIES AND CONTROLS

- A.** Remove temporary utilities, equipment, facilities, and materials prior to final inspection.
- B.** Remove underground temporary installations to a minimum depth of 2 feet below final grade. Grade site as indicated.
- C.** Clean and repair damage caused by installation or use of temporary work.
- D.** Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.
- E.** DuPont-owned structures, office trailers, and other property that was utilized during the project will remain on site unless other arrangements are made between the Contractor and DuPont.

PART 2 – PRODUCTS

- A.** Not used

PART 3 – EXECUTION

- A.** Not used

END OF SECTION

SECTION 01 71 23 FIELD ENGINEERING

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section describes the general requirements for Site surveying and grade control including pre-construction and post-construction topographic and bathymetric surveys, utilities and record drawings, construction progress surveying, record keeping, and submittals. In addition, establish and maintain design lines and grades shown on the Contract Drawings.

1.02 RELATED WORK

- A. Section 01 33 00 – Submittal Procedures
- B. Section 01 70 00 –Closeout Procedures

1.03 DEFINITIONS

- A. Acronyms
 - 1. BMA – Bank Management Area
 - 2. DSR – DuPont Site Representative
 - 3. DTM – Digital Terrain Model

1.04 REFERENCES

- A. Not used

1.05 QUALITY ASSURANCE

- A. It is the responsibility of the Contractor to schedule Contractor's survey and to verify it has met the Contract requirements prior to proceeding to the next sequence of work. The DuPont Site Representative (DSR) shall review and approve each survey or survey increment prior to the Contractor proceeding to the next phase of work in that area. The Contractor shall allow up to 3 working days for DSR review. Surveys of the Project shall be surveyed using the same vertical datum and horizontal coordinate system as the Contract Drawings. Surveys may need to be completed in small increments to document work progress and sequential excavation and backfill. Survey requirements include.
 - 1. Pre-Construction Surveying for Bank Management Areas (BMAs): Following completion of clearing and grubbing, the Contractor shall conduct topographic and bathymetric surveys to establish pre-construction conditions.
 - a. The Contractor shall establish local horizontal and vertical control at each BMA project site. Local control shall be established using local survey markers. The Contractor shall ensure closure of all survey loops.
 - b. The survey shall be adequate resolution to allow subsequent accurate calculations of excavated volumes. The survey shall consist of a

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FIELD ENGINEERING

minimum 3-foot by 3-foot grid spacing of points; locate all tops and toes of slopes, and locate all grade breaks, with horizontal and vertical coordinates.

2. Post-Construction Surveying for BMAs and Jones Hollow Property: The Contractor shall perform a post-construction bathymetric and topographic survey of the entire Project Site. This survey shall be incorporated into the As-built Drawings.
- B. All surveys for verification of pay quantities shall be performed and stamped by an independent, licensed Professional Land Surveyor acceptable to the DSR.
 - C. The surveyor shall have insurance that has limits that meet or exceed the requirements of the Contract Specifications.
 - D. The DSR reserves the right to retain an independent surveyor to periodically check the Contractor's survey. Surveying performed by the DSR will be at no cost to the Contractor.
 - E. EGS & Associates and AECOM are DuPont's Surveyor of Record for the base information provided. EGS & Associates is eligible for Contractor surveying services during this project.

1.06 SUBMITTALS

- A. General submittals required in accordance with this Section include the following.
 1. Name, address, telephone number, and statement of qualifications of the Professional Land Surveyor before starting survey work. This surveyor shall be responsible for stamping and signing all work as noted below.
 2. On request, field notes and documentation verifying accuracy of survey work.
 3. Project survey data shall be stored as electronic files on a DVD, compact disc, flash drive, or other portable media, formatted as: a) DWG; b) TIF; c) PDF; d) Digital Terrain Model (DTM) file; and e) printed to a paper sheet. At a minimum, data for each survey point shall include a sequential reference number, the elevation, and appropriate northing and easting coordinates.
 4. Field notes, drawings, quantity computations, and point data for each survey shall be submitted to the DSR.
 5. Progress surveys shall be conducted to monitor the accuracy of the work being performed. Progress surveys shall be submitted prior to submittal of progress payment requests.
 6. Closure calculation for horizontal and vertical control. Submit prior to commencing pre-construction survey work.

SECTION 01 71 23 FIELD ENGINEERING

B. As-built Drawings

1. Upon completion of all activities, the Contractor shall prepare As-built Drawings for each survey described in this Section. The post-construction As-built Drawing shall locate all features as constructed and all real estate/property boundaries and public land survey section corners and lines. The As-built Drawings shall be produced full size (ANSI D) on bond paper and signed by the surveyor and Contractor. A paper copy of half-size As-builts shall also be created by the Contractor. Contractor to submit As-built Drawings in paper and electronic formats.
2. Contractor electronic files for the As-Builts shall be fully editable so as to allow future changes by DuPont. The Contractor shall submit the electronic version of the As-built Drawings with hard copies as specified.

1.07 SURVEY VERTICAL DATUM

- A. The vertical datum used for this Project is North American Vertical Datum of 1988, based on the elevations from benchmarks included on the Contract Drawings.

1.08 SURVEY HORIZONTAL DATUM

- A. The horizontal datum used for this Project is Virginia State Plane, North Zone, North American Datum 83, U.S. Feet based on the coordinates from survey benchmarks included on the Contract Drawings.

PART 2 – PRODUCTS

- A. Not used

PART 3 – EXECUTION

3.01 GENERAL

- A. At the Pre-construction Meeting, the Surveyor shall meet with the DSR to discuss the survey proceedings, methods, and equipment to be employed for the Contractor's surveys and the survey submittal schedules.

3.02 SURVEY REFERENCE POINTS

- A. Locate and establish survey control points and monuments for the layout for the Project as required. Control points and monuments shall be established for demolition and clearing limits, erosion and sedimentation control, grading, storm sewer utilities, sewer utilities, water utilities, gas lines, electrical facilities, sidewalks and promenades, and any other items shown on the Contract Drawings, as needed. Promptly notify the DSR in writing of any discrepancies discovered.

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- B. Provide a control traverse in the horizontal and vertical datum established for the Project.
- C. Mark and protect survey control points prior to starting Site work. Make no change without prior written notice to the DSR.
- D. Promptly report to the DSR the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Obtain written permission from the City of Waynesboro Public Works to remove survey monuments anticipated to be disturbed or destroyed during construction. Monuments shall be restored in accordance with City of Waynesboro's "Standard Details and Approved Products Manual," Details R-1 and R-2 (current edition).
- F. Replace or relocate dislocated survey control points, or establish new control points, based on original survey control at no added cost to the Owner.

3.03 PROCEDURES

- A. Contractor survey procedures (positioning modes, equipment calibration, and data reduction, adjustment, processing, and plotting) shall conform to industry standards.
- B. Failure to perform and process such surveys in accordance with recognized standards will result in a rejection and nonpayment for work performed.

3.04 UNDERGROUND UTILITIES

- A. The Contractor shall be responsible for locating all underground utilities and notifying all underground utility companies prior to commencing work.
- B. The Contractor shall be responsible for providing As-built Drawings showing accurate locations of utilities installed or relocated as part of the work.
- C. Prior to placing utility backfill, the Contractor shall survey the utility to accurately record the installed depth, alignment, and location of bends, valves, manholes, and all other items or conditions to provide an accurate record of all below-grade utilities. Contractor shall provide 72 hour written notice to the DSR at least before any utility backfill and surveys. Provide survey data as described in Article 1.06.

3.05 NEW CONSTRUCTION

- A. Contractor shall develop and make all detailed surveys necessary for construction of new work, including setting benchmarks for location of working points, verification of existing structures and critical topographic features, cut sheets, slope stakes, and other surveys as required to ensure the work is installed in accordance with the Contract Documents. Contractor is responsible for notifying the DSR of any discrepancies found as a result of the detailed survey.

3.06 SLOPE PROTECTION

- A. Contractor shall develop and make all detailed surveys necessary for construction of toe rock placement and restoration, including pre- and post-placement surveys of the

SECTION 01 71 23
FIELD ENGINEERING

foundation and slope to verify that the slope protection materials have been placed in accordance with the lines and grades shown on the Contract Drawings.

- B.** The keyway at the toe of the slope shall be surveyed prior to rock placement. The survey must be reviewed and approved by the DSR prior to placement of rock in the keyway. The keyway shall be surveyed after all rock placement is completed to verify that the keyway has been constructed in accordance with the Contract Drawings. Contractor is responsible for maintaining the keyway elevation for the duration of the Project.
- C.** The slope shall be surveyed prior to and following restoration to verify that the materials have been placed in accordance with the Contract Drawings. Contractor is responsible for maintaining the stability of the slope for the duration of the Project.
- D.** The final surveys for acceptance of the planting and habitat restoration, and restoration of Jones Hollow Property shall be completed by a Surveyor as described in Paragraph 1.03.B.

3.07 PROGRESS SURVEYS

- A.** The contractor shall complete at a minimum the following surveys:

 - 1. Post Clearing topography
 - 2. Bottom of Excavation
 - 3. Top of stone toe.
 - 4. Top of Geoweb
 - 5. Top of subgrade fill
 - 6. Final Grade
 - 7. Tree/shrub planting locations

END OF SECTION

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

PART 1 – GENERAL**1.01 SUMMARY**

- A. Section Includes
 - 1. Contract closeout procedures

1.02 RELATED WORK

- A. Section 01 10 00 – Summary of Work
- B. Section 01 29 00 – Payment Procedures
- C. Section 01 33 00 – Submittal Procedures
- D. Section 01 50 00 – Temporary Facilities and Controls
- E. Section 01 78 00 – Closeout Submittals

1.03 DEFINITIONS

- A. Acronym
 - 1. DSR – DuPont Site Representative

1.04 REFERENCES

- A. Not used

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Not used

1.06 SUBMITTALS

DuPont Site Representative (DSR) review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor Quality Control approval and are to be submitted to DSR for information only.

- A. Submit the following in accordance with Section 01 33 00 – Submittal Procedures
 - 1. Action Submittals
 - a. Not used
 - 2. Informational Submittals
 - a. Certificates

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CLOSEOUT PROCEDURES

- i. Certification that Contract Documents are complete and ready for DSR's review.
- b. Special Procedure Submittals
 - i. Punch-out Inspection Punch List.
 - ii. Notice to schedule the Pre-final Inspection.
 - iii. Notice to schedule the Final Acceptance Inspection.
 - iv. Release of Liens and Claims.
- 3. Closeout Submittals
 - a. Not used
- 4. Maintenance Material Submittals
 - a. Not used

1.07 COMPLETION INSPECTIONS

- A. Punch-out Inspection
 - 1. Inspect the Work and develop a punch list of items that do not conform to the approved Contract Drawings and Contract Specifications. Schedule near the completion of Work or any increment thereof established by a completion time stated in the Contract or stated elsewhere in the Contract Specifications. Ensure Quality Control Manager has reviewed and signed the punch list.
 - 2. Include in the punch list each remaining item requiring rework that was not corrected prior to the Punch-out Inspection.
 - 3. Include the estimated date that the deficiencies will be corrected on the punch list.
 - 4. Submit a copy of the punch list to the DSR.
 - 5. Complete additional inspections to ascertain that each deficiency has been corrected. Once this is accomplished, notify the DSR that the facility is ready for the "Pre-Final Inspection."
- B. Pre-Final Inspection
 - 1. The DSR will perform this inspection to verify the work is complete and ready for final acceptance inspection.
 - 2. The DSR may develop a pre-final punch list as a result of this inspection.

SECTION 01 77 00 CLOSEOUT PROCEDURES

3. Ensure each item on this list is corrected prior to notifying the DSR that a "Final" inspection with DuPont can be scheduled.
 4. Correct items noted on the "Pre-Final" inspection in a timely manner and prior to the Contract completion date for the Work or particular increments thereof if the project is divided into increments by separate completion dates.
- C. Final Acceptance Inspection**
1. Notify the DSR at least 14 days prior to the desired Final Acceptance Inspection date.
 2. State in the notice that specific items previously identified to the Contractor as being unacceptable will be complete by the date scheduled for the final acceptance inspection.
 3. The DSR will formally schedule the Final Acceptance Inspection based upon results of the "Pre-Final Inspection."
 4. The Quality Control Manager, the superintendent, or other Contractor management personnel must attend the Final Acceptance Inspection. The DSR will attend this inspection. Additional DuPont personnel may attend at their discretion.
 5. Failure to have Contract Work acceptably complete for this inspection will be cause for the DSR to bill the Contractor for additional inspection cost in accordance with the Contract.

1.08 CLOSEOUT PROCEDURES

- A.** Conduct completion inspections, including Pre-final and Final Acceptance Inspections.
- B.** Submit final periodic Application for Payment in accordance with Section 01 29 00 – Payment Procedures.
- C.** Submit draft project record documents to DSR for review in accordance with Section 01 78 00 – Closeout Submittals.
- D.** Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for DSR's review.
- E.** Execute warranty documents in accordance with Section 01 78 00 – Closeout Submittals.
- F.** The DSR will return reviewed draft project record documents to Contractor for revisions as specified in Section 01 78 00 – Closeout Submittals.
- G.** Complete demobilization and remove temporary utilities, facilities, and controls as specified in Section 01 50 00 – Temporary Facilities and Controls.

**SECTION 01 77 00
CLOSEOUT PROCEDURES**

- H.** Submit final project record documents and warranty information to the DSR in accordance with Section 01 78 00 – Closeout Submittals.
- I.** Submit Release of Liens and Claims from each Subcontractor and Supplier.
- J.** Submit final Application for Payment requesting release of retainage and identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- K.** The DSR will conduct Final Application for Payment inspection to confirm demobilization is complete and acceptable.

PART 2 – PRODUCTS

- A.** Not used

PART 3 – EXECUTION

- A.** Not used

END OF SECTION

**SECTION 01 78 00
CLOSEOUT SUBMITTALS**

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Section Includes
 - 1.** Record documents and document maintenance
 - 2.** Warranties

1.02 RELATED WORK

- A.** Section 01 33 00 – Submittal Procedures

1.03 DEFINITIONS

- A.** Acronym
 - 1.** DSR – DuPont Site Representative

1.04 REFERENCES

- A.** Not used

1.05 ADMINISTRATIVE REQUIREMENTS

- A.** Prepare, maintain, and submit Project record documents as required by the Contract Specifications.
- B.** Maintain two bound sets and four electronic sets of the following record documents
 - 1.** Drawings
 - a.** Contract Drawings as issued for construction
 - b.** As-built (red line) Drawings
 - 2.** Contract Specifications
 - 3.** Addenda
 - 4.** Change Orders and other modifications to the Contract
 - 5.** Reviewed Submittals and Record Submittal Schedule
 - 6.** Record schedule
 - 7.** Survey notes, records, and calculations
 - 8.** DuPont Site Representative (DSR) field orders and written instructions

SECTION 01 78 00 CLOSEOUT SUBMITTALS

9. Daily progress reports, including required attachments
 10. Spill incident reports
 11. Approved site-specific Health and Safety Plan and addenda
 12. Approved Project-specific Waste Management Plan and addenda
 13. Manufacturer's instruction for assembly, installation, and adjusting
 14. Daily Quality Control reports
 15. Daily Safety Logs
 16. Lab analytical results
 17. Daily Work Activity Summary Reports
 18. Photographic documentation
 19. Other items as required by the DSR
- C. Record actual revisions to the work concurrent with construction progress.
 - D. Ensure entries are complete, legible, and accurate, enabling future reference.
 - E. Store a minimum of one set of documents and samples in the Contractor's field office apart from documents used for work.
 - F. File documents and samples to facilitate retrieval.
 - G. Maintain documents in a clean, dry, legible condition and in good order.
 - H. Do not use record documents for work purposes.
 - I. Make documents available continuously for inspection by the DSR. Bring one copy of the current As-built Drawings to every other weekly progress meeting for the DSR to review.

1.06 SUBMITTALS

DSR review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor Quality Control approval and are to be submitted to DSR for information only.

- A. Submit the following in accordance with Section 01 33 00 – Submittal Procedures.
 1. Action Submittals: Draft Submittal
 - a. Submit two draft copies of completed record documents, including As-built (red line) Drawings to the DSR following Substantial Completion of

SECTION 01 78 00

CLOSEOUT SUBMITTALS

construction and at least 15 days prior to the Final Acceptance Inspection.

- b.** Ensure the draft record documents are neat, legible, and accurate.
 - c.** If upon review, the draft record drawings are found to contain errors or omissions, they will be returned to the Contractor for corrections. Complete the corrections and return the draft record documents to the DSR within 10 calendar days.
 - d.** One copy of the approved draft record documents with the DSR comments will be returned to the Contractor after the Final Acceptance Inspection for use in preparation of final record documents.
- 2.** Informational Submittals: Not used
- 3.** Closeout Submittal: Operation and Maintenance Data
- a.** Provide two bound and four electronic sets of copies of operation and maintenance instructions, arranged by system and subdivided by Contract Specification section.
 - b.** For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers.
 - c.** Identify the following
 - i.** Significant design criteria.
 - ii.** List of equipment.
 - iii.** Parts list for each component.
 - iv.** Operating instructions.
 - v.** Maintenance instructions for equipment and systems.
 - vi.** Maintenance instructions for finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
 - d.** Warranty Documentation
 - i.** Equipment/Product Warranty List.
 - ii.** Provide six sets of notarized copies of warranties required in individual Contract Specification sections.
 - e.** Record Documentation

SECTION 01 78 00 CLOSEOUT SUBMITTALS

- i. Submit final record documents to the DSR with final Application for Payment.
- 4. Maintenance Material Submittals
 - a. Label and deliver spare parts, maintenance items, and extra materials to the Site. Place in locations as directed.
 - i. Include "NOT FOR WARRANTY REPAIRS" on the labels.
 - ii. Obtain receipt prior to final payment.
 - b. Do not use the spare parts and maintenance materials required by the Contract Documents to remedy defects during the warranty period, except when approved otherwise by the DSR. In such cases, replace items used.
 - c. Furnish the names, business addresses, and telephone numbers of fully equipped authorized service organizations.
 - d. Applications for final payment will not be approved until these items are delivered.

1.07 RECORD DOCUMENTS

- A. Contract Specifications
 - 1. Legibly mark and record at each product reference the description of actual Products installed, including the following
 - a. Manufacturer's name and product model and number.
 - b. Product substitutions or alternates utilized.
 - c. Changes made by Addenda and modifications. Include reference to approved Engineering Change Order or Contract Change Order.
 - 2. Legibly mark and record changes to execution methods specified. Include reference to approved Engineering Change Order.
- B. Contractor's Pre-construction Submittals
 - 1. Legibly mark and record alternate vendors and subcontractors used.
 - 2. Legibly mark and record changes to environmental protection, spill, and discharge control procedures.
 - 3. Legibly mark and record changes to the Submittal Register, including
 - a. Date of submittal

SECTION 01 78 00
CLOSEOUT SUBMITTALS

- b. Date submittal was approved
 - c. Additional submittals required
 - 4. Legibly mark and record changes to the following
 - a. Contractor's Quality Control Plan
 - b. Overhead and Underground Obstructions Plan
 - c. Sample Forms
 - 5. Approved site-specific Health and Safety Plan and addenda
 - 6. Legibly mark and record approved changes to the Health and Safety Plan and addenda.
- C. Manufacturer's instruction for assembly, installation, and adjusting
 - 1. Legibly mark and record variances from Manufacturer's instructions, including the following
 - a. Description of variance
 - b. Reason for variance
 - c. Effect of variance on manufacturer's guarantee or warranty
 - d. Additional considerations or procedures required due to variance
 - 2. Provide correspondence regarding Manufacturer's recommendations in support of or against the variance.

1.08 RECORD DOCUMENTS

- A. Contract Specifications
 - 1. Legibly mark and record at each product reference the description of actual Products installed, including the following
 - a. Manufacturer's name and product model and number.
 - b. Product substitutions or alternates utilized.
 - c. Changes made by Addenda and modifications. Include reference to approved Engineering Change Order or Contract Change Order.
 - 2. Legibly mark and record changes to execution methods specified. Include reference to approved Engineering Change Order.
- B. Contractor's Pre-construction Submittals

SECTION 01 78 00 CLOSEOUT SUBMITTALS

1. Legibly mark and record alternate vendors and subcontractors used.
 2. Legibly mark and record changes to environmental protection, spill, and discharge control procedures.
 3. Legibly mark and record changes to the Submittal Register including
 - a. Date of submittal
 - b. Date submittal was approved
 - c. Additional submittals required
 4. Legibly mark and record changes to the following
 - a. Contractor's Quality Control Plan
 - b. Overhead and Underground Obstructions Plan
 - c. Sample Forms
- C.** Approved site-specific Health and Safety Plan and addenda
1. Legibly mark and record approved changes to the Health and Safety Plan and addenda.
- D.** Manufacturer's instruction for assembly, installation, and adjusting
1. Legibly mark and record variances from Manufacturer's instructions, including the following
 - a. Description of variance
 - b. Reason for variance
 - c. Effect of variance on manufacturer's guarantee or warranty
 - d. Additional considerations or procedures required due to variance
 2. Provide correspondence regarding Manufacturer's recommendations in support of or against the variance.

1.09 RECORD DRAWINGS

- A.** Keep record drawings current and available on the job site at all times, two sets of marked drawings (paper prints) showing as-built conditions.
- B.** Accurately and neatly record changes from the Contract Drawings that are made in the work or additional information that might be uncovered in the course of construction as they occur by means of details and notes.

SECTION 01 78 00 CLOSEOUT SUBMITTALS

- C.** Legibly mark drawings to record actual construction, including
- 1.** Field changes of dimension and detail including
 - a.** Correct grade or alignment of pipelines or utilities if changes were made from Contract Drawings.
 - b.** Correct elevations if changes were made in site grading.
 - c.** Design and additional information obtained from working drawings specified to be prepared and furnished by the Contractor, including but not limited to, fabrication, installation plans and placing details, and pipe sizes.
 - 2.** Changes made by field order and by change order.
 - 3.** Details not on original Contract Drawings.
 - 4.** The location and description of utilities and appurtenances and other installations or description known to exist within the construction area. Include measured horizontal and vertical dimensions referenced to permanent surface features.
 - 5.** Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 6.** The topography and grades of installed or affected work as a part of the Project construction.
 - 7.** Changes or modifications that result from the final inspection.
 - 8.** Show only the option selected for construction on the As-built Drawings where Contract Drawings or Contract Specifications allow options.

1.10 WARRANTY REQUIREMENTS

- A.** Equipment/Product Warranty List
- 1.** Submit a bound and indexed notebook containing written warranties for equipment/products furnished and prepare a complete listing of such equipment/products.
 - 2.** State the description or name of the equipment/product, the Contract Specification section applicable to the equipment/product, serial number (where applicable), duration of the warranty, start date of the warranty, ending date of the warranty, maintenance procedures and schedule (where applicable), and the point of contact for fulfillment of the warranty.
 - a.** Ensure the guarantor's representative will honor the warranty during the warranty period, and will provide the services prescribed by the terms of the warranty.

SECTION 01 78 00
CLOSEOUT SUBMITTALS

3. Start the warranty period on the same date as Project acceptance and continue for the full product warranty period.
4. Execute the full list and submit prior to final acceptance of the Project.

PART 2 – PRODUCTS

- A. Not used

PART 3 – EXECUTION

- A. Not used

END OF SECTION

SECTION 02 11 40 STOCKPILING

PART 1 – GENERAL

1.01 SECTION INCLUDES:

- A. Summary
- B. Bottom Liners and Covers
- C. General
- D. Stockpile Construction
- E. Stockpile Management
- F. Stockpile Inspection
- G. Stockpile Removal

1.02 SUMMARY:

- A. Provide all necessary labor, materials, and equipment for on-site temporary stockpiling of both clean backfill and excavated impacted soils and debris. The Contractor will load, transport, and place materials from the Temporary Soil and Material Staging/Stockpiling Area (Clean Material Stockpiles) as part of Site restoration activities. Impacted materials generated from remediation activities will be transported to the Impacted Material Stockpile (if direct loading is not an option), then loaded by the Contractor into trucks for off-site disposal.
- B. If existing stockpiles are inadequate to complete Work, additional stockpiles shall be installed (as deemed necessary by DuPont Site Representative [DSR]) at no additional cost to the Owner.
- C. Impacted Material Stockpiles shall be designated for hazardous material or non-hazardous material.

PART 2 – PRODUCTS

2.01 BOTTOM LINERS AND COVERS:

- A. Impacted Material Stockpiles outside the limits of excavation shall require bottom liners. Impacted Material Stockpile Bottom Liners shall be 40-mil (minimum thickness), high-density polyethylene (HDPE), geomembrane material as shown on the Contract Drawings and specified in Specification Section 02 07 00 – Geosynthetic Materials.
- B. Stockpile covers shall be black, 10-mil (minimum thickness), nylon-reinforced, polyethylene sheeting. Polyethylene sheets shall be of sufficient length and width to cover each stockpile with no more than two sheets.
- C. Stockpile covers and liners shall be free of holes or tears. Defective material shall be replaced, as determined by the Engineer.
- D. Furnish sand bags or other weights of sufficient quantity and weight to hold the stockpile cover in position. Impacted materials or loose soils shall not be used as ballast for the cover.

SECTION 02 11 40

STOCKPILING

PART 3 – EXECUTION

3.01 GENERAL:

- A. Establish separate Clean Material Stockpiles and Impacted Material Stockpiles. Segregation of stockpiles must be approved by the DSR
- B. Exert the highest standard of care with respect to stockpiling impacted materials. Coordinate stockpiling and loading work with excavation work as directed by the Engineer.

3.02 STOCKPILE CONSTRUCTION:

- A. Prepare designated clean areas for stockpile construction, including clearing of vegetation. Remove sharp stones and other debris and provide a smooth surface to protect the bottom liner from puncture and tearing under anticipated loading.
- B. Install bottom liner, as shown in the Contract Drawings, to fully cover the ground surface for each stockpile without field seams or overlaps. Anchor the liner as required to prevent displacement.
- C. Install stockpile cover in a manner that minimizes wrinkles. Overlap adjacent panels of polyethylene sheeting (or similar material approved by DSR) a minimum of four (4) feet. Place sandbags or other approved ballast on the cover to prevent uplift from wind. Ballast shall be placed along all edges and overlaps at spacing no greater than 5 feet apart.
- D. Protect the cover from damage. Remove and replace damaged polyethylene sheeting as directed by the Engineer.
- E. Impacted Material Stockpiles shall not exceed 14 feet in height, maximum volume of 4,000 cubic yards, or have slopes steeper than 1:1 (H:V).
- F. The maximum allowable stockpiled volume for hazardous material is 4,000 cubic yards. The maximum allowable stockpiled volume for non-hazardous material is 4,000 cubic yards. The combined stockpile volume (hazardous and non-hazardous) shall not exceed 8,000 cubic yards (unless approved by DSR).

3.03 STOCKPILE MANAGEMENT:

- A. Place impacted materials on properly constructed and maintained stockpiles. Do not place any designated non-impacted materials in the Impacted Material Stockpiles.
- B. Prevent impacted dust from becoming airborne as detailed in the Contractor-prepared Stormwater Pollution Prevention Plan. Place and anchor stockpile covers at the completion of each workday and during periods of rain or wind. Cover the stockpiles whenever the stockpiles are not being used.
- C. Provide run-on controls to divert storm water away from stockpiles. Collect accumulated leachate from lined stockpile areas and store in 20,000-gallon frac tanks on-site. Construction water will be analyzed in accordance with AECOM's Waste Management Plan prior to disposal.

SECTION 02 11 40
STOCKPILING

- D.** Place saturated materials in such a manner that they do not become re-saturated.
- E.** Protect stockpiles from precipitation to avoid re-saturation of soils.
- F.** Control odors from the stockpiles.
- G.** Avoid vehicular traffic on the stockpile covers or liners.
- H.** Stockpiles shall remain covered for the duration of the Work.

3.04 STOCKPILE INSPECTION:

- A.** The Engineer will inspect Impacted Material Stockpiles frequently to verify the integrity of the stockpile liner and cover system.
- B.** All deficiencies noted by the DSR shall be immediately corrected to the satisfaction of the DSR. If necessary, stockpiled material shall be relocated to another impacted material stockpile so that repairs can be made.
- C.** Each stockpile shall be visually inspected daily for damage, and immediately repaired.

3.05 STOCKPILE REMOVAL:

- A.** After removal and relocation or disposal of stockpiled materials, perform gross decontamination of the stockpile areas.
- B.** Remove the bottom liner and top cover and dispose at the designated off-site disposal facility with the impacted soil and debris at the completion of the Work, unless otherwise directed by the DSR.

END OF SECTION

SECTION 02 51 00
EQUIPMENT DECONTAMINATION AND SCREENING

PART 1 – GENERAL**1.01 SUMMARY OF WORK**

- A.** The Contractor shall conduct decontamination of equipment, personnel, and materials utilized during the work activities.
- B.** The Contractor shall conduct a mercury-vapor screening program to verify that items are appropriately decontaminated.
- C.** The Contractor shall containerize and dispose of used cleaning equipment, Personal Protective Equipment, and decontamination wastewater in accordance with the Waste Management Plan (Appendix C) and applicable rules and regulations.
- D.** The Contractor shall be solely responsible for their means, methods and sequences with regard to the work.
- E.** Work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.

1.02 RELATED WORK

- A.** Work related to this Section is described in
 - 1.** Section 01 35 29 – Health, Safety, and Emergency Response Procedures

1.03 DEFINITIONS

- A.** Acronyms
 - 1.** $\mu\text{g}/\text{m}^3$ – micrograms per cubic meter
 - 2.** DSR – DuPont Site Representative
 - 3.** HASP – Health and Safety Plan
 - 4.** MVA – mercury vapor analyzer
 - 5.** USDOT – United States Department of Transportation

1.04 REFERENCES

- A.** Waste Management Plan – Appendix C

SECTION 02 51 00

EQUIPMENT DECONTAMINATION AND SCREENING

PART 2 – MATERIALS

2.01 MATERIALS AND EQUIPMENT

- A. To be specified and supplied by the Contractor.

2.02 CONTAINERS

- A. The Contractor shall provide United States Department of Transportation (USDOT)-approved containers for storage of wastes generated by the construction activities prior to transportation for off-site disposition.

PART 3 – EXECUTION

3.01 EQUIPMENT DECONTAMINATION

- A. Planned areas for equipment decontamination are shown on the Contract Drawings. These include stabilized construction entrances and tire wash areas. The Contractor shall conduct decontamination activities in these or other areas within the work area proposed by the Contractor and approved by the DSR. The decontamination areas shall be bermed and lined with 20-mil (minimum) reinforced polyethylene sheeting that slopes to a lined collection sump.
- B. The Contractor shall be responsible for constructing and maintaining the decontamination area to accommodate all loads, equipment, and potential decontamination fluid migration scenarios.
- C. Any equipment and materials to be taken off site by the Contractor will be subject to a final visual review by the DSR and cleaning by the Contractor (when necessary) at the decontamination area. The extent and method of cleaning shall be at the discretion of the Contractor. However, each piece of equipment/materials will be observed by the DSR for visible soils, dust, or other debris prior to the removal of equipment/materials from the Site. Any observed soils or other debris shall be promptly removed and containerized by the Contractor into USDOT-approved containers.
- D. Prior to removal from the Site, each piece of the Contractor's reusable equipment/materials will be screened by the Contractor for the potential presence of mercury using the Mercury Scanning Guidelines presented below. If the item sampled exceeds the action levels presented below, the Contractor shall decontaminate the item. If the item cannot be decontaminated to meet the Mercury Scanning Guidelines below, the Contractor shall place the item into appropriate USDOT-approved waste containers for characterization (by the Contractor) and off-site disposal. Any equipment/materials or other items owned, leased, and/or rented by the Contractor that cannot be decontaminated in accordance with the Mercury Scanning Guidelines (Section 3.02 below) shall be designated for off-site disposal at no additional cost to the DuPont.
- E. Solid waste materials generated during decontamination activities shall be separated from washwaters, collected, and containerized into appropriate USDOT-approved waste containers prior to off-site transportation and disposal in accordance with Section 02 60

SECTION 02 51 00

EQUIPMENT DECONTAMINATION AND SCREENING

00 – Contaminated Site Material Removal. Washwater generated by the decontamination activities shall be collected and transported for off-site disposal in accordance with the Waste Management Plan (Appendix C).

- F.** Following completion of decontamination activities associated with the Work activities, the Contractor shall dismantle the decontamination area and dispose of all waste materials associated with the decontamination area in accordance with Section 02 60 00 – Contaminated Site Material Removal and the Waste Management Plan (Appendix C).

3.02 MERCURY SCREENING GUIDELINES

- A.** The below guidelines will be used to screen reusable equipment/materials as identified above. This guideline is not intended for the screening of waste materials (e.g., demolition debris, excavated soil, and subsurface structure debris) generated by the work activities.
- B.** The Contractor will use a MVA (Jerome Model J405 or equivalent) to screen a minimum of three locations (consisting of an average of three readings at each location). Because the resolution of the Jerome MVA is ± 0.013 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), averaged readings between 0 and $0.013 \mu\text{g}/\text{m}^3$ will be recorded as $0 \mu\text{g}/\text{m}^3$. The readings will be collected from immediately above the item's surface.
- 1.** If the item sampled is below $10 \mu\text{g}/\text{m}^3$, then it may be removed from the Site.
 - 2.** If the item sampled ranges from $10 \mu\text{g}/\text{m}^3$ and $49.99 \mu\text{g}/\text{m}^3$, then the item will be transferred to a designated area, covered with polyethylene, and sampled after a 15-minute holding time.
 - 3.** If the reading of the covered item is less than $49.99 \mu\text{g}/\text{m}^3$, and decreases during follow-up sampling, then the item may be removed from the Site.
 - 4.** If the reading of the covered item is less than $49.99 \mu\text{g}/\text{m}^3$, and follow-up samples do not decrease, then the item will be decontaminated in accordance with the guidelines presented herein.
 - 5.** If the item sampled is greater than $50.00 \mu\text{g}/\text{m}^3$, then the item will be decontaminated in accordance with the guidelines presented herein.
- C.** Following an individual reading, the instrument should sample ambient air prior to the next replicate.
- D.** If the results for subsequent scanning activities continue to exceed the action levels for mercury, then the object will be evaluated with the DSR to determine appropriate off-site disposal in accordance with applicable regulations.

END OF SECTION

SECTION 02 60 00
CONTAMINATED SITE MATERIAL REMOVAL

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Immediately after clearing and grubbing (See Section 31 11 00 – Clearing and Grubbing) in the bank removal and restoration areas, the Contractor shall advance test pits within the Primary BMA footprints to allow the DSR or designee to collect samples to characterize the waste profile of the bank soils targeted for removal in situ. Test pits shall be advanced and samples collected and analyzed in accordance with the Waste Characterization Sampling Plan (Attachment 1).
- B.** The Contractor shall collect and containerize all soil, debris, dust (e.g., including sawdust, wood chips, and concrete debris), and other waste materials generated by the work activities for off-site transportation and disposal in accordance with applicable regulations, this Contract Specification, and the Contractor's approved work plan.
- C.** Waste material handling, segregation, and containerization activities shall be conducted by the Contractor, as the waste materials are generated, throughout the implementation of the work.
- D.** The Contractor shall propose specific methods for handling, segregating, and containerizing (including proposed containers to be provided by the Contractor) for each anticipated waste stream generated during the work.
- E.** The Contractor shall complete air monitoring activities in accordance with applicable regulations and as detailed in the Contractor-prepared Air Monitoring Plan.
- F.** The Contractor shall be solely responsible for their methods and sequences with regard to the work.
- G.** Work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.

1.02 RELATED WORK

- A.** Work related to this Section is described in
 - 1.** Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 - 2.** Section 31 11 00 – Clearing and Grubbing

1.03 DEFINITIONS

- A.** Acronyms
 - 1.** BMA – Bank Management Area
 - 2.** HASP – Health and Safety Plan

SECTION 02 60 00
CONTAMINATED SITE MATERIAL REMOVAL

- 3. RCRA – Resource Conservation and Recovery Act
- 4. TCLP – toxicity characteristic leaching procedures
- 5. THg – total mercury
- 6. USDOT – U.S. Department of Transportation

1.04 REFERENCES

- A. Not used

PART 2 – MATERIALS

2.01 MATERIALS AND EQUIPMENT

- A. To be specified and supplied by the Contractor.

2.02 CONTAINERS

- A. The Contractor shall provide U.S. Department of Transportation- (USDOT)- approved containers for storage of wastes generated by the removal activities prior to transportation for off-site disposition. Containers may be lined rolloff containers, Super Sacks, or other approved products.

PART 3 – EXECUTION

3.01 GENERAL

- A. During the progress of the work, the Contractor shall keep the premises free from accumulations of waste materials, rubbish, and other debris resulting from the work. At the completion of the work, the Contractor shall remove all waste materials, rubbish, debris, and surplus materials from the premises. In particular, tripping hazards shall be consistently monitored, as identified by Site workers, and shall be addressed immediately.
- B. Soil testing to determine levels of contamination shall be performed before the commencement of mass grading. This will determine the appropriate disposal facility that the soils excavated from each Bank Management Area (BMA) will need to be transported and disposed of at.
 - 1. The Contractor may elect to load excavated soils from the Primary BMAs directly into trucks lined with durable plastic sheeting for direct transport to disposal facility.

SECTION 02 60 00

CONTAMINATED SITE MATERIAL REMOVAL

- a. The liners shall be durable enough to withstand physical (tearing) and chemical degradation during transport, and shall be inspected daily and replaced by the Contractor if damage is noted.
- 2. The Contractor may also elect to load excavated soil into secure containers for transport to appropriate disposal facility.
 - a. From start of work on Monday through close of business on Friday, soil may be kept in secure containers within the work area. However, no containers shall remain on site from after close of business Friday to start of work Monday.
- 3. The Contractor shall stockpile excavated soil on site from Secondary BMAs.
- C. Stockpiled material from the Secondary BMAs will be characterized to determine the suitability for use as backfill material in Primary BMAs and for disposal purposes. If it is determined that the material is not suitable for use as backfill material on-site, the material will be disposed of in accordance with the Waste Management Plan. The Contractor shall not burn or bury any materials on site.

3.02 WASTE MATERIAL STAGING AREAS

- A. Waste material shall be directly loaded into appropriate USDOT-approved waste containers in temporary on-site staging areas to promote efficient on-site handling, containerization, and off-site transportation and disposition of the materials. Only like waste materials with similar waste characteristics and/or disposal requirements may be staged together (if staging is required). Area within the project limits shown on the Contract Drawings is available for temporary staging and laydown. If any of these locations are to be used for waste material staging areas, it shall be proposed by the Contractor and approved by the DSR.
- B. Waste material staging area(s) shall be constructed within the project limits shown on the Contract Drawings with a 12-inch-high (minimum) berm along the perimeter, lined with two layers of 20-mil (minimum) reinforced polyethylene sheeting, and sloped to a polyethylene-lined sump to allow for collection of liquids (if any). The polyethylene sheeting shall be extended over the top and outside face of the berm, and shall be adequately secured to prevent disturbance due to wind forces and/or on-site operation. The polyethylene sheeting shall be overlain by a layer of sand (minimum depth of 4 inches) and a layer of gravel (minimum depth of 4 inches). In addition, the Contractor shall install erosion- and sediment-control measures surrounding all waste material staging areas located outside.
- C. Waste material staging areas shall be covered with a low-permeability cover of 20-mil polyethylene sheeting whenever the waste material is not actively being placed into/removed from the staging areas, during overnight hours, during periods of precipitation, whenever dust or mercury vapor action levels are being exceeded, or whenever directed by the DSR. The low-permeability cover shall be adequately anchored to prevent disturbance due to wind or other forces. Soil, demolition debris, or other waste materials shall not be utilized to anchor the cover.

SECTION 02 60 00
CONTAMINATED SITE MATERIAL REMOVAL

- D. Liquids collected within the waste material staging area shall be collected and containerized for characterization (by the Contractor) prior to off-site disposition.
- E. Following completion of the off-site transportation and disposition activities, staging area materials shall be disposed in accordance with the waste material stored in the staging area.

3.03 WASTE MATERIAL CHARACTERIZATION

- A. Bank soils targeted for excavation will be characterized in situ by the DSR or designee according to the Waste Characterization Sampling Plan. The Contractor shall assist in collection of the samples.
- B. Waste materials generated during the work activities shall be handled and segregated into appropriate waste streams (based on waste characterization) to facilitate off-site transportation and disposition in accordance with applicable federal, state, and local regulations.
- C. Waste materials that have not been characterized based on the results of previous Site investigation activities (including, but not limited to, unanticipated waste materials, materials inaccessible during the Site investigation activities, and waste materials to be generated during work implementation) will be characterized by the DSR prior to off-site transportation and disposition.

3.04 WASTE MATERIAL PROCESSING

- A. The Contractor shall be responsible for processing waste materials into manageable sizes, as necessary, to satisfy off-site transport and disposal requirements. All waste material processing activities shall be conducted at the point of generation (e.g., within the work area limits prior to removal), within on-site staging areas, and/or at the disposition facility.
- B. The Contractor shall submit to the DSR proposed methods necessary for processing all waste materials, as well as maximum size requirements, to satisfy off-site transportation and disposition requirements. The Contractor's proposed methods shall include appropriate dust and mercury vapor control measures to be utilized during the processing activities. The Contractor shall present their proposed methods for material processing in their work plan for review by the DSR.
- C. Like waste streams shall be consolidated to facilitate off-site transportation and disposal.
- D. Failure by the Contractor to keep the waste streams segregated, resulting in a new waste stream(s) to be characterized and disposed, shall not result in additional costs to DuPont. If a previously nonhazardous waste stream is rendered a hazardous waste stream due to the Contractor's failure to maintain segregation of waste materials, the Contractor shall be responsible for all additional costs associated with the transportation and off-site disposition of the new hazardous waste stream.

SECTION 02 60 00
CONTAMINATED SITE MATERIAL REMOVAL

3.05 CONTAINERIZATION REQUIREMENTS

- A.** The Contractor shall be responsible for containerizing all waste materials generated during the work activities. All wastes generated during the work activities shall be containerized by the Contractor into USDOT-approved waste containers.
- B.** All rolloff containers, dump trucks, and/or dump trailers used for the transport of waste materials generated during the work activities shall be lined with durable polyethylene sheeting (with a minimum thickness of 20 mil) and shall be covered with a tarp secured to minimize the potential for release of dust and/or mercury vapors during transportation. If the container/truck/trailer lining or cover materials are ripped, not secured, or otherwise unacceptable to the DSR, the container/truck/trailer shall not exit the Site until the deficiencies have been addressed (to the satisfaction of the DSR).

3.06 DISPOSITION REQUIREMENTS

- A.** The Contractor shall be responsible for establishing waste profiles for each waste stream, as required by the waste disposition facilities. The DSR may be consulted during the completion of waste profiles, as necessary. The Contractor shall submit the completed profiles to the DSR for review and signature.
- B.** All hazardous wastes transported from the Site shall be under manifests as required by their status as hazardous waste. Nonhazardous wastes shall be transported from the Site under nonhazardous waste manifests. Each waste manifest shall include a waste material description according to USDOT requirements (i.e., proper shipping name, hazard class, and ID number). All hazardous wastes shall be assigned the appropriate hazardous waste codes according to characterization information. Land Disposal Restriction (LDR) Notification Forms shall also be prepared by the Contractor for each hazardous waste stream subject to LDR regulations (40 CFR 268).
- C.** The Contractor shall be responsible for preparing all waste manifests (for hazardous and nonhazardous wastes) for each off-site shipment of waste material generated during the work activities. The prepared manifests will be subject to review by the DSR. The DSR will be responsible for signing waste manifests for each off-site shipment of waste materials.
- D.** Certificates of Destruction/Disposal from all disposition facilities shall be provided directly to the Contractor, who will forward copies to the DSR. Copies of manifests and Certificates of Destruction/Disposal will be maintained by the DSR at the Site. The Contractor shall be responsible for obtaining and providing to the DSR documentation of weights for each waste shipment from the disposition facilities for Project information and invoice payment purposes. The documentation shall present the weights of materials disposed/recycled/reclaimed at the facility for each manifest identification number.
- E.** Only waste transporters licensed and permitted in accordance with USDOT, Virginia Department of Transportation, and other state agencies (as applicable) to handle the type of waste material transported shall be used. The waste transportation companies shall be subject to DSR review and approval.

SECTION 02 60 00
CONTAMINATED SITE MATERIAL REMOVAL

- F.** Prior to off-site transportation, the Contractor shall screen all waste containers for mercury vapor. If the results of screening indicate that the waste should be re-characterized based on the final planned disposition method, the DSR shall be notified and the materials shall be re-characterized for appropriate off-site disposal as necessary.
- G.** The Contractor shall only utilize disposition facilities that have been reviewed by the DSR prior to off-site shipment of waste materials. Each disposition facility utilized shall be licensed, permitted, and compliant (as applicable) with all applicable federal, state, and local regulations.
- 1.** The DSR has identified facilities in Table 1 for waste disposal dependent on final tested values for total mercury (THg) and Resource Conservation and Recovery Act (RCRA) toxicity characteristic leaching procedures (TCLP) as reported before excavation. The Contractor may propose alternative disposal facilities, but shall use these facilities unless written approval is given by the DSR.

Tested Values	RCRA Classification	Disposal Facility
THg < 260 mg/kg TCLP Hg < 0.2 mg/L	RCRA Non-Hazardous	Waste Management Amelia Landfill (Jettersville, VA)
THg ≥ 260 mg/kg TCLP Hg < 0.2 mg/L	RCRA Non-Hazardous	U.S. Ecology Subtitle-C Landfill in Belleville, MI
THg < 260 mg/kg TCLP Hg ≥ 0.2 mg/L	RCRA Hazardous	U.S. Ecology Subtitle-C Landfill in Belleville, MI
THg ≥ 260 mg/kg TCLP Hg ≥ 0.2 mg/L	RCRA Hazardous	Bethlehem Apparatus (Retorting Facility) in Bethlehem, PA

- H.** At a minimum, waste materials generated from the work activities (including materials with total mercury and TCLP mercury less than values noted in the Table above) shall be sent to a non-hazardous RCRA Subtitle D landfill disposal facility. Based on characterization results and/or waste characteristics, other wastes may be disposed at a disposition and/or recycling facility with more stringent criteria and/or as required by local, state, and federal regulations.

END OF SECTION

SECTION 31 05 19

GEOSYNTHETICS

PART 1 – GENERAL

1.01 SUMMARY

- A. Work shall consist of furnishing and placing geosynthetic soil reinforcement for construction of embankments, 6-inch blended biochar placement, and 12-inch planting substrate placement.
- B. The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C. If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A. Section 01 33 00 – Submittals
- B. Section 01 35 29 – Health, Safety, and Emergency Response Procedures
- C. Section 02 11 40 – Stockpiling
- D. Section 31 23 00 – Earthwork and Fill
- E. Section 31 35 00 – Slope Protection
- F. Section 31 37 00 – Stone Toe Protection
- G. Section 32 90 00 – Planting and Habitat Restoration

1.03 DEFINITIONS

- A. Acronyms
 - 1. ASTM – American Society for Testing and Materials
 - 2. DSR – DuPont Site Representative
 - 3. HASP – Health and Safety Plan
 - 4. VDOT – Virginia Department of Transportation

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM) D4873
- B. Virginia Department of Transportation (VDOT) Standard Specification Section 245.03(c)

SECTION 31 05 19 GEOSYNTHETICS

1.05 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00 – Submittals, for each geosynthetic product described in this section.
 - 1. Geotextile:
 - a. Reinforcement material supplier
 - b. Reinforcement product information including manufacturer name, manufacturer product number, and test results that verify the product complies with required Contract Specifications
 - c. Geosynthetic manufacturer's certification that the geosynthetics supplied meet the respective index criteria provided in this section, measured in full accordance with all test methods and standards specified.
 - 2. Geomembrane, Geotextile, and Geocell System: The Contractor shall submit manufacturer data showing that geotextile and geocell system meets or exceeds the requirements outlined herein for the DuPont Site Representative's (DSR's) review and approval prior to ordering materials.

PART 2 – PRODUCTS

2.01 GEOMEMBRANE FOR IMPACTED STOCKPILE BOTTOM LINERS

- A. The Contractor shall submit a geosynthetic 40-mil high-density polyethylene (HDPE) geomembrane and appurtenances or equivalent for the DSR for review and approval. The geomembrane shall be placed between 2 layers of geotextile on top of 2 to 6 inches of subgrade fill as shown in accordance with Section 02 11 40 – Stockpiling and the Contract Drawings.

2.02 GEOTEXTILE

- A. Geotextile shall comply with VDOT Standard Specification Section 245.03(c). Mirafi FW404 and appurtenances or equivalent is an acceptable product.

2.03 GEOCELL SYSTEM FOR BANK REMOVAL AND RESTORATION AREAS

- A. The Contractor shall submit a geosynthetic 6-inch geocell system and appurtenances or equivalent for the DSR for review and approval. The 6-inch geocell system shall be placed on top of the geotextile in Section 2.01 and underneath the Section 31 37 00 – Stone Toe Protection and as noted in the Contract Drawings.
- B. Backfill material shall be in accordance with Section 31 23 00 – Earthwork and Fill, Subsection 2.07.

SECTION 31 05 19

GEOSYNTHETICS

2.04 GEOCELL SYSTEM FOR BANK STABILIZATION AREAS

- A.** The Contractor shall submit a geosynthetic 12-inch geocell system and appurtenances or equivalent for DSR for review and approval. The 12-inch geocell system shall be placed in accordance with Section 32 90 00 – Planting and Habitat Restoration and as noted in the Contract Drawings.
- B.** Backfill material shall be in accordance with Section 32 23 00 – Earthwork and Fill, Subsection 2.08.

PART 3 – EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

- A.** Check products upon delivery to ensure proper material has been received and material is dry and undamaged.
- B.** Protect materials from damage and exposure in accordance with ASTM D4873.
 - 1.** Protect geosynthetic from deleterious materials, chemicals, sparks and flames, excess temperature, and any other environmental conditions that may degrade physical properties.
 - 2.** If stored outdoors, rolls shall be elevated from the ground surface.
- C.** Label each roll with manufacturer's name, product identification, roll dimensions, lot number, and date manufactured.
- D.** Handle and unload rolls by hand or with load-carrying straps, fork lift with stinger bar, or axial bar assembly, or as recommended by the manufacturer.
- E.** Do not drag, lift by one end, lift by cables or chains, or drop roll to the ground.

3.02 SUBGRADE PREPARATION

- A.** Prepare subgrade to be level and free from deleterious materials, loose, or otherwise unsuitable soils.
- B.** Prior to geosynthetic placement, proof roll subgrade to identify soft areas.
- C.** Soft subgrade areas shall be excavated and backfilled with suitable compacted soils.
- D.** Bench the back cut as necessary in a manner that results in stable slope conditions.

3.03 GEOSYNTHETIC PLACEMENT

- A.** Install geosynthetics in accordance with manufacturer's recommendations and this Contract Specification.

SECTION 31 05 19 GEOSYNTHETICS

- B. Where conflicts arise between the recommendations of the manufacturer and this Contract Specification, the stricter of the requirements, as determined by the DSR, shall govern the installation.
- C. Place geosynthetic in continuous longitudinal strips in the direction of the main reinforcement.
- D. Horizontal coverage of less than 100% is not allowed.
- E. Place only that amount of geosynthetic reinforcement required for immediately pending work to prevent undue damage.
- F. Geosynthetic reinforcement shall be placed to lie flat and pulled tight prior to backfilling.

3.04 GEOCELL SYSTEMS FOR BANK REMOVAL AND RESTORATION AREAS

- A. The geocell system shall be installed in accordance with the manufacturer recommendations. The Contractor shall perform any Quality Control testing or verification as recommended by the manufacturer.
- B. Where conflicts arise between the recommendations of the manufacturer and this Contract Specification, the stricter of the requirements, as determined by the DSR, shall govern the installation.

3.05 FILL PLACEMENT OVER GEOTEXTILE

- A. Place, spread, and compact backfill in a manner to minimize the development of wrinkles and/or displacement of the geosynthetic.
- B. Place fill in maximum 12-inch-thick lift thickness when heavy compaction equipment is used, and maximum 6-inch-thick lift thickness when hand-operated compaction equipment is used.
- C. Grade backfill away from the slope crest, and roll backfill at the end of the work shift to prevent ponding of water on the reinforced backfill surface.
- D. Do not operate tracked construction equipment directly on the geosynthetic surface. A minimum of 6 inches of backfill shall overlay the geosynthetic where tracked equipment is operating.
- E. Compact backfill as noted in Section 31 23 00 – Earthwork and Fill for the appropriate backfill product.
- F. Conduct one in situ density test for in the first three lifts of backfill placed per BMA, and one per each 500 cubic yards of backfill placed thereafter to verify conformance with these Contract Specifications.

3.06 FILL PLACEMENT WITHIN GEOCELL SYSTEMS FOR BANK STABILIZATION AREAS

- A. Place and spread backfill in a manner to minimize the development of wrinkles and/or displacement of the geocell systems.

SECTION 31 05 19
GEOSYNTHETICS

- B.** Place fill in lift thicknesses as recommended by the manufacturer.
- C.** There is no required backfill compaction requirement, but hand tamping of the backfill shall be performed in order to reach a compacted state to the satisfaction of the DSR.
- D.** Hand-operated machinery may be used if recommended by the manufacturer. The Contractor shall take precautions not to damage the geocell systems. If damage occurs, the Contractor shall be responsible to perform repairs as recommended by the manufacturer, up to and including replacement.

END OF SECTION

SECTION 31 11 00 CLEARING AND GRUBBING

PART 1 – GENERAL

1.01 SUMMARY

- A.** The Contractor shall determine the extent of clearing and grubbing necessary to complete the work. Clearing and grubbing is expected to be necessary for Site access and in the Bank Management Areas (BMAs) prior to bank excavation in the removal and restoration areas and placement of geocells in the bank stabilization areas. The work includes the requirements for clearing, grubbing, and cleanup of the areas identified by the Contractor in accordance with the Contract Drawings for areas identified as Clearing and Grubbing Areas. The work is to be accomplished by removing and disposing of all removed trees, brush, down timber, stumps, roots, rubbish, and debris from the BMAs and as necessary to construct temporary construction access roads.
- B.** The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C.** If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A.** Work related to this Section is described in
 - 1. Section 01 10 00 – Summary of Work
 - 2. Section 01 33 00 – Submittal Procedures
 - 3. Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 - 4. Section 01 35 43 – Environmental Protection Procedures
 - 5. Section 02 60 00 – Contaminated Site Material Removal
 - 6. Section 06 13 43 – Large Woody Material
 - 7. Section 31 12 00 – Selective Clearing
 - 8. Section 31 25 00 – Erosion and Sedimentation Control

1.03 DEFINITIONS

- A.** Acronym
 - 1. BMA – Bank Management Area
 - 2. HASP – Health and Safety Plan
 - 3. DSR – DuPont Site Representative

**SECTION 31 11 00
CLEARING AND GRUBBING**

1.04 REFERENCES

1. Not used

PART 2 – PRODUCTS

- A. Products that are required to accomplish, or to be incorporated into, the work of this Section shall be as selected by the Contractor, subject to the approval of the DuPont Site Representative.

PART 3 – EXECUTION

3.01 CLEARING

- A. Remove and dispose of all other trees, including roots, brush, logs, upturned stumps, roots of downed trees, rubbish, and debris from within the bank removal and restoration area and bank stabilization area limits as necessary to facilitate bank excavation and geocell placement.
- B. If necessary for protection, trees and shrubs on the boundaries of the clearing limits shall be fenced during the Contractor's operations in accordance with Section 32 12 00 – Selective Clearing

3.02 GRUBBING

- A. Perform grubbing where necessary to accommodate the work. Remove from the ground all stumps, roots, buried logs, and other vegetation of a decomposable nature.
- B. Grub all BMAs where slopes will be excavated and re-graded in accordance with Section 02 60 00 – Contaminated Site Material Removal.
- C. Within the limits of grubbing, grubbing shall be to the depth necessary to remove all stumps, large roots, buried logs, and other objectionable material.
- D. Dispose of the refuse resulting from the grubbing operations in accordance with Section 02 60 00 – Contaminated Site Material Removal.

3.03 ORDERLY WORK AREA AND SITE CLEANUP

- A. The Contractor shall maintain neat and orderly staging, storage and work areas. The Contract will not be considered complete until all of the Contractor's tools, equipment, and property have been removed from the Project Site, and the Contractor's storage and work areas have been properly cleaned.

END OF SECTION

SECTION 31 12 00 SELECTIVE CLEARING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for the protection of trees not designated for removal and procedures for cutting trees designated for removal in the Selective Clear Areas identified on the Contract Drawings as Selective Clearing Areas.
- B. The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C. If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A. Work related to this Section is described in
 - 1. Section 01 33 00 – Submittal Procedures
 - 2. Section 01 35 39 - Health, Safety, and Emergency Response Procedures
 - 3. Section 31 11 00 – Clearing and Grubbing
 - 4. Section 32 90 00 – Planting and Habitat Restoration

1.03 DEFINITIONS

- A. Acronyms
 - 1. DSR – DuPont Site Representative
 - 2. HASP – Health and Safety Plan

1.04 REFERENCES

- A. National Arborist Association tree-pruning standards

1.01 SUBMITTALS

The Contractor shall submit the following for the approval by the DSR, in accordance with Section 01 33 00 – Submittal Procedures, and as further specified in this Section.

SECTION 31 12 00 SELECTIVE CLEARING

- A. Certificates: The Contractor shall provide DuPont with copies of the following documentation.
 - 1. Professional tree service company(s): Prior to commencing of tree trimming activities, the Contractor shall submit for review the name, applicable State identification number, past performance record of tree service company. The Contractor shall also submit a letter of commitment from the tree service company which they are proposing to use for tree trimming services.

PART 2 – PRODUCTS

2.01 TEMPORARY TREE PROTECTION FENCING

- A. Furnish and install temporary tree protection fencing as shown on the Contract Drawings where work is occurring near tree dripline.
- B. The temporary fence shall consist of woven wire mesh not less than six feet in height, complete with metal or wood posts and all required bracing, and with truck and pedestrian gates, required to accomplish the work.
- C. Construction fencing and gates shall not block access to the park driveway and private residences that have an easement to use this driveway.

PART 3 – EXECUTION

3.01 PROTECTION WITHIN THE DRIP-LINE WITHIN THE AREA OF WORK

- A. Where existing trees are to remain the area of work, the Contractor shall employ all methods to minimize adverse impact to these existing trees, including limbs and roots, during installation of the geocell and other work. These methods may include but not be limited to
 - 1. Temporary tie-up of low limbs.
 - 2. Application of a 4- to 6-inch thick layer of mulch (or wood chips salvaged from clearing and grubbing operations) within the drip-line of trees.
 - 3. Timber or steel planking for protection of surface roots from equipment.
 - 4. Tree limb and/or root pruning or other tree limb and/or root treatment as directed by a Virginia-certified Arborist.
- B. No storage of equipment or materials shall be allowed within the drip-line of trees not designated for removal. Steel planking, or timber planking made of 4-inch-thick material, each plank covering a minimum of 8 square feet, shall be used to support backhoe and other equipment stabilizers when set within the drip-line of a tree to remain.

SECTION 31 12 00 SELECTIVE CLEARING

- C. The Contractor shall use lightweight machinery around the trees and shrubs to remain in place, or perform work by hand.

3.02 PROTECTION WITHIN THE DRIP-LINE OUTSIDE OF THE AREA OF WORK

- A. Where existing trees outside the area of work have drip-lines extending into the area of work, the Contractor shall employ all methods to minimize adverse impact to these existing trees, including limbs and roots from equipment mobilization and other work. These methods may include but not be limited to
 - 1. Temporary chain link construction fencing.
 - 2. Temporary tie-up of low limbs.
 - 3. Application of a 4- to 6-inch-thick layer of mulch (or wood chips salvaged from clearing and grubbing operations) within the drip-line of trees.
 - 4. Timber or steel planking for protection of surface roots from equipment.
 - 5. Tree limb and/or root pruning or other tree limb and/or root treatment as directed by a Virginia-certified Arborist.
- B. No storage of equipment or materials shall be allowed within the drip-line of trees not designated for removal. Steel planking, or timber planking made of 4-inch-thick material, each plank covering a minimum of 8 square feet, shall be used to support backhoe and other equipment stabilizers when set within the drip-line of a tree to remain.

3.03 ABOVE-GRADE WORK

- A. Tree removal or tree trimming within 10 feet of any overhead utility line requires the Contractor to notify the DuPont Site Representative (DSR) at least 5 working days in advance of commencing such operations.
 - 1. Before trimming any trees, the Contractor shall notify DSR of the proposed method and the amount of trimming required.
- B. Trees that will be removed are shown on the Contract Drawings, and all surrounding shrubs shall be removed. The Contractor shall cut tree trunks flush with the soil surface as accepted by the DSR.
- C. When the Contractor anticipates construction operations that will unavoidably affect tree limbs, the Contractor shall notify the DSR at least 5 working days in advance of commencing such operations.
 - 1. Before trimming any trees, the Contractor shall notify DSR of the proposed method and the amount of trimming required.
- D. Trimming shall be done by a professional tree service company whose past and current performance is in accordance with National Arborist Association tree-pruning standards.

**SECTION 31 12 00
SELECTIVE CLEARING**

3.04 ORDERLY WORK AREA AND SITE CLEANUP

- A.** The Contractor shall maintain neat and orderly storage and work areas to the satisfaction of the DSR. The Contract will not be considered complete until all of the Contractor's tools, equipment, and property have been removed from the Project site, and the Contractor's storage and work areas have been properly cleaned.

END OF SECTION

**SECTION 31 23 00
EARTHWORK AND FILL**

PART 1 – GENERAL

1.01 SUMMARY

- A.** Work Includes
 - 1.** Site excavation, grading, filling, and compaction as required to achieve the lines and grades shown on the Contract Drawings
 - 2.** Dewatering temporary cofferdam prior to excavation and prior to deconstruction of cofferdam
 - 3.** Other miscellaneous earthwork required to complete the Project
- B.** The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C.** If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A.** Work related to this section is described in
 - 1.** Section 00 31 32 – Geotechnical Data
 - 2.** Section 01 29 00 – Payment Procedures
 - 3.** Section 01 33 00 – Submittal Procedures
 - 4.** Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 - 5.** Section 02 60 00 – Contaminated Site Material Removal
 - 6.** Section 04 40 00 – Stone Assemblies for Public Access
 - 7.** Section 31 05 19 – Geosynthetics
 - 8.** Section 31 11 00 – Clearing and Grubbing
 - 9.** Section 31 12 00 – Selective Clearing
 - 10.** Section 31 25 00 – Erosion and Sediment Controls
 - 11.** Section 31 35 00 – Slope Protection
 - 12.** Section 31 37 00 – Stone Toe Protection

SECTION 31 23 00 EARTHWORK AND FILL

- 13. Section 31 52 00 – Temporary Cofferdams
- 14. Section 32 90 00 – Planting and Habitat Restoration

B. Acronyms

- 1. ASTM – American Society for Testing and Materials
- 2. AASHTO – American Association of State Highway and Transportation Officials
- 3. BMA – Bank Management Area
- 4. DSR – DuPont Site Representative
- 5. HASP – Health and Safety Plan
- 6. mmhos/cm – millimhos per centimeter
- 7. NTUs - Nephelometric Turbidity Units
- 8. TMECC – Test Methods for the Examination of Composting and Compost
- 9. VDOT – Virginia Department of Transportation
- 10. VDEQ – Virginia Department of Environmental Quality

1.03 REFERENCES

- A. The references listed below shall be the current adopted version(s) at time of project award.
 - 1. City of Waynesboro "Standard Details and Approved Products Manual," Details R-12 and R-12A
 - 2. American Association of State Highway and Transportation Officials (AASHTO) M57
 - 3. Virginia Department of Transportation (VDOT) –Road and Bridge Specifications and Road and Bridge Standards, Volume I and II (current adopted edition)
 - 4. VDOT Special Provision Copied Notes, Special Provision, and Supplemental Specifications (current edition)
 - 5. American Society for Testing and Materials (ASTM) D422 – Standard Test Method for Particle-Size Analysis of Soils
 - 6. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 pounds per square foot)
 - 7. ASTM D2922 – Standard Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods

SECTION 31 23 00 EARTHWORK AND FILL

8. TMECC 04.10-A Electrical Conductivity.
9. All applicable sections of the Virginia Occupational Safety and Health and Occupational Safety and Health Act standards for Construction and General Industry unless superseded by
 - a. Virginia Unique Standards
http://www.doli.virginia.gov/vosh_enforcement/vaunique_standards.html

1.04 QUALITY ASSURANCE

- A. The Contractor is responsible for verifying the quality of the work and shall perform compaction and density tests on request of the DuPont Site Representative (DSR) to check compliance with these Contract Specifications. A copy of the test reports shall be furnished to the DSR.
- B. Inspection of Materials at the Site: Truckloads of imported material shall be visually inspected by the Contractor upon delivery. Materials shall be inspected for the presence of foreign, recycled, or reprocessed material. The DSR may, at any and all times, perform an independent inspection.
 - a. The DSR may require that an independent testing laboratory test imported materials at any time.
 - b. If the material is found to be non-compliant with the Contract, the Contractor shall bear the cost of testing and removal of all non-compliant materials from the Project Site, and replacement of the materials with those meeting the requirements of the Contract.
- C. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by DuPont prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

1.05 EXISTING CONDITIONS

- A. Information on existing soil conditions of the Bank Management Areas (BMAs) is provided in the geotechnical report for the site, included in Attachment A – Geotechnical Investigation Report.
- B. Excavated soils within the BMA sites shall not be reused on the Site and shall be removed from the site in accordance with Section 02 60 00 – Contaminated Site Material Removal.
- C. Information on existing soil conditions of Jones Hollow Property is located in Section 00 31 32 – Geotechnical Data (Jones Hollow)

1.06 SUBMITTALS

The Contractor shall submit the following for the approval by the DSR, in accordance with Section 01 33 00 – Submittal Procedures, and as further specified in this Section.

SECTION 31 23 00 EARTHWORK AND FILL

- A.** Earthwork Plan: Prior to commencing earthwork activities on the Project, the Contractor shall prepare and submit an Earthwork Plan for approval by the DSR. The Earthwork Plan shall include, at a minimum, detailed descriptions of the following items.
1. Methods and equipment that will be used for excavation.
 2. Methods and equipment that will be used for transport and hauling of excavated materials.
 3. Sequence and estimated duration of excavation activity including anticipated cubic yards of excavated soils generated daily.
 4. Means by which limits and cut depths will be checked and verified by the Contractor.
 5. Plan for methods for proper moisture conditioning and compaction all fill materials.
 6. Means for managing excavated materials and preparing them for transportation in accordance with Section 02 60 00 – Contaminated Site Material Removal.
 7. Disposal locations for excavated materials, including haul routes and any locations where re-handling or offloading is required, and documentation of the disposal facility acceptance of the waste in accordance with Section 02 60 00 – Contaminated Site Material Removal.
 8. Methods, equipment, and location(s) for isolating excavated materials from the environment and preventing unfiltered off-flow water from entering Site waters
 9. Means of protecting excavated materials and exposed subgrade surfaces from erosion, wind, and spillage
 10. Worker safety and protection of the public.
 11. Methods and equipment for survey control.
 12. Methods for shoring and securing trenches and temporary excavations in accordance with applicable Occupational Safety and Health Act and Virginia Occupational Safety and Health requirements (Standard 1926, Subpart P and all applicable standards referenced therein)
 - a. Unless otherwise indicated, remove all sheeting, shoring, and bracing after placement and compaction of backfill.
 13. Traffic control during construction duration.
 14. Notification and procedures to be used to coordinate with and accommodate marine vessel traffic while dredging, when work is performed from the river side.

SECTION 31 23 00 EARTHWORK AND FILL

If the Earthwork Plan is judged unsatisfactory to the DSR, then it will be returned to the Contractor for amendment and resubmission. No physical work at the Site shall be started until the Earthwork Plan is accepted.

- B.** Certificates: The Contractor shall provide DuPont with copies of the following documentation.
 - 1.** Shipping and Disposal Documents: The Contractor shall submit copies of trip tickets and Certificates of Disposal signed by the receiving disposal facility for any waste transported from the site. The Contractor shall also submit all manifests and shipping documents.
 - 2.** Imported Materials: The Contractor shall submit a particle gradation analysis in graph and table form, based on the sieve sizes in these Contract Specifications, for each product specified in this Section, unless otherwise specified. By submitting the test reports, the Contractor certifies that the test results are representative of the material purchased and delivered for use in the project. Products specified in this Section shall be approved by the DSR prior to being imported to the site.
 - a.** The initial test reports shall be submitted to the DSR no less than 7 calendar days prior to delivery to the site.
 - b.** If the required volume of a product is more than 200 cubic yards then the Contractor shall submit additional test reports for every 20 percent of the total volume of each material delivered to the site.
 - 3.** Soil Analysis Reports: The Contractor shall submit test results for Planting Substrate as specified in Article 2.05 (A). Testing shall be performed by a lab approved by DSR.

PART 2 – PRODUCTS

2.01 GENERAL

- A.** Imported materials shall be from the Jones Hollow Property or from sources arranged for by the Contractor and approved by the DSR.
- B.** Materials shall be of the quality, size, shape, gradation, or equal to that of the manufacture as specified herein. During the course of importing materials, the Contractor shall be responsible for continually checking the materials to ensure they continue to meet the Contract Specifications.
- C.** Refer to Section 31 05 19 – Geosynthetics for geotextile, geocell system for the Bank Removal and Restoration Areas, and geocell system for the Bank Stabilization Areas.
- D.** Refer to Section 04 40 00 – Stone Assemblies for Public Access for stepping stones, viewing platform, and limestone boulders.
- E.** Refer to Section 31 37 00 – Stone Toe Protection for toe rock and imported boulders.

SECTION 31 23 00 EARTHWORK AND FILL

2.02 CONTAMINATED ON-SITE SOILS

- A. All onsite soils to be disturbed and/or excavated shall be considered contaminated and shall be handled in accordance with Section 02 60 00 – Contaminated Site Material Removal.

2.03 SUBGRADE FILL MATERIAL

- A. The Contractor shall backfill excavations with imported subgrade fill material from the Jones Hollow Property or an approved source.
 - 1. If material is imported from a source other than the Jones Hollow Property, the Contractor shall provide verification that the materials conform to the requirements listed in this Contract Specification.
 - a. Grain Size Analysis (American Society for Testing and Materials [ASTM] D422)
 - b. Moisture Content (ASTM D 2216)
 - c. Specific Gravity (ASTM D854)
 - d. Total organic carbon (Standard Methods [SM] method 5310B)
 - e. U.S. Environmental Protection Agency [EPA] publication SW 846, Method 7471A
 - 2. Jones Hollow Property materials do not require additional testing unless requested by the DSR.
- B. Subgrade Fill Material shall be granular material and shall be imported or processed from suitable native material that is non-contaminated with mercury. Individual particles shall be free from all objectionable coating. The material shall contain no organic matter or soft friable particles in quantities considered objectionable by the DSR.
 - 1. Concrete, slag, and glass shall not be used on the site.
 - 2. Subgrade Fill material shall meet the requirements of VDOT Standard Specification Section 303.02(a) and American AASHTO M57, Section 4.2.1 except that material classified as A-4, A-5, A-6, and A-7 shall not be used without the DSR's approval.

2.04 CRUSHED GRAVEL

- A. Material shall conform to Virginia Size Nos. 5, 56, 57, 67, or 68 as noted in Table II-3 of the VDOT Standard Specifications (current edition) and all other requirements of VDOT Standard Specification Section 203.03.
 - 1. The Contractor shall provide current gradation information to DSR.

SECTION 31 23 00 EARTHWORK AND FILL

2. The Contractor shall provide other verification information noted in Section 203.03 at the DSR's requests.
 - a. Any additional testing and delays to schedule in order to verify conformance with Section 203.03 shall be the Contractor's responsibility

2.05 PLANTING SUBSTRATE

- A. Planting substrate mix shall consist of 50 percent Subgrade Fill and 50 percent compost by volume.
 1. Mix shall contain 10 percent to 20 percent organic matter, by weight (loss on ignition).
 2. The pH range shall be from 6.0 to 7.5.
 3. Soluble salt contents shall be less than 3.0 mmhos/cm tested in accordance with TMECC 04.10-A "Electrical Conductivity."

Subgrade Fill shall conform to Article 2.03 of this Section and shall be free of phyto-toxic materials and viable seeds, rhizomes, or roots of State-listed noxious weeds
- B. Compost
 1. Compost shall be derived from plant material and meet the general criteria set forth by the U.S. Composting Seal of Testing Assurance (STA) program. See www.compostingcouncil.org for a list of local providers.
 2. The compost shall be the result of the biological degradation and transformation of plant-derived materials under conditions that promote anaerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have a moisture content that has no visible free water or dust produced when handling the material. It shall meet the following criteria, as reported by the U.S. Composting Council STA Compost Technical Data Sheet provided by the vendor.
 - a. 100 percent of the material must pass through a 0.5-inch screen
 - b. The pH of the material shall be between 5.5 and 8.5.
 - c. Manufactured inert material (e.g., plastic, concrete, ceramics, and metal) shall be less than 1.0 percent by weight.
 - d. Minimum organic matter shall be 40 percent dry weight basis, as determined by TMECC 05.07A, LOI.
 - e. Soluble salt contents shall be less than 4.0 mmhos/cm, tested in accordance with TMECC 04.10-A "Electrical Conductivity."

SECTION 31 23 00
EARTHWORK AND FILL

- f. Must be mature and stable per the appropriate test(s) as specified by STA.
 - g. Carbon/nitrogen ratio shall be less than 25:1.
 - h. Must meet U.S. Environmental Protection Agency Part 503 levels for heavy metals.
 - i. The compost should have an optimum dry bulk density ranging from 40 to 50 pounds/cubic feet (ft³). However, certain fully mature coarse textured composts may be lower.
3. Compost may be sourced from below supplier or other approved equal
- a. Black Bear Composting, Crimora, Virginia

2.06 BIOCHAR BLEND FOR APPLICATION IN BANK REMOVAL AND RESTORATION AREAS

- A. The biochar blend shall consist of 15% biochar and 85% subgrade fill.
 - 1. Subgrade fill shall be in accordance with 2.03 of this Section.
 - 2. Biochar shall be an all-natural hardwood charcoal product with no added chemical or fillers. Biochar Now Medium Biochar or engineer approved equivalent is an acceptable product.
- B. The biochar blend shall meet the gradation noted in the table below.
 - 1. If necessary, the Contractor shall grind or process the biochar prior to mixing with the subgrade fill, then perform particle size analysis (ASTM D422) on the blended material in order to meet the gradation requirements of the table below.
- C. The biochar blend shall have a hydraulic conductivity of 10⁻³ centimeter/second (50 feet/day) or greater (more permeable). The DSR may request that the Contractor provide test results on the blended materials to confirm conformance.

U.S. Sieve Size	Percent Passing
1-inch	100
3 /4-inch	60-90
U.S. No. 10	25-65
U.S. No. 40	10-40
U.S. No. 200	0-4

2.07 BIOCHAR BLEND FOR APPLICATION IN BANK STABILIZATION AREAS

- A. The biochar blend shall consist of 15% biochar and 85% planting substrate.
 - 1. Planting Substrate shall be in accordance with 2.05 of this Section.

SECTION 31 23 00 EARTHWORK AND FILL

2. Biochar shall be in accordance with 2.06 (A.2) of this Section.
 - a. If necessary, the Contractor shall grind or process the biochar prior to mixing in order to meet the gradation requirements of the table below prior to blending with the Planting Substrate.

U.S. Sieve Size	Percent Passing
3 /4-inch	Min. 100
U.S. No. 4	94-100
U.S. No. 50	Max. 25

2.08 UTILITY BACKFILL MATERIALS

- A. The Contractor shall follow the material and design requirements of the City of Waynesboro Public Works for replacement in kind of utilities (reinforced concrete pipe (RCP) storm sewer).
 1. The class of RCP shall be determined by the utility owner, but if not, then the Contractor shall not procure and install RCP below Class III.
 2. The utility owner shall determine whether VDOT Road and Bridge Standard EW-1, EW-1PC, ES-1 shall be used for construction.
 3. Materials shall be in accordance with VDOT Road and Bridge Standard PB-1 for “normal earth foundation”
 4. Only natural earth materials shall be allowed for backfill.

2.09 PAVEMENT REPAIR

- A. The Contractor shall conform with the requirements of the City of Waynesboro “Standard Details and Approved Products Manual,” Details R-12 and R-12A (current version).

2.10 STABILIZED CONSTRUCTION ENTRANCE

- A. Materials shall conform with the requirements of VDOT Road and Bridge Standard EC-11 (current version).

PART 3 – EXECUTION

3.01 SITE EXCAVATION, GRADING AND BACKFILL

- A. Earthwork – General
 1. The Contractor shall excavate material encountered within the limits, lines, and grades specified on the Contract Plans. The Contractor shall maintain side slopes of excavations so that they remain stable and free of sloughing soil.

SECTION 31 23 00 EARTHWORK AND FILL

2. Excavation on slopes shall proceed downward, working from top of slope to toe of slope. As the work progresses, it is anticipated that some slope material will slough into the cut area. The Contractor shall remove this material and will make a final pass with the excavator bucket along the sections' edges when the excavation is completed to help assure proper grades are achieved.
3. The Contractor shall not store any equipment within 5 horizontal feet of the upper edge of any excavation or farther as deemed necessary for safety reasons. Locate and retain soil materials away from edge of excavations and drip lines of trees to remain.
4. Do not excavate in frozen material without the written approval of the DSR.
5. In performing the excavation, the Contractor shall pay particular attention to the conditions of issued permits and authorizations requiring the minimization of turbidity and siltation and adherence to water quality requirements.

B. Over Excavation

1. Removal of materials beyond indicated sub-grade elevations or dimensions without specific direction of the DSR is not authorized. Unauthorized excavation, as well as corrective work directed by the DSR, shall be at the Contractor's expense.
 - a. Undercut Excavation and Backfill Procedures: Refer to VDOT Standard Specification Sections 303.04(c) and 303.04(f)
 - b. Backfilling Openings Made for Structures: Refer to VDOT Standard Specification Sections 303.04(g)
 - c. Removal of Unsuitable Materials: Refer to VDOT Standard Specification Section 303.04(e)

C. Tolerances: Refer to VDOT Standard Specification Section 303.05

3.02 MANAGEMENT OF EXCAVATED SURFACES

- A. The Contractor shall be aware of the potential for erosion, contamination, and generation of water sheen from newly excavated surfaces. The Contractor shall control the potential for erosion of materials and loss of soils from freshly exposed excavated surfaces by rolling or grading the surfaces to a smooth condition. If this procedure is judged to be insufficient for protection against erosion in the opinion of the DSR, then the Contractor shall institute additional procedures.

3.03 DEWATERING

- A. All water management activities (i.e., diversion/dewatering, treatment, and discharge) shall conform to local, county, and state regulations, in particular the City of Waynesboro and the VDEQ.

SECTION 31 23 00 EARTHWORK AND FILL

- B.** Prevent surface and subsurface water from flowing into excavations and from flooding project site.
 - 1.** See Section 31 52 00 – Temporary Cofferdams for river diversion structures.
- C.** Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Line ditches and sumps with coarse-grained material that acts as a filter. Do not use trench excavations as temporary drainage ditches.
- D.** Provide, maintain, and operate necessary pumps and other equipment for removal of water from excavations.
- E.** If a generator is to be used to operate pumping equipment, generator shall be placed at the top of the bank or inland of the top of the bank within an approved spill protection area.
- F.** Provide dewatering facilities capable of operating in freezing temperatures if freezing weather conditions occur.
- G.** Monitor and control discharge in accordance with Section 31 25 00 – Erosion and Sediment Controls and the permits required under that section.
- H.** Dewatering Temporary Cofferdam
 - 1.** Prior to excavation pump water from the temporary cofferdam area, filter through sediment filter bags, and discharge directly to the surrounding river in accordance with the project's Waste Management Plan.
 - 2.** Prior to deconstruction of the cofferdam, allow standing water within the cofferdam to settle. Take turbidity readings of standing water and of surrounding river. If the turbidity of the standing water is less than 50 Nephelometric Turbidity Units (NTUs) above the turbidity of the surrounding river, discharge standing water to the surrounding river. If the standing water is 50 NTUs or greater above the turbidity of the surrounding river, implement additional clarification methods approved by the DSR. Following clarification, the standing water will be filtered through sediment filter bags and discharged directly to the surrounding river in accordance with AECOM's Waste Management Plan.
 - 3.** See Section 31 52 00 – Temporary Cofferdams
- I.** Excavations Below Groundwater Table
 - 1.** Dewatering is not required in areas where excavation and trenching extend below the groundwater level.
 - 2.** Except for excavation required to place the stone toe or re-shape critical bank slope BMAs, excavation will stop at the groundwater table.
 - 3.** Construction water generated during stockpiling of saturated impacted soil will be collected and sampled, prior to filtering through sediment filter bags and

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discharged directly to the surrounding river in accordance with the project's Waste Management Plan.

3.04 EXCAVATED SOILS

- A. Handling, storage, transport, and disposal of soils shall be in accordance with Section 02 60 00 – Contaminated Site Material Removal.
- B. It is the responsibility of the Contractor to properly store the stockpiled materials. The Contractor shall be responsible for the protection stockpiled reusable fill from erosion and the effects of inclement weather.
- C. Depending on the facility utilized for disposal, the excavated material may be taken in trucks directly to the landfill. The Contractor will utilize appropriate controls such as lining of truck beds and/or covering of loads to prevent any loss of excavated material during transport. Special care will be taken to prevent spillage onto public roadways or adjacent property, and any such spillage shall be promptly cleaned up. The Contractor may also elect to truck the excavated material to an offloading site for transfer directly to rail cars for shipment.

3.05 EXCAVATED SOILS (JONES HOLLOW PROPERTY)

- A. Reusable fill must be free of deleterious materials, including, soft friable particles, clay balls, wood debris, organics, large objects, and is subject to the DSR's approval.
- B. Store the stockpiled materials in accordance with Paragraph 3.09 below.
- C. It is the responsibility of the Contractor to maintain proper moisture conditions in stockpiled materials so that they may be used as subgrade fill.

3.06 EMBANKMENT PROCEDURES:

- A. Refer to VDOT Standard Specification 303.04(h) with following exception:
 - 1. Refer to Article 3.09 Compaction

3.07 TRENCHING AND BACKFILLING FOR UTILITY INSTALLATION

- A. Installation shall be in accordance with VDOT Road and Bridge Standard PB-1 for "normal earth foundation"
- B. The utility owner shall determine whether VDOT Road and Bridge Standard EW-1, EW-1PC, ES-1 shall be used for construction of end section.

3.08 PAVEMENT REPAIR

- A. The Contractor shall follow the design and construction requirements of the City of Waynesboro "Standard Details and Approved Products Manual," Details R-12 and R-12A

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3.09 COMPACTION

- A. The Contractor shall compact backfill by means of an appropriately sized static, vibratory, or impact type compactor suited to the soil and physical restrictions of the area to be compacted. Although the Contractor is responsible for the selection of the method of compaction, selection of an inappropriate method shall not relieve the Contractor of the responsibility to achieve the specified result. Jetting, sluicing, or water settling will not be permitted.
- B. Compaction testing performed by the DSR shall not relieve the Contractor of the obligation to place and compact backfill materials as required in accordance with these Contract Specifications.
- C. Control soil compaction during construction so as to provide minimum percentage of density specified for area classification. Do not allow equipment traffic to overly compact areas beyond specified percentages. Correct over-compaction as directed by the DSR, including ripping, regrading and re-compaction or over-excavation and in-kind replacement per plan.
- D. Unless otherwise specified for a specific backfill or fill material, place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand operated tampers.
- E. Do not place backfill on surfaces that are frozen, overly wet, or graded inconsistently.
- F. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages for maximum dry density for soils determined in accordance with ASTM 1557 (Modified Proctor).
 - 1. Backfill
 - a. Irrigation Pipe Bedding below pipe – 95 percent
 - b. Irrigation Pipe Backfill over pipe – hand tamp to 75 percent
 - c. General Landscape Backfill – 85 percent
 - d. Over excavation Backfill of existing sub-grade to remain – 95 percent
 - 2. Subgrades
 - a. Subgrade soils in paving areas – 95 percent
 - b. Import aggregate base in paving areas – 95 percent
 - c. Subgrade for planting substrate and soil amendments (planted/seeded areas) – 85 percent
 - 3. Surface Fills

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- a. Structural Fill – 95 percent
- b. Embankment Fill – 95 percent
- c. Fills on slopes exceeding 3H:1V, to prevent erosion – 90 percent

G. Moisture Control

- 1. Moisture content of compacted backfill, subgrades, and surface fills that require 90 percent relative density (or greater) shall have a moisture content tolerance of +/- two percent of optimum moisture content.
- 2. Where sub-grade or lift of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
- 3. Before compaction, moisten or aerate each layer as necessary to provide optimum content. Compact each layer to required percentages of maximum dry density or relative dry density for each area classification.
- 4. Do not perform compaction operations on excessively wetted soils.

3.10 TEMPORARY STOCKPILES (JONES HOLLOW PROPERTY)

- A. The Contractor may elect to establish an area for temporary stockpiling of excavated soils from Jones Hollow Property in preparation for their use as subgrade fill. The location of this area shall avoid any interference with ongoing traffic and activities at and around the Site, and shall be subject to the written approved of the DSR.
- B. Stockpiles shall not be placed within 5 horizontal feet of the upper edge of any excavation. Stockpiles and stockpile areas shall be maintained in good condition and constructed of materials that are compatible with the material being stored.
- C. Stockpile areas shall be fenced and locked while work is not taking place on the site. The Contractor shall also post a sign at each entrance to the stockpile areas, bearing the legend "Unauthorized Persons Keep Out," or an equivalent legend, legible from a distance of 25 feet or more.
- D. The Contractor shall employ best management practices as necessary to prevent loss of stockpiled materials by such events as erosion, spillage, or wind. The Contractor shall also prevent loss of material during transfer of materials to and from the stockpile area from trucks, or other selected excavation, dredging, and hauling equipment.
- E. Stockpile excavated native materials meeting the material requirements for products specified as backfill until processed or placed as pipe bedding or backfill material.
- F. Place, grade, and shape all stockpiles for proper drainage. Protect from wind and moisture with plastic sheeting and secure sheeting with sand bags or other approved material.

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- G.** Do not compact stockpiled material.

3.11 ATTACHMENTS

- A.** Area of Concern 4 Geotechnical Data Summary Report, South River Remediation, Waynesboro, Virginia

END OF SECTION

ATTACHMENT A

**AREA OF CONCERN 4 GEOTECHNICAL DATA SUMMARY REPORT, SOUTH RIVER
REMEDICATION, WAYNESBORO, VIRGINIA**

AREA OF CONCERN 4 GEOTECHNICAL DATA SUMMARY REPORT SOUTH RIVER REMEDIATION WAYNESBORO, VIRGINIA

Prepared for

E. I. du Pont de Nemours and Company

Prepared by

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February 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
ASTM	ASTM International
bgs	below ground surface
BMA	Bank Management Area
DGPS	differential global positioning system
DuPont site	E.I du Pont de Nemours and Company South River site downstream of DuPont facility in Waynesboro, Virginia
SPT	standard penetration testing
USCS	Unified Soil Classification System

1 INTRODUCTION

This report summarizes and presents the findings of the geotechnical investigation performed in November 2014 as part of the Area of Concern (AOC) 4 Bank Management Area Phase 1A Interim Measures Design detailed in the AOC 4 Phase 1 Work Plan (Anchor QEA, URS, and DuPont 2014). The investigation was conducted in support of remediation design of mercury-contaminated riverbanks downstream of the former E.I du Pont de Nemours and Company (DuPont) facility in Waynesboro, Virginia (the site). The investigation focused on characterizing physical (geotechnical) properties of upland soil and riverbank sediment within AOC 4 (also referred to herein as the Bank Management Areas [BMAs]) shown in Figures 1 through 6. Characterization of the upland soil and sediments within the BMAs will inform design elements of remedial measures as well as disposal options. Details of the explorations as well as laboratory test results are tabulated at the end of the report. Boring logs and laboratory reports from the testing labs are included as Appendices A and B, respectively.

The 2.0-mile section of the South River investigated lies within the city limits of Waynesboro, Virginia, and work performed for Phase 1A was limited to BMAs within City of Waynesboro property. The explorations performed in the BMAs consisted of 10 hollow stem auger soil borings ranging from 6.2 to 23.5 feet below ground surface (bgs) with standard penetration testing (SPT; ASTM 1586) performed in 2.5-foot intervals. All borings were terminated at or in bedrock. A total of 46 soil samples were collected and submitted for laboratory testing.

2 FIELD SAMPLING SUMMARY

The field sampling performed at the site consisted of 10 upland boring performed along the riverbank of the South River between river miles 0.0 and 2.0. All explorations, in situ testing, and sampling were performed by Total Depth Drilling of Knoxville, Tennessee. Borehole logging, sample collection and labeling, and oversight of the investigation were performed by an Anchor QEA geotechnical engineer. Work was performed from November 6 to November 7, 2014, and samples were shipped to GeoTesting Express in Anton, Massachusetts for laboratory testing on November 8, 2014. Boring locations were first selected based on proximity to the mapped BMAs and were adjusted in the field as necessary due to access limitations and utilities. Location AQSR-05 was moved approximately 90 feet due to the presence of utilities. All other locations were moved fewer than 10 feet for access purposes.

Navigation and recording of exploration, sample, and testing locations were performed using a Trimble Geo6000XH differential global positioning system (DGPS). The horizontal datum used was Virginia State Plane North 1983. Coordinates of the locations are presented in U.S. Survey feet in Table 1. Figures 1 through 6 present the actual exploration, sampling, and testing locations performed during the Phase 1A geotechnical investigation.

2.1 Soil Borings

Hollow-stem augers were utilized for soil borings. SPT was performed through the hollow-stem augers, which allowed for collection of soil and sediment samples. The borings were performed to total depths of 6.2 and 23.5 feet bgs. Boring depth was limited by refusal from bedrock, which was encountered in all borings.

2.2 Soil and Sediment Sampling

Soil and sediment samples were obtained using both disturbed and undisturbed sampling methods. Disturbed sampling was performed using a split-spoon, standard penetration sampler (i.e., 18-inch length, 1.375-inch inside diameter, and 2.0-inch outside diameter). Sample recovery length was recorded and the soil units were classified and logged in accordance with the Unified Soil Classification System (USCS; ASTM D2487) and were logged at each location shown in Figures 1 through 6. Disturbed samples were labeled,

stored, and sealed in water-tight plastic bags to minimize moisture loss. Samples were shipped to the testing laboratory in a sealed 5-gallon bucket and held in a moisture-controlled environment until testing was performed. A total of 47 disturbed samples were submitted to the testing laboratory, 28 for analysis and 19 for archiving. These samples were tested for index properties, including moisture content, organic matter, grain size distribution, specific gravity, and Atterberg limits. Testing results for disturbed samples are presented in Table 2.

Undisturbed sampling was performed by advancing a 3-inch outside diameter, thin-walled Shelby tube into cohesive soil units using constant hydraulic pressure (ASTM 1587). Only one undisturbed sample was successfully retrieved. Upon retrieval, the sample was characterized by visual observation of both the top and bottom of the Shelby tube, then moisture-sealed using wax. The ends were additionally sealed with plastic caps. The undisturbed sample was wrapped with bubble wrap and shipped in a Schedule 40 PVC tube with PVC end-caps to the testing laboratory. The sample was stored in a moisture-controlled room until tested. This sample was tested for compressibility and strength properties using one-dimensional consolidation and direct shear testing, respectively. Testing results for undisturbed samples are presented in Table 3.

2.3 Work Plan Deviations

The following deviations from the Work Plan occurred:

- Location AQSR-05 was moved 94 feet to the southeast and parallel to the river for purposes of avoiding underground utilities.
- Strength testing of the undisturbed sample utilized the direct shear test (ASTM D3080) rather than the tri-axial compression test (ASTM D2850). The direct shear test was chosen because it required less material per test and therefore enabled more tests results to be obtained.

3 INVESTIGATION RESULTS

A discussion of the findings and testing results performed for the geotechnical investigation is presented in this section. Soil boring logs are included in Appendix A.

3.1 Subsurface Conditions

Characterization of subsurface conditions was performed during soil borings through observations of samples obtained from regular intervals from the ground surface to the final boring depth (i.e., bedrock surface). Three principal soil units were identified during the investigation. All soil borings were terminated at bedrock surface. Soil units are described in order from the ground surface downward, as follows.

Topsoil/Silty SAND (SM)

The near-surface soils consisted primarily of top soil, fill, and/or recently deposited river sediments. This unit consisted of a loose to medium dense, dry to moist, dark brown to yellow-brown, fine silty sand with non- to slightly plastic fines, occasional gravel and rock fragments, and varying amounts of organic matter. This unit varied in thickness from 2.0 to 13.5 feet, with an average thickness of 6.9 feet. This unit was observed at all sampling locations.

Alluvium (SM/GM)

Underlying the near-surface soils was a predominately granular alluvium. This unit was loose to medium dense, damp to wet, brown/yellow-brown to olive-gray, fine to coarse silty sand and silty gravel with frequent large gravel and cobbles that are sub-rounded to sub-angular in shape. This unit was typically observed immediately beneath the topsoil/silty sand unit and ranged in thickness from 2.5 to 5.0 feet, with an average thickness of 3.8 feet. This unit was not observed in soil borings AQSR-04, AQSR-05, and AQSR-07.

SILT/CLAY (ML/MH/CL)

Cohesive soil units were observed at five of the ten soil boring locations: AQSR-01, AQSR-03, AQSR-04, AQSR-05, and AQSR-06. This unit was highly variable and ranged from a stiff, moist, brown to dark brown, non-plastic very fine sandy silt/clay to a very soft, moist/wet, orange-brown silt with medium to high plasticity. Moisture content of the

cohesive units ranged from 11.9% to 99.1%. Thickness of this unit ranged from 2.0 to 9.5 feet, with an average thickness of 4.8 feet.

At AQSR-01 and AQSR-06, where cohesive units were observed to be very soft to soft, the units were immediately above bedrock and exhibited a blocky fracture when intact pieces were broken apart. The material appeared to be very highly weathered bedrock, such as limestone, that exhibits a clay-like behavior when disturbed and remolded. An undisturbed sample was successfully collected at AQSR-01, while all other sampling used disturbed methods. Four other undisturbed sampling attempts were performed unsuccessfully in the cohesive unit.

Bedrock

Bedrock outcrops were frequently observed at various locations of the site. Bedrock was encountered in all boring logs and was the contacted at the bottom of each boring. For boring logs AQSR-01 and AQSR-06, soil borings were terminated in weathered bedrock. The soil overburden thickness and zones of weathered bedrock are expected be variable throughout the site.

Groundwater

Groundwater was observed in all soil borings except AQSR-04, where shallow bedrock was encountered. Depth to groundwater ranged from 5.0 to 19.0 feet bgs, as shown in Table 1.

3.2 Geotechnical Laboratory Testing

Testing performed as part of the geotechnical investigation consisted of laboratory and in situ testing. Laboratory testing included the following tests:

- Moisture Content (ASTM D2216)
- Organic Content (ASTM D2974)
- Atterberg limits (ASTM D4318)
- Dry Density (ASTM D2937)
- Specific Gravity (ASTM D854)
- Grain Size (ASTM D422)
- One-Dimension Consolidation (ASTM D2435)

- Direct Shear (ASTM D3080)

All testing was performed by GeoTesting Express. Results of the laboratory testing for index testing and strength testing are presented in Tables 2 and 3, respectively. Results of consolidation testing are presented in Appendix B.

4 REFERENCES

- Anchor QEA, LLC, URS Corporation, and E. I. du Pont de Nemours and Company, 2014. *Final Interim Measures Design, Implementation, and Monitoring Work Plan: Phase 1 – South River Area of Concern 4*. August 2014.
- ASTM Standard D422, 2007. *Standard Test Method for Particle-Size Analysis of Sediments*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D854, 2010. *Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D1586, 2011. *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Sediments*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D1587, 2012. *Standard Practice for Thin-Walled Tube Sampling of Sediments for Geotechnical Purposes*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D2216, 2010. *Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D2435, 2011. *Standard Test Methods for One-Dimensional Consolidation Properties of Sediments Using Incremental Loading*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D2487, 2011. *Standard Practice for Classification of Sediments for Engineering Purposes (Unified Soil Classification System)*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D2850, 2007. *Standard Test Methods for Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils*. ASTM International, West Conshohocken, PA, www.astm.org.
- ASTM Standard D2937, 2010. *Standard Test Methods for Density of Soil in Place by the Drive-Cylinder Method*. ASTM International, West Conshohocken, PA, www.astm.org.

ASTM Standard D2974, 2014. *Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils*. West Conshohocken, PA, www.astm.org.

ASTM Standard D3080, 2011. *Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions*. ASTM International, West Conshohocken, PA, www.astm.org.

ASTM Standard D4318, 2010. *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Sediments*. ASTM International, West Conshohocken, PA, www.astm.org.

TABLES

Table 1
Summary of Explorations

Exploration ID	Easting (x)¹	Northing (y)¹	Type of Exploration	Date of Exploration²	Depth to groundwater (feet)	Termination Depth³ (feet)
AQSB-01	11372203.92	6707572.17	Soil Boring	11/6/2014	10.9	21.5
AQSB-02	11371910.44	6709143.97	Soil Boring	11/6/2014	5.0	6.6
AQSB-03	11372825.57	6710897.65	Soil Boring	11/7/2014	10.0	11.2
AQSB-04	11373219.19	6711330.99	Soil Boring	11/7/2014	---	9.7
AQSB-05	11374051.98	6711620.90	Soil Boring	11/7/2014	15.3	16.1
AQSB-06	11374380.48	6711781.40	Soil Boring	11/6/2014	19.0	24.1
AQSB-07	11374716.77	6711891.29	Soil Boring	11/7/2014	6.0	6.2
AQSB-08	11374869.93	6712194.14	Soil Boring	11/6/2014	13.3	14.3
AQSB-09	11375102.30	6712314.58	Soil Boring	11/6/2014	14.0	16.1
AQSB-10	11374916.48	6713802.35	Soil Boring	11/7/2014	9.4	11.0

Notes:

¹ Horizontal datum is North American Datum of 1983 Virginia State Plane North, U.S. Survey feet.

² Depth to groundwater refers to the groundwater depth below ground surface at the time of drilling.

³ Termination depth is relative to the ground surface.

Table 2
Index Test Results

		In Situ Sample Depth (feet) ¹						Atterberg Limits			Particle Size Summary			
Boring ID	Sample ID ²	Top	Bottom	Recovery (inches)	Moisture Content (%)	Organic Matter (%)	Specific Gravity	Liquid Limit	Plastic Limit	Plasticity Index	Gravel (%)	Sand (%)	Fines (%)	USCS Symbol
AQSB-01	SS02	3.5	5.0	12.0	12.1	3.0	2.63	---	---	---	10.4	58.1	31.5	SM
AQSB-01	SS04	8.5	10.0	8.0	6.4	---	2.71	---	---	---	42	50.2	7.8	SP-SM
AQSB-01	SS06	13.5	15.0	14.0	36.4	---	2.81	47	32	15	---	---	---	ML
AQSB-01	ST01	18.0	20.0	24.0	52.6	---	2.75	NP	NP	NP	28.2	28.6	43.2	SM
AQSB-02	SS01	1.0	2.5	12.0	18.5	2.5	2.66	---	---	---	6.0	48.0	46.0	SM
AQSB-03	SS01	1.0	2.5	12.0	9.4	1.0	2.68	---	---	---	4.8	63.1	32.1	SM
AQSB-03	SS03	6.0	7.5	18.0	19.4	---	2.61	29	17	12	---	---	---	CL
AQSB-03	SS04	9.5	11.0	12.0	15.3	---	---	---	---	---	40.5	46.2	13.3	SM
AQSB-04	SS01	1.0	2.5	6.0	9.4	1.6	2.72	---	---	---	19.7	56.2	25.1	SM
AQSB-04	SS02	3.5	5.0	11.0	15.7	---	---	---	---	---	3.7	27.6	68.7	ML
AQSB-05	SS02	3.5	5.0	16.0	7.0	---	2.63	---	---	---	5.8	66.1	28.1	SM
AQSB-05	SS03	6.0	7.5	18.0	11.9	---	---	---	---	---	0.0	45.8	54.2	ML
AQSB-06	SS04	8.5	10.0	4.0	11.2	---	---	---	---	---	10.8	56.1	33.1	SM
AQSB-06	SS05	11.0	12.5	12.0	16.0	---	2.68	---	---	---	0.0	51.2	48.8	SM
AQSB-06	SS06	13.5	15.0	18.0	43.5	---	2.60	38	22	16	---	---	---	CL
AQSB-06	SS08	18.5	20.0	18.0	20.9	---	---	---	---	---	31.1	36.4	32.5	SM
AQSB-06	SS09	21.0	22.5	18.0	99.1	---	2.74	89	43	46	---	---	---	MH
AQSB-07	SS01	1.0	2.5	18.0	9.8	2.2	2.64	---	---	---	19.1	43.8	37.1	SM
AQSB-08	SS01	1.0	2.5	11.0	8.8	0.8	2.72	---	---	---	43.4	29.3	27.3	GM
AQSB-08	SS03	6.0	7.5	13.0	6.6	---	---	---	---	---	2.1	66.3	31.6	SM
AQSB-08	SS04	8.5	10.0	12.0	6.7	---	2.72	---	---	---	38.5	47.0	14.5	SM
AQSB-08	SS05	11.0	12.5	10.0	6.4	---	---	---	---	---	47.8	44.2	8.0	GP-GM
AQSB-09	SS02	3.5	5.0	18.0	8.3	2.2	2.68	---	---	---	0.0	57.7	42.3	SM
AQSB-09	SS04	8.5	10.0	18.0	4.6	---	2.71	---	---	---	38.1	53.0	8.9	SP-SM
AQSB-09	SS06	13.5	15.0	11.0	13.1	---	2.82	---	---	---	45.2	42.2	12.6	GP-GM
AQSB-10	SS01	1.0	2.5	8.0	17.3	2.9	2.68	---	---	---	0.5	54.4	45.1	SM
AQSB-10	SS03	6.0	7.5	15.0	29.9	---	2.69	43	26	17	0.0	53.6	46.4	SC

Notes:

¹ In situ depth refers to the depth below the surface at the time of sampling.

² SS = Split-spoon; ST = Shelby tube

USCS = Unified Soil Classification System

Table 3
Direct Shear Test Results

Boring ID	Sample ID	Test ID	In Situ Depth ¹ (feet)		Initial Moisture Content (%)	Specific Gravity	Initial Void Ratio	Normal Shear Stess (psf)	Maximum Shear Stess (psf)	Apparent Cohesion (psf)	Friction Angle (degrees)	Description (USCS Symbol)
			Top	Bottom								
AQSB-01	ST01	DS-1	19.0	19.5	29.8	2.75	0.83	450	582	440	36.3	Silty SAND (SM) with gravel
AQSB-01	ST01	DS-2	19.5	20.0	23.7	2.75	0.78	900	1320			Silty SAND (SM) with gravel
AQSB-01	ST01	DS-3 ²	20.0	20.5	---	---	---	---	---			Silty SAND (SM) with gravel
AQSB-01	ST01	DS-4	20.5	21.0	63.6	2.75	1.81	3600	3050			Silty SAND (SM) with gravel

Notes:

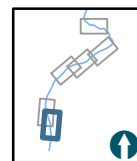
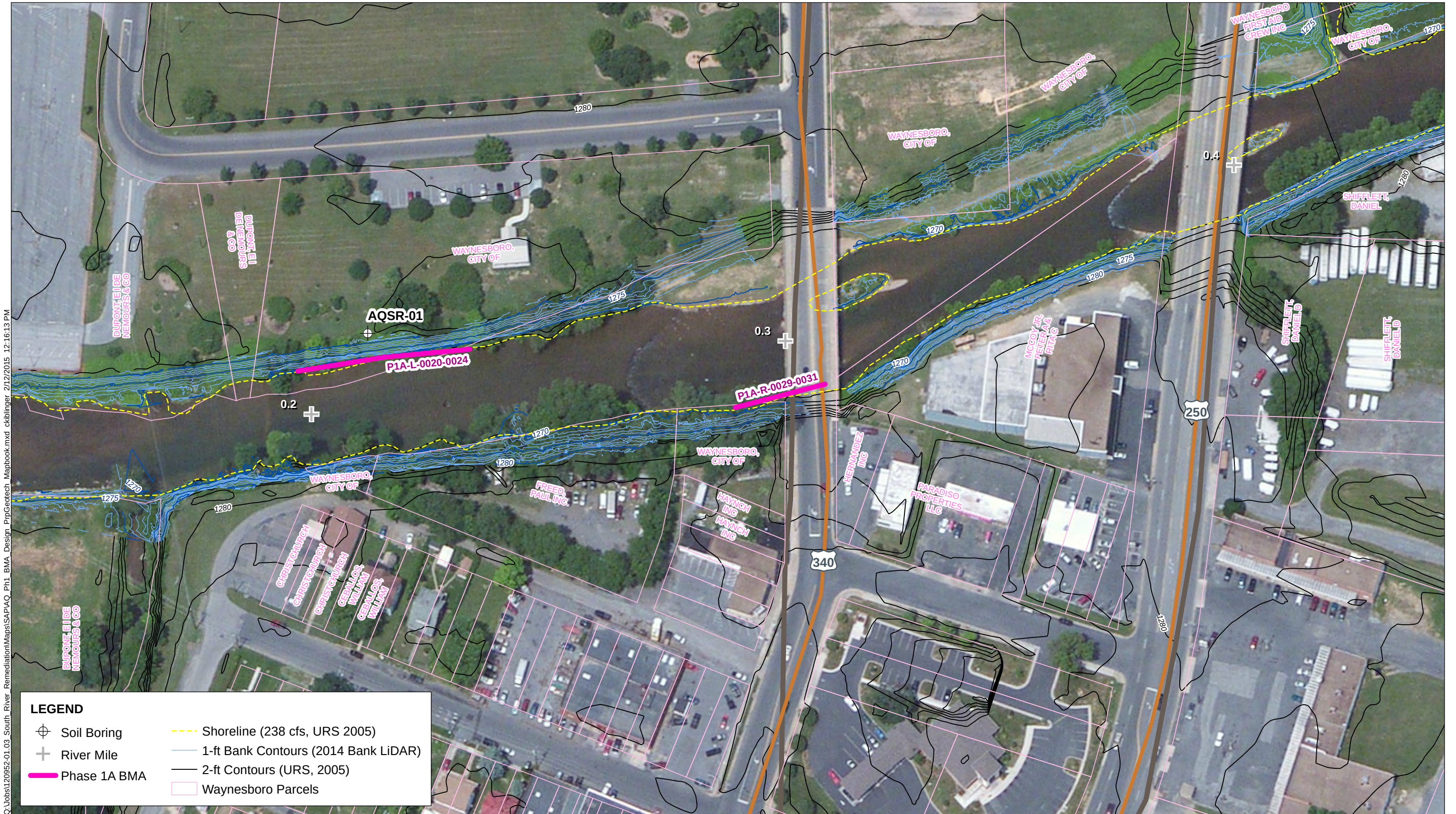
¹ In situ depth is referenced from ground surface for AQSB-01.

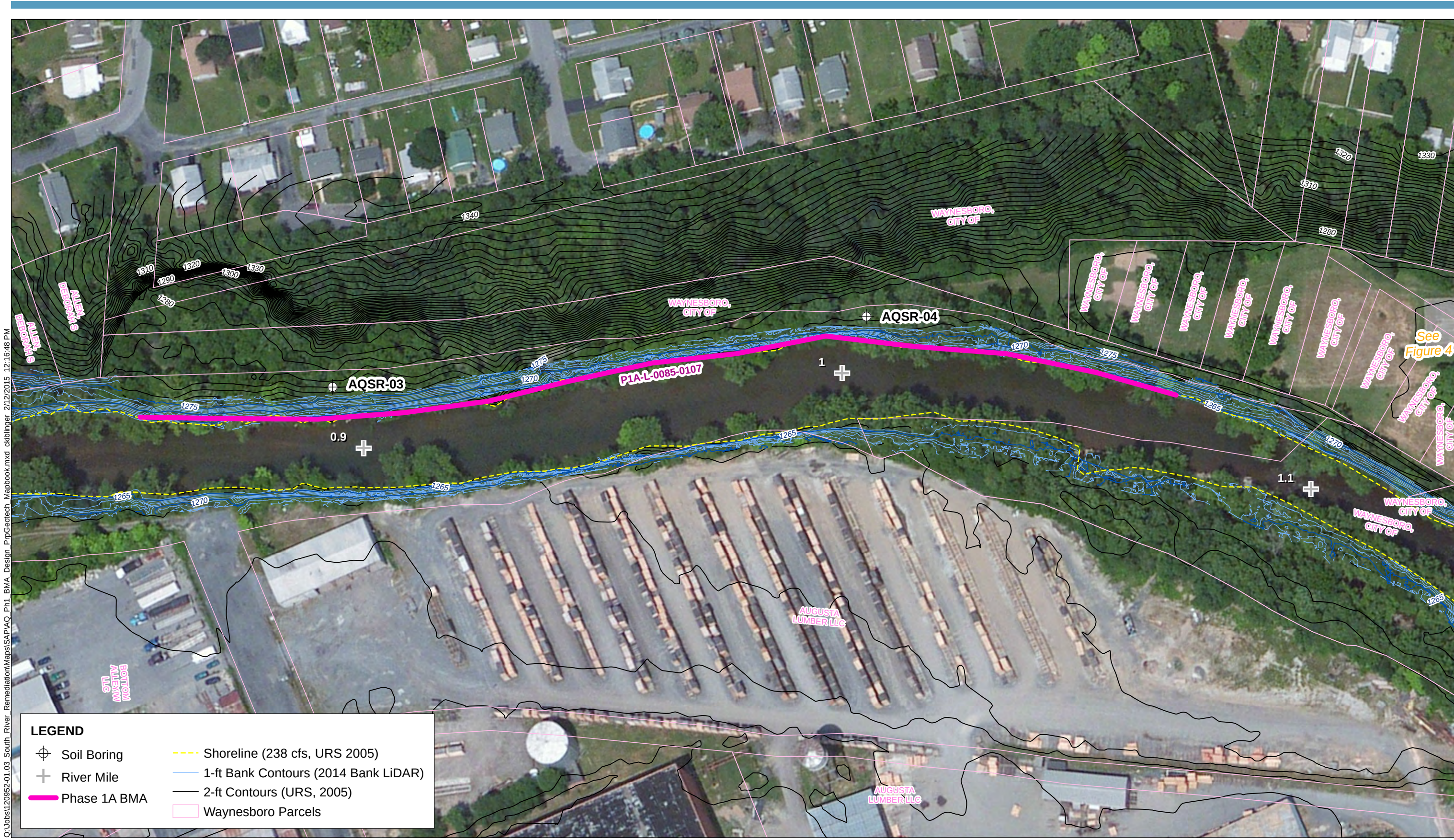
² Testing was not preformed due to high sample disturbance during sample preparation.

psf = pounds per square foot

USCS = Unified Soil Classification System

FIGURES





NOTE:
Aerial Imagery: ESRI (20110509).

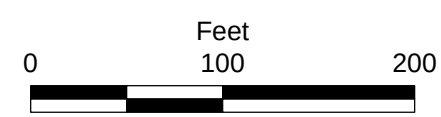
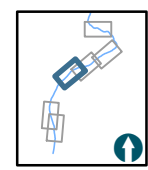
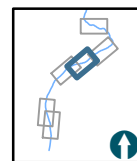
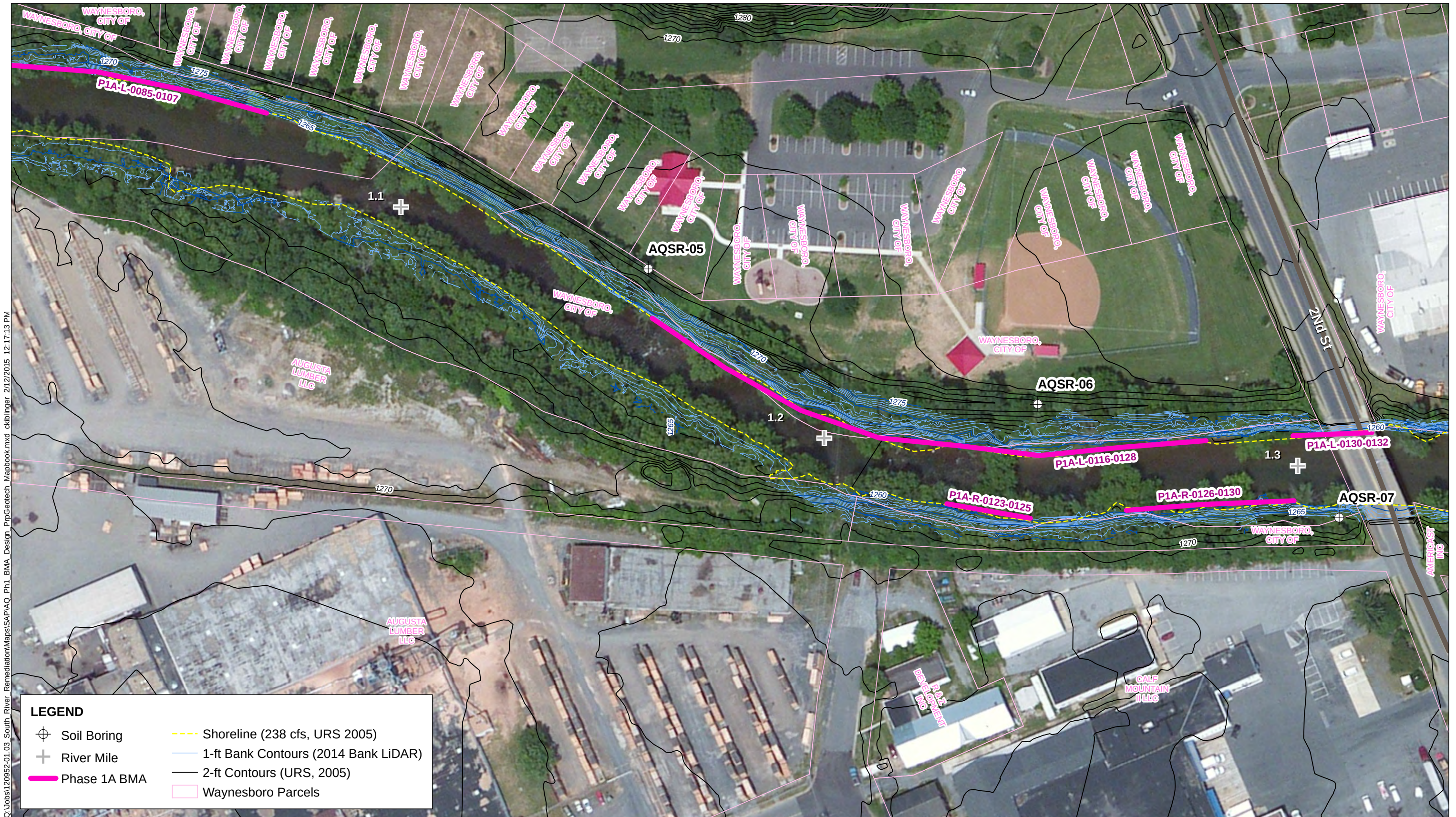
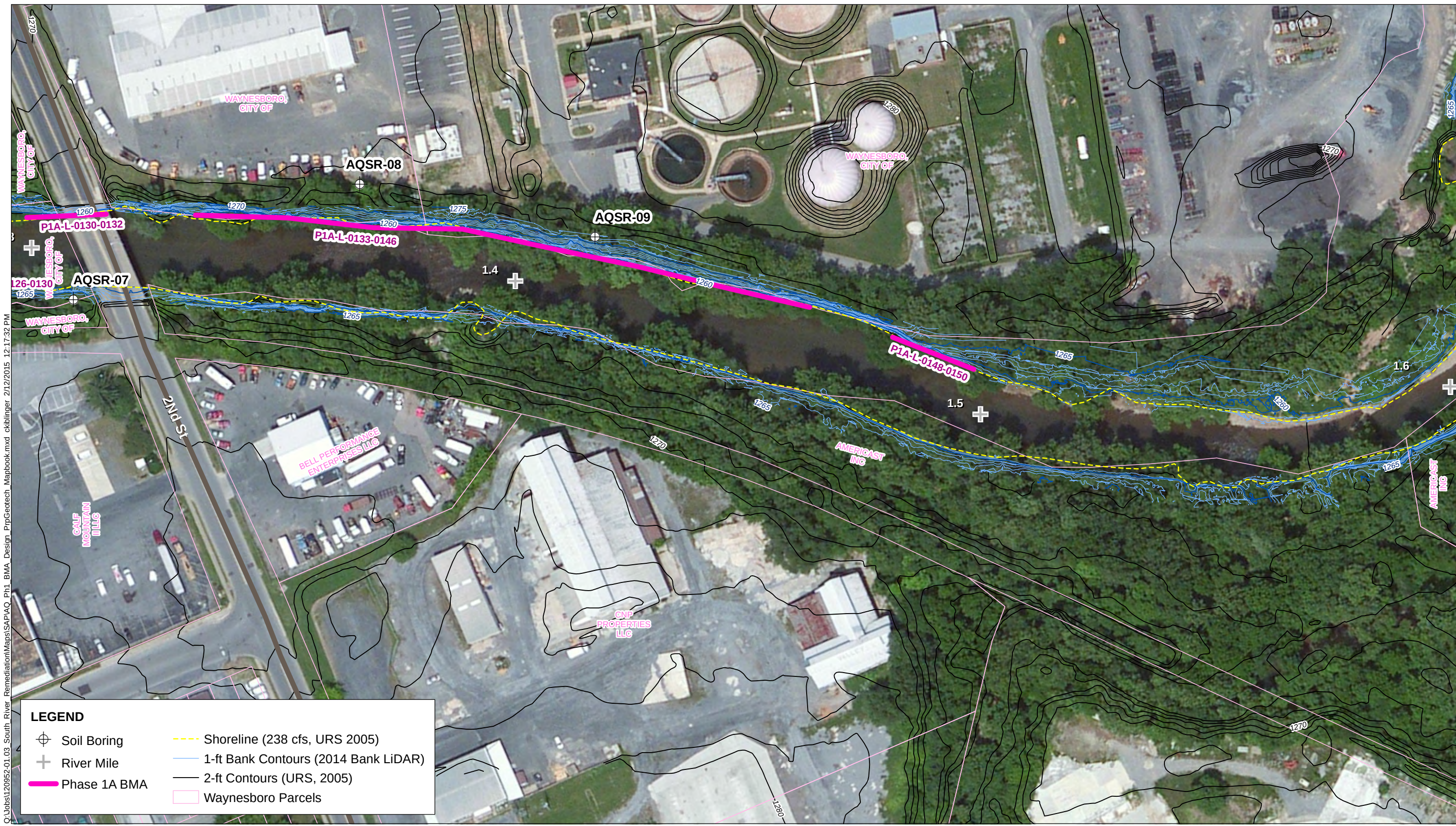


Figure 3
Geotechnical Data Report
River Mile 0.8 - 1.1
AOC 4 Phase 1A - South River





Q:\Jobs\120952-01.03 South River Remediation\Maps\SAP\AQ Ph1 BMA Design_P1P\Geotech_Mapbook.mxd ckilinger 2/12/2015 12:17:32 PM



NOTE:
Aerial Imagery: ESRI (20110509).

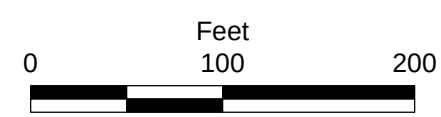
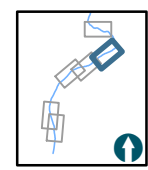


Figure 5
Geotechnical Data Report
River Mile 1.3 - 1.5
AOC 4 Phase 1A - South River

SECTION 31 25 00 EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Work Includes

1. Requirements for soil erosion and sediment control measures used in complying with the Virginia Department of Environmental Quality Virginia Erosion and Sediment Control Handbook (Third Edition, 1992), the Virginia Department of Conservation and Recreation – Virginia Stormwater Management Handbook (First Edition, 1999), and the City of Waynesboro.
2. The soil erosion and sediment control measures presented on the Contract Drawings serve as the minimum for erosion control during construction. The Contractor is ultimately responsible for providing adequate erosion control and water quality throughout the duration of the project. Temporary erosion control measures shall be installed, relocated, and modified (as necessary) to accommodate site conditions and the Contractor's means and methods and as directed by the DuPont Site Representative (DSR), Engineer, and/or regulatory agencies.

- A.** The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- B.** If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

A. Work related to this Section is described in

1. Section 01 11 00 – Summary of Work
2. Section 01 35 29 – Health, Safety, and Emergency Response Procedures
3. Section 31 11 00 – Clearing and Grubbing
4. Section 31 12 00 – Selective Clearing
5. Section 31 23 23 – Earthwork and Fill

1.03 DEFINITIONS

A. Acronyms

1. HASP – Health and Safety Plan

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

2. DSR – DuPont Site Representative
3. ASTM – American Society of Testing and Materials
4. NPDES – National Pollutant Discharge Elimination System
5. VDOT – Virginia Department of Transportation

B. Definitions

1. Erosion Control Blanket – A temporary, biodegradable rolled erosion control product made of natural fibers attached to synthetic netting and used to protect newly seeded areas from environmental forces such as wind, rain, and intense sunlight, and to enhance the growth of vegetation.
2. Filter Bag – A geosynthetic bag used to filter dewatered sediment-impacted areas prior to discharge.
3. Silt Fence – A temporary sediment barrier consisting of sediment trapping geotextile fence that reduces the off-site transport of sediment via ponding of runoff allowing sediment to filter out on the upstream side of the fence.
4. Stabilized Construction Entrance – A stabilized pad of aggregate placed over a geotextile fabric to reduce the amount of soil and mud tracked off site by construction-related traffic.
5. Diversion – A temporary ridge of compacted soil and/or an interceptor ditch/channel at the top or base of a sloping disturbed areas to divert overland flow away from exposed slopes (crest or toe) and discharge through a stabilized outlet.
6. Straw Waddles – A temporary sediment barrier consisting for sediment trapping straw contained in a tubed fabric.

1.04 REFERENCES

- A. Reference Standards: The publications listed below form a part of this Contract Specification to the extent referenced. The publications are referred to within the text by the basic designation only.
 1. American Society of Testing and Materials (ASTM)
 - a. ASTM C33/C33M-08 – Standard Specification for Concrete Aggregates
 - b. ASTM C136 – Sieve Analysis of Fine and Coarse Aggregate.
 - c. ASTM D123 – Terminology Relating to Textiles Materials.
 - d. ASTM D488 – Standard Classification for Sizes of Aggregate for Road and Bridge Construction

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EROSION AND SEDIMENTATION CONTROL

- e. ASTM D3786 – Test Method for Hydraulic Bursting Strength of Knitted Goods and Non-woven Fabrics: Diaphragm Bursting Strength Tester Method
- f. ASTM D4354 – Practice for Sampling of Geotextiles for Testing.
- g. ASTM D4355 – Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
- h. ASTM D4491 – Test Method for Water Permeability of Geotextiles by Permittivity
- i. ASTM D4632 – Test Method for Grab Breaking Load and Elongation of Geotextiles.
- j. ASTM D4751 – Test Method for Determining the Apparent Opening Size of a Geotextile.
- k. ASTM D4759 – Test Method for Determining the Specification Conformance of Geosynthetics
- l. ASTM D6461e2 – Standard Specification for Silt Fence Materials
- 2. Virginia Department of Environmental Quality
 - a. Virginia Erosion and Sediment Control Handbook (Third Edition, 1992).
- 3. Virginia Department of Conservation and Recreation
 - a. Virginia Stormwater Management Handbook (First Edition, 1999).

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing
 - 1. Prior to earth disturbance activities, the Contractor shall notify the regulatory notifications in accordance with the permit conditions.
 - 2. Within 24 hours following soil disturbance or re-disturbance, complete permanent or temporary stabilization to the surface of each perimeter sediment control, topsoil stockpile, and other disturbed or graded areas on the Project Site. These requirements do not apply to those areas that are shown on the Contract Drawings and are currently being used for material storage, or for those areas on which actual earth moving activities are currently being performed.
 - a. If adverse weather is expected within 24 hours following soil disturbance, then measures shall be installed immediately following these activities.

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

B. Scheduling

1. Submit a construction work sequence schedule, with the approved erosion control plan prior to start of construction.
2. Schedule the work to coordinate the timing of land disturbing activities with the provision of erosion control measures.

1.06 SUBMITTALS

DSR's review is required for submittals designated as "Action Submittals." Submittals not designated as "Action Submittals" are for Contractor Quality Control approval and are to be submitted to the DSR for information only. Submit the following in accordance with Section 01 33 00 – Submittal Procedures.

A. Action Submittals

1. Product Data
 - a. Geotextile
 - b. Erosion control blanket
 - c. Silt fence
 - d. Filter bag
 - e. Aggregate
 - f. Temporary construction fence
 - g. Seed, fertilizer, and soil amendments/conditioners

B. Informational Submittals

1. Manufacturer Instructions
 - a. Erosion control blanket installation instructions
2. Qualification Statements
 - a. Installer qualification statement
3. Erosion and Sediment Control Inspection Logs
 - a. Inspections required in accordance with regulatory standards, permit applications, approvals, and conditions, and as designated by the DSR, Engineer, and/or regulatory agencies

C. Closeout Submittals

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

1. Operation and Maintenance Data
 - a. Maintenance record for erosion controls
 2. Bonds
 - a. City of Waynesboro erosion and sediment control
 3. Warranty Documentation
 4. Record Documentation
 - a. As-built location of installed permanent erosion controls.
- D. Maintenance Material Submittals**
1. Not used

1.07 QUALITY ASSURANCE

- A. Regulatory Requirements**
1. Comply with the Virginia Erosion and Sediment Control Handbook and the Virginia Stormwater Management Handbook, Volumes I & II.
 2. Comply with City of Waynesboro Code of Ordinances, Chapter 30, Article II, "Erosion and Sediment Control Ordinance of the City of Waynesboro, Virginia" and Chapter 30, Article III Stormwater Management.
- B. Qualifications**
1. Installer
 - a. Certified by the manufacturer for training and experience installing the material.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements**
1. Inspect products delivered to Site for damage. Do not offload damaged products. Return damaged products to manufacturer.
 2. Unload with minimum handling.
 3. Deliver and store geosynthetic binders and synthetic soil binders in the manufacturer's original sealed containers.

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

B. Storage and Handling Requirements

1. Store and protect products in accordance with the manufacturer's recommendations.
2. Protect products from the weather, excessive humidity, excessive temperature variation, ultraviolet exposure, and dirt, dust, or other contaminants.
3. Do not store products directly on ground.
4. Deliver products to final location in sound, undamaged condition.
5. Prevent damage to interior and exterior surfaces. Repair damage.
6. Carry and do not drag products.

C. Packaging Waste Management

1. When possible, furnish products with minimal and easily recyclable packaging and use manufacturers with policies that take back product packaging.
2. Dispose of product packaging in accordance with the Waste Management Plan.

1.09 FIELD CONDITIONS

A. Ambient Conditions

1. Perform erosion control operations under favorable weather conditions. Stop work when excessive moisture, frozen ground, or other unsatisfactory conditions prevail.
2. When special conditions warrant a variance to earthwork operations, submit a revised construction schedule for approval.
3. Do not apply erosion control materials in adverse weather conditions that could affect their performance.

B. Existing Conditions

1. When obstructions below ground affect the work, submit shop drawings showing proposed adjustments to placement of erosion control material for approval.

1.10 WARRANTY AND BOND

A. Manufacturer Warranty

1. Provide erosion control material with a warranty for use and durable condition for Project-specific installations.
2. Provide a minimum 18-month warranty on temporary erosion control materials.

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

- 3. Provide a minimum 3-year warranty on permanent erosion control materials.
- B. Bond
 - 1. Furnish the bond required by the City of Waynesboro.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Products that are required to accomplish or be incorporated into the work of this Section shall be as shown on the Contract Drawings, or as selected by the Contractor, subject to approval by the DSR and the regulatory agencies, if required.

2.02 DUST CONTROL

- A. Dust palliative for dust control shall be proposed by the Contractor and approved by the DSR.

2.03 MARKING CLEARING LIMITS

- A. Clearing limits shall be marked with high-visibility plastic or metal fence, in accordance with City of Waynesboro Erosion and Sediment Control Standards.

PART 3 – EXECUTION

3.01 GENERAL

- A. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply as determined by the DSR.
- B. No discharge of water shall be allowed that exceeds the regulated pollutant levels in the National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges Associated with Construction Activities.
- C. The Contractor shall be solely responsible for any damages and fines incurred because of Contractor, subcontractor, or supplier actions in implementing the requirements of this section.
- D. The Contractor shall be solely responsible for schedule impacts incurred because of Contractor, subcontractor, or supplier actions in implementing the requirements of this section.

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

3.02 PREPARATION

A. Protection of In-place Conditions

1. Verify and mark the location of underground utilities and facilities in the area of the work.
2. Repair damage to underground utilities and facilities at the Contractor's expense.

B. Surface Preparation

1. Prepare surfaces of ditches and slopes to conform to the lines, grades, and cross sections shown on the Contract Drawings.
2. Finish surfaces and slopes to a smooth and even condition with debris, roots, stones, and clods greater than 3 inches in diameter raked out or removed prior to the placement of erosion control measures.
3. Correct subgrade irregularities exceeding previously specified limit by removing or adding material as required, followed by rolling until compacted in accordance with Section 31 23 00 – Earthwork and Fill.

3.03 TEMPORARY EROSION AND SEDIMENT CONTROL DEVELOPMENT

A. Construction Access Routes

1. Wherever construction vehicles enter or leave a construction site, a stabilized construction entrance is required.
2. Temporary access roads, including public road surfaces (as necessary) shall be cleaned thoroughly at the end of each work day. Sediments removed from roadways shall be shoveled or swept and transported to a sediment controlled staging/disposal area. Any public roadway street cleaning shall be performed only after sediments have been removed.
3. Temporary access roads shall be maintained and additional geotextile fabric and aggregate stone shall be applied to maintain roadway thicknesses and prevent rutting or other unsafe and environmentally sensitive condition.
4. As required and at the discretion of the DSR, all construction vehicles shall be cleaned (i.e., decontaminated/washed) and inspected prior to leaving the Site.

B. Erosion and Sediment Control Measures

1. All temporary and permanent erosion and sediment control measures shall be maintained and repaired as necessary to ensure continued performance of their intended function. If the overall function and intent of erosion control is not being met, the DSR will require the Contractor to provide additional measures as required to obtain the desired results.

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

2. Erosion control measures installed by the Contractor shall be adequately maintained by the Contractor until the project is complete and accepted by the DSR and all regulatory agencies.
3. Properties adjacent to the Site shall be protected from sediment deposition. Sediment barriers (i.e., silt fence, straw bales, etc.) and diversions shall be installed in accordance with the Contract Drawings and permit approvals/conditions.

3.04 FIELD QUALITY CONTROL

A. Field Inspections

1. Maintain the integrity of the erosion control devices as long as they are necessary to contain sediment runoff associated with the work to be performed.
2. Inspect erosion controls once every 7 days and within 24 hours of a rainfall event of 0.25 inches or greater.

3.05 CLEANING

- A.** Properly dispose of excess material, debris, and waste materials.
- B.** Clear adjacent paved areas.
- C.** Immediately upon completion of the installation in an area, protect the area against traffic or other use by erecting barricades and providing signage as required or as directed.

3.06 MAINTENANCE

- A.** Remove sediment deposits, eradicate weeds; protect embankments and ditches from surface erosion; maintain the performance of the erosion control materials and mulch; and protect installed areas from traffic.
- B.** Furnish written instructions containing Contract Drawings and other necessary information, describing the care of the installed material, including when and where maintenance should occur, and the procedures for material replacement.
- C.** Unless otherwise directed, place, seam, or patch material as recommended by the manufacturer.
- D.** Remove material not meeting the required performance as a result of placement, seaming, or patching from the Site.
- E.** Replace the unacceptable material.
- F.** Furnish a record describing the maintenance work performed, record of measurements and findings for product failure, recommendations for repair, and products replaced.

SECTION 31 25 00
EROSION AND SEDIMENTATION CONTROL

3.07 DISPOSITION OF TEMPORARY MEASURES

- A.** All temporary erosion and sediment control measures shall be removed and disposed of within thirty (30) days after final Site stabilization is achieved or after the temporary measures are no longer needed as determined by the DSR.
- B.** Any trapped sediment and other disturbed soil areas resulting from disposition of temporary measures shall be permanently stabilized to prevent further erosion.
- C.** Any damages to the Site shall be repaired to the satisfaction of the DSR and at no additional expense.

END OF SECTION

SECTION 31 35 00 SLOPE PROTECTION

PART 1 – GENERAL

1.01 SUMMARY

- A. Work Includes
 - 1. Furnishing and installing synthetic slope protection product, including geocell for slope stabilization.
 - 2. Furnishing and installing biodegradable erosion control product, including coir fabric.
- B. The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C. If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A. Work related to this Section is described in:
 - 1. Section 01 33 00 – Submittal Procedures
 - 2. Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 - 3. Section 31 05 19 – Geosynthetics
 - 4. Section 31 23 00 – Excavation and Fill
 - 5. Section 31 37 00 – Stone Toe Protection
 - 6. Section 32 90 00 – Planting and Habitat Restoration

1.03 DEFINITIONS

- A. Acronyms
 - 1. DSR – DuPont Site Representative
 - 2. H:V – horizontal to vertical
 - 3. HASP – Health and Safety Plan

1.04 REFERENCES

- 1. Not used

**SECTION 31 35 00
SLOPE PROTECTION**

1.05 QUALITY ASSURANCE

1. All products supplied shall comply with applicable state and local codes.

1.06 SUBMITTALS

- A. Submit the following material certification/datasheets
 1. Geocell
 2. Coir fabric

PART 2 – PRODUCTS

2.01 GEOCELL FOR SLOPE STABILIZATION

- A. Geocell for Slope Stabilization shall conform to Section 31 05 19 – Geosynthetics.

2.02 COIR FABRIC

- A. Nedia KoirMat 900, or pre-bid approved equal, available from Nedia Enterprises, Inc. See <http://www.nedia.com/>.

2.03 WOOD STAKES FOR COIR FABRIC

- A. Stakes shall be 2-inch by 2-inch hardwood with one tapered end, 2 feet in length. No split or badly splintered stakes will be accepted.

PART 3 – EXECUTION

3.01 GEOCELL FOR SLOPE STABILIZATION INSTALLATION

- A. Geocell for slope stabilization shall be installed as shown on the Contract Drawings and according to manufacturer's instruction for the appropriate slope conditions.

3.02 COIR FABRIC INSTALLATION

- A. Coir fabric shall be placed immediately after planting substrate is placed to final grade to prevent erosion. The Contractor shall install coir erosion control fabric to the limits shown on the Contract Drawings and per the manufacturer's instructions. Where more than one strip of coir fabric is required to cover the given area, it shall overlap the adjacent mat by a minimum of 6 inches. The upslope end of each coir mat shall be staked and buried in a 12-inch-deep trench with the soil firmly tamped against the mat.
- B. Drive stakes below the finish ground line prior to backfilling of the trench according to manufacturer's instruction for the appropriate slope condition. The DuPont Site Representative may require that any other edge exposed to more than normal flow of water or strong prevailing winds be staked and buried in a similar manner.

SECTION 31 35 00
SLOPE PROTECTION

- C.** Coir erosion control fabric shall be held in place by approved wooden stakes driven vertically into the soil. The fabric shall be anchored according to manufacturer's instruction for the appropriate slope conditions. The length of wooden stakes shall be sufficient to securely anchor the fabric against the soil, and the top of stakes shall be driven 4-inch above the finished grade.

3.03 ORDERLY WORK AREA AND SITE CLEANUP

- A.** The Contractor shall maintain neat and orderly storage and work areas. The Contract will not be considered complete until all of the Contractor's tools, equipment, and property have been removed from the Project Site, and the Contractor's storage and work areas have been properly cleaned.

END OF SECTION

SECTION 31 37 00
STONE TOE PROTECTION

PART 1 – GENERAL**1.01 SUMMARY**

- A.** The work described in this Section includes
- 1.** Furnishing all labor, materials, tools, equipment, and incidentals required for importing, stockpiling, and placing imported bank protection and anchoring materials, for the purposes of achieving required grades, slopes, and elevations, as described on the Contract Drawings.
 - 2.** Section includes the following
 - a.** Toe rock (riprap), imported
 - b.** Geotextile
 - 3.** Toe rock will be imported to the staging areas by the Contractor. The Contractor will be required to disperse to final placement locations on the construction site.
 - 4.** All imported rock shall be placed as described in these Contract Specifications and as shown on the Contract Drawings.
 - 5.** The Contractor shall be responsible for the care and proper installation of the geotextile under the toe rock.
- B.** The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C.** If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A.** Work related to this Section is described in
- 1.** Section 01 33 00 – Submittal Procedures
 - 2.** Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 - 3.** Section 31 05 19 – Geosynthetics

1.03 DEFINITIONS

- A.** Acronyms
- 1.** ASTM – American Society for Testing and Materials
 - 2.** DSR – DuPont Site Representative

SECTION 31 37 00 STONE TOE PROTECTION

- 3. HASP – Health and Safety Plan
- 4. VDOT –Virginia State Department of Transportation

1.04 REFERENCES

- A. The publications listed below form a part of this Contract Specification to the extent referenced. The publications are referred to within the text by the basic designation only.
 - 1. American Association of State Highway and Transportation Officials (AASHTO) – Standard Specifications for Transportation Materials and Methods of Sampling and Testing (2015)
 - 2. Virginia State Department of Transportation (VDOT) – Road and Bridge Specifications (2007)

1.05 SUBMITTALS

- A. Contractor shall submit the following in accordance with Section 01 33 00 – Submittal Procedures.
- B. Product Data
 - 1. The Contractor shall provide the DSR with a copy of the Earthwork Plan that includes product datasheet for imported toe rock and geotextile showing they meet the Specifications herein.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Inspection on delivery
 - 1. Upon delivery to the Contractor's work or storage area, the products shall be inspected in the presence of the DSR for condition and conformance with the Specifications.

PART 2 – PRODUCTS

2.01 TOE ROCK

- A. Toe Rock shall conform to VDOT Specification Section 204 and Section 414 for "Class I Dry Riprap."
- B. Toe Rock shall be sound and durable, free of cracks, soft seams, and other structural defects. Toe rock shall consist of well-graded, crushed, angular stone free of fine-grained particles and organic material. Unless otherwise approved by DSR, the Toe Rock shall meet the following specifications.
 - 1. The minimum stone diameter shall be 8 inches across the smallest dimension of the stone. The maximum stone diameter shall be 26 inches across the largest dimension of the stone.

SECTION 31 37 00
STONE TOE PROTECTION

2. Material shall be well graded between 8 to 26 inches.
3. Material shall also meet the following requirements.

Property	ASTM Method	Requirement
Minimum Specific Gravity	C-127	2.6
Maximum Absorption	C-127	2%

- C. Shall be imported quarried rock in conformance with 2.01B.

2.02 GEOTEXTILE

- A. Geotextile shall include required appurtenances and conform to Section 31 05 19 – Geosynthetics, Article 2.01.
- B. Geocell system shall conform to Section 31 05 19 – Geosynthetics, Article 2.02 and Article 2.03.

PART 3 – EXECUTION

3.01 INSTALLATION OF GEOTEXTILE AND GEOCELL SYSTEM FOR BANK REMOVAL AND RESTORATION AREAS

- A. Refer to Section 31 05 19 Geosynthetics, Articles 3.01 through 3.05 for geotextile and Geocell System for Bank Removal and Restoration Areas.
- B. Refer to Section 31 23 00, Article 2.06 for biochar blend.
- C. Place geotextile as shown on Contract Drawings or as directed by the DSR.
- D. Place biochar blend within the geocell system. Hand compact biochar blend to a relatively dense state as approved by the DSR and Engineer. Biochar blend shall fill the entire geocell system so as not to damage the exposed edges of the geocells when subjected to construction foot traffic and toe rock placement.
 1. The Contractor shall take care if using equipment over the geocell system. The Contractor shall be responsible for all repairs or replacement of the geocell system in accordance with the manufacturer's recommendations for any damage identified by the DSR.
 2. The Contractor shall be responsible for any associated work or labor to remove and reconstruct areas that were disturbed by the Contractor to gain access to the geocell system for repair or replacement.
- E. In underwater applications, the geotextile, geocell system, and overlying toe rock shall be placed the same day.

SECTION 31 37 00
STONE TOE PROTECTION

3.02 TOE ROCK PLACEMENT

- A.** Toe rock shall be placed at the locations and to elevations shown on the Contract Drawings.
- B.** The toe rock placement shall begin at the toe within the area excavated for the stone and proceed up the slope. Placement shall take place so as to avoid stretching and subsequent tearing of the geotextile and geocell system.
- C.** Placement shall occur along the embankment as soon as practicable after geotextile bedding has been finished, but shall not exceed 10 calendar days.
- D.** Larger rocks shall be reasonably well distributed to produce a well graded rock mass minimizing voids.

 - 1.** Final placement shall be free from objectionable pockets of small rocks and clusters of large rocks.
 - 2.** Hand placing may be required to the extent necessary to secure the results specified and form uniform slopes.
- E.** Toe rock shall not be dropped onto the geotextile and geocell system from a height greater than 1 foot.
- F.** Construction access shall be maintained by the Contractor until the placement is approved by the DSR. Misplaced material shall be replaced to the locations and elevations shown on the Contract Drawings at the Contractor's expense.

3.03 ORDERLY WORK AREA AND SITE CLEANUP

- A.** The Contractor shall maintain neat and orderly storage and work areas. The Contract will not be considered complete until all of the Contractor's tools, equipment, and property have been removed from the Project Site, and the Contractor's storage and work areas have been properly cleaned.

END OF SECTION

SECTION 31 52 00
TEMPORARY COFFERDAMS

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Work includes
 - 1.** Furnishing temporary cofferdam system
 - 2.** Installing temporary cofferdam system
 - 3.** Dewatering the area isolated within the temporary cofferdam system
 - 4.** Removing the temporary cofferdam system
- B.** The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C.** If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A.** Work related to this section is described in
 - 1.** Section 01 33 00 – Submittal Procedures
 - 2.** Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 - 3.** Section 31 23 00 – Earthwork and Fill
 - 4.** Section 31 37 00 – Stone Toe Protection

1.03 DEFINITIONS

- A.** Acronym
 - 1.** DSR – DuPont Site Representative
 - 2.** HASP – Health and Safety Plan
 - 3.** USGS – U.S. Geological Survey

1.04 REFERENCES

- 1.** Not used

SECTION 31 52 00
TEMPORARY COFFERDAMS

1.05 QUALITY ASSURANCE

1. Notify DuPont Site Representative (DSR) 48 hours in advance of installation of temporary cofferdam system.
2. Notify DSR 48 hours in advance of removal of temporary cofferdam system.

1.06 DELIVERY, STORAGE, AND HANDLING**A. Inspection on Delivery**

1. Upon delivery to the Contractor's work or storage area, the system shall be inspected in the presence of the DSR for conformance with the Contract Specifications and condition.

B. Storage

1. Store materials in accordance with manufacturer's instructions.

C. Handling

1. Protect materials during handling, installation, and removal to prevent damage.

1.07 SUBMITTALS**A. Water Control Plan**

1. The Contractor shall submit a Water Control and Emergency Action Plan for approval by the DSR prior to mobilization that
 - a. Defines how Site water will be managed during construction at each site.
 - b. Discusses additional standby water control measures for adapting to changing water levels in the South River.
 - c. Describes emergency action procedures if flooding occurs on the South River during construction.

PART 2 – PRODUCTS**2.01 COFFERDAM SYSTEM****A. Temporary Cofferdam System that will accomplish the following.**

1. Effectively isolate the work area from South River water for the duration of the work.
2. Minimize impacts to the existing river channel and the adjacent banks and upland areas and floodplains.

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3. Adapt to fluctuations in water levels in the South River.
- a. Water levels may change rapidly due to late summer thunderstorms or fall storm events. The following table presents % monthly exceedance flows for the South River as measured at USGS gages near Waynesboro, Virginia (USGS gage 01626000), and Dooms, Virginia (USGS gage 01626850), which upstream and downstream of the project area respectively.

STREAMFLOW STATISTICS – USGS GAGE 01626000 NEAR WAYNESBORO, VA							
MONTH	DISCHARGE CORRESPONDS TO THE GIVEN FLOW EXCEEDANCE PROBABILITY (CFS)						
	20%	10%	5%	1%	0.5%	0.25%	0%
JANUARY	224	328	452	1,051	1,756	2,279	6,390
FEBRUARY	230	341	515	1,347	1,755	2,031	3,930
MARCH	349	519	746	1,475	1,785	2,332	3,630
APRIL	300	449	612	1,405	1,899	2,324	4,400
MAY	205	302	431	861	1,258	1,577	4,430
JUNE	116	172	273	905	1,088	2,063	7,430
JULY	68	94	140	423	648	898	1,410
AUGUST	57	87	173	513	885	1,494	9,670
SEPTEMBER	68	130	294	1,002	1,651	2,425	8,110
OCTOBER	121	201	359	1,174	1,804	2,304	3,730
NOVEMBER	156	266	421	1,003	1,479	2,387	9,070
DECEMBER	202	294	415	864	954	1,313	1,710

STREAMFLOW STATISTICS - USGS GAGE 01626850 NEAR DOOMS, VA							
MONTH	DISCHARGE CORRESPONDS TO THE GIVEN FLOW EXCEEDANCE PROBABILITY (CFS)						
	20%	10%	5%	1%	0.5%	0.25%	0%
JANUARY	162	196	237	691	2,691	3,828	9,870
FEBRUARY	171	197	229	536	1,583	2,498	2,790
MARCH	243	287	347	1,035	2,762	3,082	5,310
APRIL	206	242	300	834	3,083	3,634	5,390
MAY	167	188	216	528	1,740	2,057	2,680
JUNE	102	115	130	346	1,451	2,278	4,230
JULY	79	85	95	192	1,019	1,360	1,630
AUGUST	67	70	79	210	675	951	1,740
SEPTEMBER	62	66	78	432	1,910	2,713	8,780
OCTOBER	70	78	101	481	1,616	2,440	3,720

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TEMPORARY COFFERDAMS

STREAMFLOW STATISTICS - USGS GAGE 01626850 NEAR DOOMS, VA							
MONTH	DISCHARGE CORRESPONDS TO THE GIVEN FLOW EXCEEDANCE PROBABILITY (CFS)						
	20%	10%	5%	1%	0.5%	0.25%	0%
NOVEMBER	92	120	164	565	3,136	4,455	12,000
DECEMBER	153	175	211	542	1,238	1,505	1,760

PART 3 – EXECUTION

3.01 EXAMINATION

- A.** The Contractor shall perform a Site examination of the area(s) to receive temporary cofferdam placement as noted on the Contract Drawings.
 - 1.** The Contractor shall notify DSR of conditions that would adversely affect installation or removal.
 - 2.** The Contractor shall not begin installation or removal until unacceptable conditions are corrected to the satisfaction of the DSR.
- B.** The Contractor shall evaluate foundation/subgrade conditions to verify consistencies relating to load bearing capacity or other conditions as recommended by the Manufacturer are satisfactory before installation if applicable. The highest anticipated water surface elevation for the construction timeframe should be considered in all calculations.
- C.** The DSR shall not be liable for costs or delays associated with the unsatisfactory or inadequate performance of the temporary cofferdam.
 - 1.** The Contractor shall responsible to inspect the cofferdams frequently throughout the Project duration to verify its performance and to correct any defects to the system.

3.02 INSTALLATION

- A.** Install temporary cofferdam system in a way that minimizes disturbance to the existing river bed, banks, and upland areas and in accordance with manufacturer's instructions if applicable.
- B.** Elements of the temporary cofferdam system shall not be placed outside the Project limits indicated on the Contract Drawings unless otherwise approved by the DSR.

3.03 REMOVAL

- A.** Allow for inspection and acceptance of the work by the DSR before re-watering enclosed area.
- B.** Dewater enclosed area in accordance with Section 31 23 00 – Earthwork and Fill prior to removal of temporary cofferdam.

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TEMPORARY COFFERDAMS

- C.** Remove temporary cofferdam system in a way that minimizes disturbance to the existing river bed, banks, and upland areas and in accordance with manufacturer's instructions if applicable.
- D.** Re-water enclosed area after completion of all work and cleanup in the area protected by the cofferdam, only after approval by the DSR.
- E.** The Contractor shall collect and properly dispose of remaining materials, debris, and rubbish resulting from cofferdam system removal.
- F.** Maintain neat and orderly storage and work areas. The Contract will not be considered complete until all of the Contractor's tools, equipment, and property have been removed from the Project Site, and the Contractor's storage and work areas have been properly cleaned up. All litter, packaging material and unused hardware, shall be removed from the Project Site and disposed of in a proper manner. Special care shall be taken to ensure that no foreign materials fall into or contaminate Project waters.

END OF SECTION

SECTION 32 90 00
PLANTING AND HABITAT RESTORATION

PART 1 – GENERAL**1.01 SUMMARY**

- A.** Work Includes
1. Furnishing and installing Planting Substrate, and amendments, for seeding and planting areas.
 2. Provide and plant trees, shrubs, and live stakes as shown on the Contract Drawings and specified.
- B.** The work area, conditions, and type of work required create considerable potential for accidents. Perform all work related to this specification in accordance with the approved project HASP. See Section 01 35 29 – Health, Safety, and Emergency Response Procedures for HASP submittal requirements.
- C.** If the Contractor identifies a discrepancy between any of the Contract Documents, they shall immediately notify the DuPont Site Representative (DSR). In general, the more stringent requirement shall take precedence.

1.02 RELATED WORK

- A.** Work related to this Section is described in
1. Section 01 33 00 – Submittal Procedures
 2. Section 01 35 29 – Health, Safety, and Emergency Response Procedures
 3. Section 31 05 19 – Geosynthetics
 4. Section 31 23 00 – Earthwork and Fill
 5. Section 31 25 00 – Erosion and Sedimentation Controls
 6. Section 31 35 00 – Slope Protection

1.03 DEFINITIONS

- A.** Acronyms
1. ASTM – American Society for Testing and Materials
 2. BMA – Bank Management Area
 3. cfu – colony forming unit
 4. DSR – DuPont Site Representative
 5. ft³ – cubic feet
 6. HASP – Health and Safety Plan

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- 7. H:V – horizontal to vertical
- 8. lb – pound
- 9. LOI – Loss-on-Ignition Organic Matter Method
- 10. mmhos/cm – milliMhos/centimeter
- 11. STA – Seal of Testing Assurance
- 12. TMECC – Test Methods for the Examination of Composting and Compost

1.04 REFERENCES

- A. Hortus Third compiled by the L. H. Bailey Arboretum, Cornell University, 1976
- B. American Society for Testing and Materials (ASTM) C602
- C. ASTM D5268
- D. ASTM D4972
- E. Virginia Erosion and Sediment Control Handbook
- F. U.S. Environmental Protection Agency Part 503 levels for heavy metals
- G. Test Methods for the Examination of Composting and Compost (TMECC) 05.07A, "Loss-on-Ignition Organic Matter Method (LOI)
- H. TMECC 04.10-A Electrical Conductivity.

1.05 QUALITY ASSURANCE

- A. All products supplied shall comply with applicable state and local codes.
- B. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock."
- C. Nomenclature shall conform to Hortus Third compiled by the L. H. Bailey Arboretum, Cornell University, 1976.
- D. All plants shall be nursery grown or collected materials that have been held in a nursery for at least 1 year. Nursery climatic conditions must be similar to those in the locality of the project. All plants shall be weed-free at the time of planting.
- E. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable at no additional cost, and providing that the larger plants will not be cut back to size indicated. Provide plants indicated by two measurements so that only a maximum of 25 percent are of the minimum size indicated, and 75 percent are of the maximum size indicated.

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1.06 SUBMITTALS

- A.** The Contractor shall submit the following in accordance with Section 01 33 00 – Submittal Procedures.
 - 1.** Plant nursery sources and photographs
 - a.** Contractor shall submit a list of nurseries supplying all plant species shown on the Contract Drawings. Submit representative color, dated photographs of each plant species.
 - 2.** Submit the following material samples
 - a.** Mulch submittal: Contractor shall notify the DuPont Site Representative (DSR) of the source of supply and provide a 1 gallon sample for approval before installation.
 - 3.** Submit the following material certification/data sheets
 - a.** Planting fertilizer

1.07 DELIVERY, STORAGE, AND HANDLING

- A.** Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in such a manner as to prevent wetting and deterioration of the fertilizer.
- B.** Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock. On arrival, the certificate shall be filed with the DSR. Protect all plants from desiccation. Wilt-proof or another anti-desiccant shall be applied only with approval of the DSR. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the DSR. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.
- C.** Cover plants transported on open vehicles with a protective covering to prevent wind-burn.
- D.** Provide dry, loose soils for planting. Frozen or muddy soil is not acceptable.
- E.** Stock shall be handled by root ball only, not the trunks, stems, or tops.
- F.** Inspect seed upon arrival at the job site for conformity to species and quality.
- G.** Reject seed that is wet, moldy, or bears a test date 5 months or older.

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1.08 PROJECT CONDITIONS

A. Ambient Conditions

1. Do not plant when the ground is frozen, snow covered, muddy, or air temperatures exceeds 90 °F.

B. Time Limitations

1. Permanent seed in accordance with seeding schedule on Contract Drawings.
2. Complete permanent seeding within 7 days after final grading operations have been completed.
3. Apply seed within 24 hours after seed bed preparation.
4. When hydroseeding, do not hold seed in the slurry for more than 24 hours.

C. Seeding Conditions

1. Perform seeding operations only during periods when beneficial results can be obtained.
2. When drought, excessive moisture, or other unsatisfactory conditions prevail, stop the work when directed.
3. When special conditions warrant a variance to the seeding operations, submit proposed alternate times for approval.

1.09 SEQUENCING AND SCHEDULING

- A. Planting live stakes shall commence after November 1st or when live stakes become available from local suppliers, whichever is earlier. Contractor shall acquire written permission by the DSR prior to planting live stakes. Planting all other vegetation shall be performed during the construction window.

1.10 WARRANTY

- A. Warrant plant material to remain alive and be in healthy, vigorous condition for a period of 1 year after the date of Physical Completion. Inspection of plants will be made by the DSR at the completion of planting.
- B. Replace, in accordance with the Contract Drawings and Contract Specifications, all plants that are dead or, as determined by the DSR, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. The cost of such replacement(s) is at the Contractor's expense. Warrant all replacement plants for 1 year after Physical Completion or installation, whichever is longer.
- C. Warranty shall not include damage or loss of trees, plants, or groundcovers caused by fires, floods, freezing rains, lightning storms, or winds more than 75 miles per hour, winter

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kill caused by extreme cold and severe winter conditions not typical of planting area, acts of vandalism, or negligence on the part of the DSR.

- D.** Remove and immediately replace all plants, as determined by the DSR, to be unsatisfactory during the initial planting installation.

PART 2 – PRODUCTS

2.01 PLANTING SUBSTRATE

- A.** Refer to Section 31 23 00 – Earthwork and Fill, Article 2.05

2.02 BIOCHAR BLEND

- A.** Refer to Section 31 23 00 – Earthwork and Fill, Article 2.07

2.03 GEOCELL SYSTEM FOR BANK STABILIZATION AREAS

- A.** Refer to Section 31 05 19 – Geosynthetics, Article 2.03

2.04 PLANT MATERIALS

- A.** Plants: Provide plants typical of their species or variety, with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from weeds, defects, disfiguring knots, sunscald injuries, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids, open spaces, broken branches, flush cuts, or stubs.

- 1.** Container-grown stock (including plugs): Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm, and whole.
 - a.** No plants shall be loose in the container.
 - b.** Container stock shall not be pot bound.
 - c.** No pruning wounds shall be present with a diameter of more than 1/2 inch, and such wounds must show vigorous callous on all edges. Trees shall not be pruned within 6 months prior to delivery.
 - d.** Deciduous trees that have solitary leaders shall have only the lateral branches thinned by pruning. All conifer trees shall have only one leader (growing apex) and one terminal bud and shall not be sheared or shaped. Trees having a damaged or missing leader, multiple leaders, or Y-crotches will be rejected.
- 2.** Live stake cuttings are live plant material without a previously developed root system. Source plants for cuttings shall be dormant when cuttings are taken, and all cuts shall be made with a sharp instrument. Live stake cuttings shall have a straight top cut immediately above a bud. The lower, rooting end shall be cut at

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an approximately 45-degree angle. Live stakes are cut from 1- to 2-year-old wood. Live stake cuttings shall be cut and installed with the bark intact, with no branches or stems attached.

2.05 SEED

A. Seed Classification

1. Provide State-approved seed of the latest season's crop in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material.
2. Ensure labels are in conformance with Agricultural Marketing Service Seed Act and applicable state seed laws.

B. Permanent Seed Mix

1. Ernst Seeds, ERNMX-822, or pre-bid approved equal, available from Ernst Conservation Seeds, Inc. See <http://www.ernstseeds.com/>.

C. Temporary Seed Species Mix

1. Ernst Seeds, ERNMX-101, or pre-bid approved equal, available from Ernst Conservation Seeds, Inc. See <http://www.ernstseeds.com/>.

D. Quality

1. Comply with minimum standards in the Virginia Erosion and Sediment Control Handbook.

E. Seed Mixing

1. The mixing of seed may be done by the seed supplier prior to delivery or on site in the presence of the DSR.

F. Substitutions

1. Substitutions will not be allowed without written request and DSR approval.

2.06 SOIL AMENDMENTS

- ##### A.
- Provide soil amendments consisting of pH adjuster, organic material, soil conditioners, and fertilizer meeting the following requirements. Do not use vermiculite.

B. pH Adjuster

1. Agricultural liming material in accordance with ASTM C602.
2. Provide burnt lime, hydrated lime, ground limestone, sulfur, or shells.
3. Use the pH adjuster to create a favorable soil pH for the plant material specified.

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4. Limestone
 - a. Minimum calcium carbonate equivalent of 80 percent
 - b. Gradation: A minimum 95 percent passing a No. 8 sieve and a minimum 55 percent passing a No. 60 sieve
 - c. Use ground limestone to raise soil pH
5. Hydrated Lime
 - a. Minimum calcium carbonate equivalent of 110 percent
 - b. Gradation: A minimum 100 percent passing a No. 8 sieve and a minimum 97 percent passing a No. 60 sieve
6. Burnt Lime
 - a. Minimum calcium carbonate equivalent of 140 percent
 - b. Gradation: A minimum 95 percent passing a No. 8 sieve and a minimum 35 percent passing a No. 60 sieve

2.07 FERTILIZERS

A. Hydroseeding Fertilizer

1. Controlled release fertilizer, to use with hydroseeding and composed of pills coated with plastic resin to provide a continuous release of nutrients for at least 6 months and based on soil tests or containing the following minimum percentages, by weight, of plant food nutrients.
2. 10 percent available nitrogen
3. 20 percent available phosphorus
4. 10 percent available potassium

B. Tree Fertilizer

1. Fertilizer for all tree plantings shall be "BioPaks-16-6-8 plus minors and biostimulants" available from Reforestation Technologies International (RTI), 1-800-784-4769.
2. BioPak®, or approved equivalent, shall consist of a 10-gram biodegradable planting packet containing a blend of 16.00 percent total nitrogen (N), 6.00 percent available phosphoric acid (P₂O₅), and 8.00 percent soluble potash (K₂O). Also containing 6.92 percent combined sulfur (S), 0.52 percent zinc (Zn), 0.54 percent Iron (Fe), 0.54 percent Magnesium (Mg), 0.23 percent Copper (Cu), 0.05 percent Boron (B), and 0.56 percent Manganese (Mn). The N, phosphorous, and potassium sources shall be coated with a polyurethane coating to provide 15.69 percent coated slow release nitrogen, 5.09 percent coated slow release

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available phosphate, and 6.80 percent available soluble potash. Also contains: 5.0 percent humic acid derived from rutile sands, 0.25 percent Kelp extract, and 0.9 percent naphthalene acetic acid.

3. Soil conditioner shall consist of Mycor Tree Saver mycorrhizal fungal transplant inoculant for trees and shrubs or approved equal consisting of:

Ectomycorrhizal Fungi	95 million spores/lb
Vesicular Arbuscular Mycorrhizal (VAM) Fungi	5,300 spores /lb
Rhizosphere Bacillus	324 million cfu/lb
Potassium polyacrylamide	33%
Formononetin	0.007%
Microbial Nutrients	39.4%
Inert Ingredients	27.3%

2.08 MULCH

- A. Free from weeds, mold, and other deleterious materials.
- B. Native to the region.

2.09 HYDROMULCH FOR HYDROSEEDING AREA

- A. Hydromulch shall be wood cellulose fiber, containing no growth- or germination-inhibiting substances. A soil-binding agent (tackifier) is required. Mulch shall be dyed a suitable color to facilitate placement coverage observation.

PART 3 – EXECUTION

3.01 PRE-INSTALLATION TESTING

- A. Soil Test
1. Test delivered and stockpiled Planting Substrate in accordance with ASTM D5268 and ASTM D4972 for determining the particle size, pH, organic matter content, textural class, chemical analysis, and soluble salts analysis.
 2. Collect samples from stockpiled Planting Substrate at different levels in the stockpile.
 3. Determine the quantities and type of soil amendments required to meet local growing conditions for the species specified.
- B. Seeding Equipment Calibration
1. Immediately prior to the commencement of seeding operations, conduct calibration tests on the equipment to be used.

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2. Confirm that the equipment is operating within the manufacturer's specifications and will meet the specified criteria.
3. Calibrate the equipment a minimum of once every day during the operation.
4. Provide calibration test results within 1 week of testing.

3.02 PLANTING AND SEEDING PREPARATION

A. Finish Grade and Planting Substrate

1. For all Areas to receive Planting Substrate except within Geocell and Jones Hollow Property
 - a. Verify that finished grades are as indicated on Contract Drawings, and that placing 12-inches of Planting Substrate, smooth grading, and compaction requirements have been completed in accordance with Section 31 23 00 – Earthwork and Fill prior to the commencement of the planting operation.
2. Planting Substrate and Biochar Blend Placement within Geocell System for Bank Stabilization Areas
 - a. Refer to Section 31 05 19 Geosynthetics, Article 3.01 and 3.06 for Bank Stabilization Areas.
 - b. Place Planting Substrate within the geocell system. Where indicated in the Contract Drawing, place a 6-inch layer of Biochar Blend (specified in 2.02 of this Section). Then, after evenly spreading the first 6-inches, place a second 6-inch layer consisting only of Planting Substrate in the same manner described in Article 2.05 of Section 31 23 00 Earthwork and Fill.
 - c. Hand compact all materials within the geocell system to a relatively dense state as approved by the DSR and Engineer. Entire geocell system shall be completely filled so as not to damage the exposed edges of the geocells when subjected to construction foot traffic.
 - i. The Contractor shall take care if using equipment over the geocell system. If damage is noted by the DSR and Engineer, then the Contractor shall be responsible for all repairs or replacement of the geocell system in accordance with the manufacturer's recommendations
 - ii. The Contractor shall be responsible for any associated work or labor to remove and reconstruct areas that were disturbed by the Contractor to gain access to the geocell system for repair or replacement.
 - d. Limit drop height to a maximum of 3 feet to prevent panel distortion.

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- e. Fill sections from the crest of the slope to toe or in accordance with DSR's direction.
 - f. Infill material shall be free-flowing and not frozen when placed into the sections.
 - g. Evenly spread infill and tamp into place.
- 3. Planting Substrate Placement within Jones Hollow Property
 - a. Verify that finished grades are as indicated on Contract Drawings, and that placing 4-inches of Planting Substrate, smooth grading, and compaction requirements have been completed in accordance with Section 31 23 00 – Earthwork and Fill prior to the commencement of the planting operation.
- B. Application of Soil Amendments
 - 1. Applying pH Adjuster
 - a. Apply as recommended by the soil test.
 - b. Incorporate the pH adjuster into the soil to a maximum 4-inch depth or as part of the tillage operation.
 - 2. Applying Soil Conditioner
 - a. Apply as recommended by the soil test.
 - b. Spread soil conditioner uniformly over the soil a minimum 1-inch depth and thoroughly incorporate by tillage into the soil to a maximum 4-inch depth.
- C. Tillage
 - 1. No tillage is required on slopes with geocell.
 - 2. On slopes that are 3-horizontal-to-1-vertical (3H:1V) or flatter: Till soil on slopes to a maximum 4 inch depth.
 - 3. On slopes between 3H:1V and 1H:1V: till the soil to a maximum 2-inch depth by scarifying with heavy rakes, or other method.
 - 4. Use rototillers where soil conditions and length of slope permit.
 - 5. On slopes 1H:1V and steeper, no tillage is required.
 - 6. Maintain drainage patterns as indicated on Contract Drawings.
 - 7. Completely pulverize by tillage areas compacted by construction operations.

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- 8. Use soil conforming to Planting Substrate requirements for repair of surface erosion or grade deficiencies.
- 9. The pH adjuster and soil conditioner may be applied during this procedure.
- D. Prepared Surface
 - 1. Preparation
 - a. Blend new surfaces to existing areas.
 - b. Complete the prepared surface with a light raking to remove debris.
 - 2. Debris
 - a. Remove debris and stones more than 5/8 inches in any dimension from the surface.
 - 3. Protection
 - a. Protect areas with the prepared surface from compaction or damage by vehicular or pedestrian traffic and surface erosion.

3.03 PLANT INSPECTION

- A. The Contractor shall notify the DSR least 48 hours in advance of the time of inspection required for completion of soil preparation before the planting of trees, shrubs, and groundcover can occur.
- B. Plant material shall be inspected and approved by the DSR at the nursery or site prior to installation. Remove unsatisfactory material from the site immediately.

3.04 PLANTING PREPARATION AND SEQUENCING

- A. The Contractor shall locate plants by staking with stakes and flags as indicated on the Contract Drawings or as approved in the field. If obstructions are encountered that are not shown on the Contract Drawings, do not proceed until DSR has selected alternate plant locations.
- B. In Slope Stabilization Areas, trees shall be installed before installing geocell.
- C. In all other areas, plant materials shall be installed after log edging, planting substrate, and coir fabric have been installed and approved by the DSR.

3.05 CONTAINER PLANT INSTALLATION

- A. Container plants brought to the planting site shall be in containers and sized as specified in the planting schedule in the Contract Drawings for the particular type of planting material. Plants shall not be planted during freezing weather or when the ground is frozen. Plants shall not be planted during excessively wet conditions. Plants shall not be placed on any day in which temperatures are forecast to exceed 80 degrees F unless the

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DSR approves otherwise. Plants shall not be placed in areas that are below finished grade.

- B.** Plants shall be removed from containers in a manner that prevents damage to the root system. Containers may require vertical cuts down the full depth of the container to accommodate removal. All circling roots shall be loosened to ensure natural directional growth after planting.
- C.** Plant installation shall be performed using the following steps.
 - 1.** Dig a hole 12 inches in diameter and 12 inches deep; minimize disturbance to the jute matting.
 - 2.** Install fertilizer packets around plant root balls based on plant size and manufacturer recommendations.
 - 3.** Set the container plant material in the planting pit to the proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structures. Set the crown of plant material at the finish grade. No filling will be permitted around trunks or stems or above grafts on grafted trees. Backfill the planting pit with Planting Substrate. Form a ring of soil around the edge of each planting pit to retain water.
 - 4.** Space plants using triangular spacing in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting area. Plant to within 12 inches of the edge of the planting area.
- D.** Mulching
 - 1.** Mulch tree and shrub planting pits and shrub beds with required mulching material immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.
- E.** Pruning
 - 1.** Prune all trees only to remove broken or damaged branches, or for aesthetic purposes as directed by the DSR. Branches will be pruned at the branch collar. Neither stubs nor flush cuts will be acceptable.

3.06 LIVE STAKE PLANT INSTALLATION

- A.** All live stake cuttings shall be continuously soaked in water immediately after cutting until delivery to the site. Cuttings shall be planted the same day that they are delivered to the site. Cuttings shall be kept continually soaked in water on site until immediately before planting.
- B.** Live stake and pole installation shall be performed using the following steps.
 - 1.** Cut an "X" in the coir fabric, with 2 inches maximum length for each cut.
 - 2.** Use an iron stake or bar of similar diameter to the live stakes and poles to create a pilot hole of sufficient depth through the jute matting.

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3. Plant the stakes with an angled bottom end in the ground, with at least two to five emerging buds exposed at the top end.
4. Install the stakes with a rubber mallet, and protect the stakes from damage such as splitting, bark peeling, and bud breakage during installation.
5. Install each stake with 80 percent (4/5) buried and 20 percent (1/5) exposed.
6. Ensure good contact through soil tamping of backfilling.
7. Install stakes perpendicular to the slope as shown on the Contract Drawings.

3.07 PLANT MAINTENANCE

- A. The contractor shall maintain planting for 12 months following completion of planting in a bank management area (BMA).
- B. Maintain planting until acceptance by the DSR.
- C. Replace any tree or shrub that does not survive first year.
- D. Maintenance shall include cultivating, weeding, removal of invasive species, watering, pruning (only as directed), installation of herbivory controls if necessary, and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.
 1. Reset settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
 2. Straighten, repair, and adjust guy wires and stakes as required.
 3. Correct defective work as soon as possible after deficiencies become apparent and as weather and season permit.
 4. Install herbivory controls as directed by the DSR if browsing damage is observed.
 5. Water trees, shrubs, and live stakes within the first 24 hours of initial planting, and not less than twice per week (including rain) until Physical Completion.

3.08 SEEDING

- A. If special conditions exist that may warrant a variance in the specified seeding dates or conditions, submit a written request stating the special conditions and proposed variance.
- B. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.

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PLANTING AND HABITAT RESTORATION

- C.** Seed Application Method (Use one of the following seeding methods)
- 1.** Broadcast and Drop Seeding in BMA
 - a.** Seed immediately after Planting Substrate is placed, and before Coir Fabric is installed.
 - b.** Uniformly broadcast permanent seed mix at the rates recommended by the manufacturer.
 - c.** Use broadcast or drop seeders.
 - d.** Sow one-half the seed in one direction, and sow remainder at right angles to the first sowing.
 - e.** Cover seed uniformly to a maximum depth of 1/4 inch in clay soils and 1/2 inch in sandy soils by means of spike-tooth harrow, cultipacker, raking, or other approved devices.
 - 2.** Hydroseeding in All Disturbed Areas including Jones Hollow.
 - a.** First, mix water and hydromulch.
 - b.** Add hydromulch at 1,000 pounds, dry weight, per acre.
 - c.** Then add and mix temporary seed mix and fertilizer to produce a homogeneous slurry.
 - d.** Add soil binding agent (tackifier) at the rate recommended by manufacturer.
 - e.** Use 10 pounds of seed per acre.
 - f.** When hydraulically sprayed on the ground, ensure material forms a blotter like cover impregnated uniformly with grass seed.
 - g.** Spread with one application with no second application of mulch.
 - 3.** Dormant Seeding
 - a.** Increase permanent seed mix application rate by 25 percent when soil temperature is below 55° Fahrenheit

3.09 ROLLING

- A.** Immediately after seeding, firm entire area except for slopes in excess of 3 to 1 with a roller not exceeding 90 pounds for each foot of roller width.
- B.** If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.

SECTION 32 90 00 PLANTING AND HABITAT RESTORATION

3.10 WATERING IN SEEDING AREA

- A. Start watering immediately after completing the seeding of an area.
- B. Apply water to supplement rainfall at a rate sufficient to ensure moist soil conditions to a minimum 1 inch depth.
- C. Prevent run-off and puddling.
- D. Prevent watering of other adjacent areas or plant material.

3.11 SURFACE EROSION CONTROL IN SEEDING AREA

- A. Surface Erosion Control Material
 - 1. Where indicated or as directed, install surface erosion control material in accordance with Section 31 25 00 – Erosion and Sedimentation Controls and manufacturer's instructions.
 - 2. Place material without damage to installed material or without deviation to finished grade.
- B. Temporary Seeding
 - 1. When directed during contract delays affecting the seeding operation or when a quick cover is required to prevent surface erosion, seed the designated areas in accordance with temporary seed mix.
 - 2. Immediately seed disturbed areas that will be left exposed more than thirty (30) days, and not subject to construction traffic using temporary seed. Immediately following surface roughening, seed critical areas subject to erosion using temporary seed in combination with straw mulch.
 - 3. Soil Amendments
 - a. When soil amendments have not been applied to the area, apply $\frac{1}{2}$ of the required soil amendments and till the area in accordance with Paragraph SITE PREPARATION.
 - b. Water the area in accordance with Paragraph WATERING.
 - c. Apply remaining soil amendments in accordance with the Paragraph TILLAGE when the surface is prepared for installing seed.

3.12 RESTORATION

- A. Restore existing turf areas, pavements, and facilities damaged from the seeding and planting operations to original condition.

SECTION 32 90 00
PLANTING AND HABITAT RESTORATION

3.13 FIELD QUALITY CONTROL

A. Quantity Check

1. For materials provided in bags, retain the empty bags for recording the amount used.
2. For materials provided in bulk, retain the weight certificates as a record of the amount used.
3. Compare the amount of material used with the total area covered to determine the rate of application used.
4. Adjust differences between the quantity applied and the quantity specified as directed.

3.14 SEED ESTABLISHMENT PERIOD

A. Commencement

1. The seed establishment period to obtain a healthy stand of grass plants will begin on the first day of seeding work and will end 12 months after the last day of the seeding operation.
2. Furnish written calendar time period for the seed establishment period.
3. When there is more than 1 seed establishment period, describe the boundaries of the seeded area covered for each period.
4. Modify the seed establishment period for inclement weather, shut down periods, and for separate completion dates of areas.

B. Satisfactory Stand of Grass Plants

1. Evaluate grass plants for species and health when the grass plants are a minimum 1 inch high.
2. The maximum allowable dimensions of bare spots are 6 inches square.
3. The maximum total number of bare spots is 30 percent of the total seeded area.

C. Maintenance during Establishment Period

1. Eradicate weeds, invasive plant species, insects and diseases; protect embankments and ditches from surface erosion; maintain erosion control materials and mulch; protect installed areas from traffic and water.
2. Repair or Reinstall
 - a. Repair or reinstall unsatisfactory stand of grass plants and mulch, and repair eroded areas in accordance with Paragraph SITE PREPARATION.

SECTION 32 90 00
PLANTING AND HABITAT RESTORATION

3. Maintenance Record

- a.** Furnish a record of each site visit, describing the maintenance work performed; areas repaired or reinstalled; and diagnosis for unsatisfactory stand of grass plants.

3.15 PHYSICAL COMPLETION

- A.** Inspection to determine Physical Completion of planted areas will be made by the DSR 1 year after planting and seeding upon Contractor's request. Provide notification at least 10 working days before requested inspection date.
 - 1.** Planted areas will be accepted, provided all requirements, including the maintenance period, have been complied with and plant materials are alive and in a healthy, vigorous condition.
- B.** Upon Physical Completion, the DSR will assume plant maintenance.

3.16 ORDERLY WORK AREA AND SITE CLEANUP

- A.** The Contractor shall maintain neat and orderly storage and work areas. The Contract will not be considered complete until all of the Contractor's tools, equipment, and property have been removed from the Project site, and the Contractor's storage and work areas have been properly cleaned.

END OF SECTION

Appendix D

Tree Survey Results Summary

Project ref:
60390328

From:
Kristy Hoffman, AECOM
Emily Genuardi, AECOM

Date:
September 13, 2017

To:
Michael Liberati, DuPont

CC:
Nancy Grosso, DuPont

Memo

Subject: AOC 4 Phase 1 Bank Management Area Vegetation Community and Tree Survey Memo
DuPont Former Waynesboro Plant, Area of Concern 4

Background

The proposed interim measures for Area of Concern 4 (AOC 4) of the former DuPont Waynesboro site located on the South River in Virginia are designed to reduce or eliminate loading of historically deposited mercury from riverbanks through targeted source area removal and riverbank stabilization. AECOM conducted a tree survey at two Phase 1 Bank Management Areas (BMAs) targeted for implementation of interim measures. The primary objective of the tree survey was to identify the extent of mature riparian forest at each BMA to minimize disturbance of these habitats to the extent possible during remediation.

Approach

The tree survey was conducted along the following two reaches of the South River:

- Shiloh Baptist Church BMA from Relative River Mile (RRM) 0.48 to 0.73¹
- Allied Ready Mix BMA from RRM 1.33 to 1.59

Trees with a minimum diameter at breast height (dbh) of 7 inches were surveyed within each reach using 36-inch calipers. Each surveyed tree was marked with a numbered aluminum tag and orange flagging nailed into the tree. The tree tag number was recorded with the tree species, the dbh, the estimated tree height, and the Critical Root Zone (CRZ). The CRZ was estimated based on the assumption that 1 inch of dbh is equal to 1.25 feet of root zone. A Trimble Geo7X GPS device was used to record survey start and end locations, as well as dead trees and other points of interest such as exposed bedrock.

¹ The portion of the Shiloh Baptist Church BMA behind the church was not surveyed as formal site access was not obtained at the time of the survey. Trees > 7" minimum dbh will be identified in future mobilizations as needed.

Results

The tree survey was performed during the week of June 26, 2017. Results are provided in the following paragraphs.

Shiloh Baptist Church BMA

Sixty-eight trees consisting of 11 species plus one unidentified (dead tree) were identified along the Riverside Drive portion of the Shiloh Baptist Church BMA. Black walnut (*Juglans nigra*) and silver maple (*Acer saccharinum*) were dominant species. Two of the surveyed trees appeared dead, and seven were multi-stemmed. Table 1 summarizes the survey results for this location.

Table 1. Summary of Tree Survey Results for Riverside Drive

Species		Quantity			Diameter at Breast Height (Inches)	Estimated Height (Feet)
Common Name	Scientific Name	Surveyed	Dead Trees	Multi-stemmed Trees		
Black Walnut	<i>Juglans nigra</i>	19	0	0	8-21	25-65
Silver Maple	<i>Acer saccharinum</i>	13	0	3	10-42	35-60
Ash-Leaf Maple	<i>Acer negundo</i>	10	0	2	7-27	25-55
American Sycamore	<i>Platanus occidentalis</i>	8	0	2	19.5-48	55-75
Common Hackberry	<i>Celtis occidentalis</i>	6	0	0	8-20	35-60
Black Locust	<i>Robinia pseudoacacia</i>	3	0	0	7.5-19	35-70
Siberian Elm	<i>Ulmus pumila</i>	3	0	0	7.25-19	30-70
Norway Maple	<i>Acer platanoides</i>	2	1	0	9.25-9.5	30-45
Northern Catalpa	<i>Catalpa speciosa</i>	1	0	0	10	40
Sugar Maple	<i>Acer saccharum</i>	1	0	0	10	30
Black Cherry	<i>Prunus serotina</i>	1	0	0	10	45
Unknown (Dead)		1	1	1	0	-
TOTAL	11	68	2	7	7-48	25-75

Allied Ready Mix BMA

One hundred and eighteen trees consisting of nine species were identified along Allied Ready Mix BMA. Silver maple and American sycamore (*Platanus occidentalis*) were the dominant species. Three of the surveyed trees appeared dead, and 20 were multi-stemmed. Table 2 summarizes the results at this location.

Table 2. Tree Survey Results for Allied Ready Mix BMA

Species		Quantity			Diameter at Breast Height (Inches)	Estimated Height (Feet)
Common Name	Scientific Name	Surveyed	Dead Trees	Multi-stemmed Trees		
Silver Maple	<i>Acer saccharinum</i>	54	3	19	7.5-29	30-80
American Sycamore	<i>Platanus occidentalis</i>	43	0	0	7-31.5	30-80
Black Walnut	<i>Juglans nigra</i>	7	0	0	8.5-18.5	50-70
Ash-Leaf Maple	<i>Acer negundo</i>	5	0	1	8-24	30-55
Sugar Maple	<i>Acer saccharum</i>	3	0	0	12	50
Black Willow	<i>Salix nigra</i>	2	0	0	12-15	35-65
Black Locust	<i>Robinia pseudoacacia</i>	1	0	0	9.5	50
Siberian Elm	<i>Ulmus pumila</i>	2	0	0	8-15	30-75
Norway Maple	<i>Acer platanoides</i>	1	0	0	22	70
TOTAL	10	118	3	20	7-31.5	25-80

Summary

A total of 186 trees consisting of 12 species was surveyed at the two reaches. Silver maple, American sycamore, black walnut, and ash-leaf maple (*Acer negundo*) were the dominant species. Five (< 3%) of the surveyed trees appeared dead, and 27 (15%) were multi-stemmed. These data will be considered in the design of the BMAs incorporating avoidance and design strategies to minimize potential disturbance and balance remedial objectives and habitat preservation goals.

Appendix E

Utility Survey Results Summary

Project ref:
60390328

From:
Michael R. Greer, P.G., AECOM
Timothy J. King, P.G., AECOM

Date:
September 11, 2017

To:
Josh Collins, AECOM

Memo

Subject: Geophysical Investigation Memo Subsurface Utility Location Survey AOC 4 Interim Measures – Phase 1 BMAs
DuPont Former Waynesboro Plant

This memo presents the findings of a geophysical investigation conducted within Area of Concern 4 (AOC 4) near the former DuPont Waynesboro Plant in Waynesboro, Virginia. The objective of the geophysical survey was to locate and map potential underground utilities and obstructions in advance of planned intrusive work within the Phase 1 Bank Management Areas (BMAs).

Project and Site Description

Geophysical surveying was conducted along portions of the eastern (Right) and western (Left) banks of South River, as shown in the attached Figures 1 through 7. Suspected underground utilities within the survey area include storm and sanitary sewer, gas, and unknown lines. Ground surface conditions generally consisted of steeply sloping and densely vegetated river banks.

Geophysical Survey Methodology

The geophysical investigation was conducted using a combination of pipe and cable locating and tracing and ground-penetrating radar (GPR) methods. Descriptions of the geophysical methods are provided below.

Pipe and Cable Locators and Tracers

Pipe and cable locators and tracers allow for inductive or conductive tracing of accessible utility lines. Tracing utilities with these instruments may require access to the utility, either via a manhole, an exposed portion of the utility, a standpipe, or a valve stem. Cast iron or steel utility lines can be traced

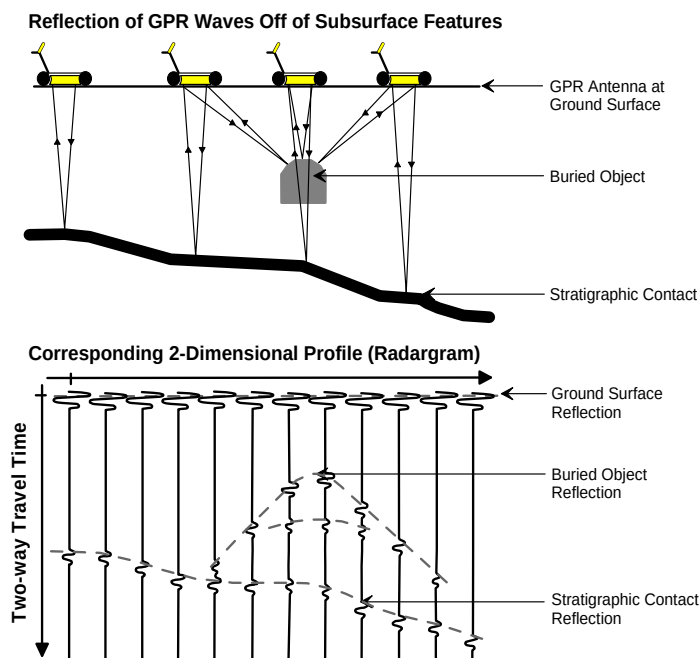
by transmitting a signal into the line via a multi-frequency high-power transmitter and using a receiver at the surface to track the signal. The signal can be transmitted to the utility either inductively by placing the transmitter on the ground surface above the suspected utility location or conductively by directly applying a signal to an exposed section of the utility.

Pipe and cable locating/tracing was performed using the Radiodetection Cable Avoidance Tool (C.A.T.). This instrument allows detection of radio signals that can be broadcasted by metal utilities or inactive conduits. This feature allows for reliable tracing of utilities that have no access points and is useful for conducting broad scans for subsurface utility lines. In addition, this instrument allows for detection of 60 Hz electric lines.

Ground Penetrating Radar (GPR)

The GPR survey was completed using the Noggin SmartCart manufactured by Sensors and Software Inc., equipped with a 250 MHz antenna. The GPR method is widely used in subsurface utility studies. GPR provides an effective technology for detecting and delineating the extent of a variety of buried features of importance in these studies including metallic and non-metallic utility lines, buried building foundations, and backfilled trenches. The GPR method involves transmitting high-frequency electromagnetic pulses into the ground using a portable transducer antenna placed on the ground surface. The radar pulses are reflected by a variety of subsurface interfaces or buried objects. The reflected pulses are sensed by a receiver antenna located adjacent to the transmitter antenna.

As the transmitter and receiver are moved along a survey line, the reflected electromagnetic signals are displayed versus either travel times or relative depths on a graphic recorder or computer. In certain types of surveys, the data can be stored and subsequently analyzed using specialized computer software. With the Noggin SmartCart and similar GPR instruments the transmitter and receiver are collocated in the same antenna housing.



The effectiveness of GPR surveying at a given site is directly related to the dielectric properties of the subsurface materials. The effective depth of exploration provided by the method can be limited by subsurface materials characterized by high conductivity and dielectric constants, including clay, metal and metallic minerals, or reinforced pavement which absorb radar energy, thereby diminishing the responses associated with reflected waves associated with the features of interest. In general, the depth of investigation at a given site is inversely proportional to antenna frequency and the degree of feature resolution is proportional to antenna frequency. A relatively smooth ground surface is essential to collection of high quality data so that coherent signals are not muted by spurious signals associated with poor coupling of the antenna to the ground surface.

The GPR antenna is linked to a control/display unit by a wire or fiber optic connection. The control unit provides the operator a set of interactive data acquisition parameters, a display screen, and file management and downloading capabilities via a computer interface. GPR data are typically collected continuously by moving a self-contained transmitter/receiver antenna unit along linear transects. As the antenna is towed along the transect line, the reflected radar signals are displayed on a video screen which depicts an approximation of the subsurface interfaces in cross-section.

Field Investigation

The field investigation was completed on July 11 and 12, 2017, by two AECOM Geophysicists..

AECOM conducted a broad scan survey across the accessible extents of the BMAs presented in Figures 1 through 7 using the pipe and cable locators and the GPR. The lateral extents of identified suspected subsurface utilities and obstructions were marked in the field using semi-permanent marking paint. Utility depths below ground surface (bgs) were noted where determined. AECOM endeavored to inspect manholes to evaluate utility types and orientations. However, all manholes identified in Figure 5 were locked and could not be accessed. Of the two manholes shown within the BMA in Figure 1, one was locked and the other flooded to the point that no utility could be identified.

Detailed sketches were generated on aerial images of the sites and provided to AECOM land surveyors. The surveyors then recorded the horizontal positions and surface elevations of the identified utilities or unknown linear features.

Access to significant portions of the BMAs was limited by steep slopes and/or dense vegetation. In most locations the vegetation and moderately to steeply sloped banks prevented the performance of surveying along portions of the banks of the river within each BMA. In areas where 100 percent survey coverage was not achievable, the following three steps were taken:

1. Scanning for utilities along transects running roughly parallel to the river banks across the accessible portions of the banks where vegetation and slope allowed access.
2. Scanning for utilities along transects running roughly perpendicular to the river banks along accessible portions of the survey area. In several instances, surveying was performed in accessible areas as far as 100 feet away from the river's edge to scan for utilities running perpendicular to the river and entering the BMAs.
3. Visual inspection of the densely vegetated and steeply sloped sections of BMAs where fully effective surveying with the entire suite of tools could not be completed. This also included the

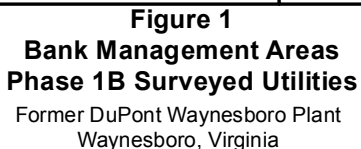
survey crew wading in the river along the portions of the BMAs to visually scan the banks for features previously unidentified by geophysical surveying on shore.

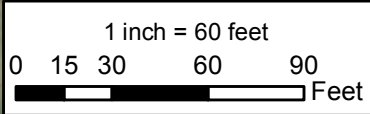
Investigation Results

The results of the utility mapping are presented as Figures 1 through 7. These maps display the lateral extents of the designated survey areas (BMAs) and the locations of identified linear anomalies and suspected subsurface utilities. The displayed survey areas and surveyed utility line features were provided by AECOM using the Virginia North FIPS 4501 State Plane Coordinate System in units of U.S. feet. Some positional discrepancies between the aerial image and surveyed lines are evident in Figures 1 through 7 but most apparent at the sanitary manhole structure in Figure 5. It should be noted that the features presented in the attached figures are limited to utilities or linear anomalies that were detected or confirmed by AECOM during this field investigation.

Limitations

This geophysical investigation, data interpretation and conclusions were developed in accordance with reasonable and accepted engineering geophysics practices, and rendered in a manner consistent with the state of the practice. However, all geophysical techniques have some level of uncertainty and limitations, and this memo includes no other warrant or guarantee.







Legend

- | | | | |
|-------------------------|---------------------------|---------------------------------|---------------------|
| Phase 1B Primary BMAs | Sanitary | Sanitary Sewer Manhole | Storm Sewer Manhole |
| Phase 1B Secondary BMAs | Unknown_Linear_Feature | BMA Topographic Survey Boundary | |
| Storm | Unknown Termination | | |
| Storm_Suspected | Interpreted Utility Depth | | |
| Gas | | | |

Reference:
VBMP 2007 Aerial Imagery

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US



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Date: 9/14/2017

Figure 3
Bank Management Areas
Phase 1B Surveyed Utilities
Former DuPont Waynesboro Plant
Waynesboro, Virginia

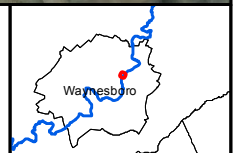


Legend

- Phase 1B Primary BMAs
- Sanitary
- Phase 1B Secondary BMAs
- Unknown_Linear_Feature
- Storm
- Storm_Suspected
- Gas
- WW Sanitary Sewer Manhole
- D Storm Sewer Manhole
- ? Unknown Termination
- BMA Topographic Survey Boundary
- 3' Interpreted Utility Depth

Reference:
VBMP 2007 Aerial Imagery

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US



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Figure 4
Bank Management Areas
Phase 1B Surveyed Utilities
Former DuPont Waynesboro Plant
Waynesboro, Virginia



Legend

	Phase 1B Primary BMAs		Sanitary		Sanitary Sewer Manhole		Storm Sewer Manhole
	Phase 1B Secondary BMAs		Unknown_Linear_Feature		BMA Topographic Survey Boundary		
	Storm		Unknown Termination				
	Storm_Suspected		Interpreted Utility Depth				
	Gas						

Reference:
VBMP 2007 Aerial Imagery

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US



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Figure 5
Bank Management Areas
Phase 1B Surveyed Utilities
Former DuPont Waynesboro Plant
Waynesboro, Virginia



Legend

- | | | | |
|-------------------------|---------------------------|---------------------------------|---------------------|
| Phase 1B Primary BMAs | Sanitary | Sanitary Sewer Manhole | Storm Sewer Manhole |
| Phase 1B Secondary BMAs | Unknown_Linear_Feature | BMA Topographic Survey Boundary | |
| Storm | Unknown Termination | | |
| Storm_Suspected | Interpreted Utility Depth | | |
| Gas | | | |

Reference:
VBMP 2007 Aerial Imagery

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US



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Figure 6
Bank Management Areas
Phase 1B Surveyed Utilities
Former DuPont Waynesboro Plant
Waynesboro, Virginia



Legend

- | | | | |
|-------------------------|---------------------------|---------------------------------|---------------------|
| Phase 1B Primary BMAs | Sanitary | Sanitary Sewer Manhole | Storm Sewer Manhole |
| Phase 1B Secondary BMAs | Unknown_Linear_Feature | BMA Topographic Survey Boundary | |
| Storm | Unknown Termination | | |
| Storm_Suspected | Interpreted Utility Depth | | |
| Gas | | | |

Reference:
VBMP 2007 Aerial Imagery

NAD 1983 StatePlane Virginia North
Projection: Transverse Mercator
Linear Unit: Foot US



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Figure 7
Bank Management Areas
Phase 1B Surveyed Utilities
Former DuPont Waynesboro Plant
Waynesboro, Virginia