

## Jeff Ribeiro

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**From:** Elizabeth Hansel <ehansel@vineyardwind.com>  
**Sent:** Tuesday, June 1, 2021 10:42 AM  
**To:** Jeff Ribeiro  
**Cc:** Tricia Foster; Ted Barten  
**Subject:** RE: Vineyard Wind 1 Minor Modification Type 1 Request

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Good morning,

Per your request, please find the documents listed below at the following ShareFile link: <https://epsilon.sharefile.com/d-s255c905d417c4e899967893e8e4f212e>.

- Stormwater Management Report, Attachment H to DRI Application as supplemented/updated by Supplemental Stormwater Report for new substation prepared by Stantec dated 3/15/19, including corresponding civil site plan sheets for substation site individually titled "Cover," "General Notes," "Existing Conditions," "Proposed Equipment Layout (AIS)," "Proposed Grading and Drainage (AIS)," "Detail Sheet 1," "Detail Sheet 2," "Detail Sheet 3," and "Drainage Profile," all with revised date of 3/15/19 (Attachment 2 to Epsilon's Supplemental Letter Dated April 2, 2019)
- Vineyard Wind Connector- Substation Draft Site Plan/ Layout, Figures 2-6, 2-7 & 2-8 included in Attachment A to DRI Application
- Vineyard Wind Connector- Substation Rendering, Figures 2-10a, 2-10b, 2-10c, 2-10d, 2-10e, 2-10f & 2-10g included in Attachment A to DRI Application

Regarding the synchronous condenser enclosures, in the original plans, the synchronous condensers were proposed to be installed in the building. As now proposed, the two synchronous condenser enclosures will be located on the west side of the substation, measuring approximately 35-40 feet in height, which is comparable to the height of the former Cape Cod Times building and approved sound walls. The new enclosures will continue to be screened by the 30-foot high perimeter wall when viewed from the east. From Independence Drive to the south, views of the new enclosure will be screened by the wooded area along Independence Drive and the existing Cape Cod Times building. From the west, the new enclosures will be screened by the wooded area along both sides of Communications Way as well as the Cape Cod Times building. From the north, the only views of the proposed substation will be from the existing Barnstable Switching Station. The redesigned substation will have no meaningful additional visual impacts and will continue to promote the 2019 RPP goals of context specific sensitive building and site design.

We invite a phone call at your earliest convenience to discuss any questions you may have. We are available tomorrow from 3pm – 4pm and Thursday from 8am – 9am and again from 1:30pm – 3pm. Please let us know if any of these times works for your schedule and I'll be happy to set up a Zoom virtual meeting.

Best,  
Elizabeth Hansel | c: 508.446.7326  
Manager, Environmental Affairs



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**From:** Jeff Ribeiro <[jeffrey.ribeiro@capecodcommission.org](mailto:jeffrey.ribeiro@capecodcommission.org)>  
**Sent:** Tuesday, May 25, 2021 10:16 AM  
**To:** Elizabeth Hansel <[ehansel@vineyardwind.com](mailto:ehansel@vineyardwind.com)>  
**Subject:** RE: Vineyard Wind 1 Minor Modification Type 1 Request

Hi Elizabeth,

I'll be handling this modification, and it took me a little while to get up to speed as I was not involved in the original DRI review.

After going through the initial application and the relevant parts of the decision, I think we need the following to be able to review the proposal to verify any potential impacts from these changes:

Stormwater Management Report, Attachment H to DRI Application as supplemented/ updated by Supplemental Stormwater Report for new substation prepared by Stantec dated 3/15/19, including corresponding civil site plan sheets for substation site individually titled "Cover," "General Notes," "Existing Conditions," "Proposed Equipment Layout (AIS)," "Proposed Grading and Drainage (AIS)," "Detail Sheet 1," "Detail Sheet 2," "Detail Sheet 3," and "Drainage Profile," all with revised date of 3/15/19 (Attachment 2 to Epsilon's Supplemental Letter Dated April 2, 2019)

Vineyard Wind Connector- Substation Draft Site Plan/ Layout, Figures 2-6, 2-7 & 2-8, Attachment A to DRI Application

Vineyard Wind Connector- Substation Rendering, Figures 2-10a, 2-10b, 2-10c, 2-10d, 2-10e, 2-10f & 2-10g, Attachment A to DRI Application

Also I was unable to references to find the synchronous condenser enclosures in the original plans and materials. I think it is important to verify their height relative to the other structures and the screening. Updates to the plans and renderings may help determine any impacts. Last, it appears that the SWPPP from early April needs to be updated as well.

I'd be happy to discuss any of this, and please let me know if I am missing something.

Best,

Jeff

**Jeffrey Ribeiro, AICP**  
Regulatory Planner  
Cape Cod Commission  
3225 Main Street, PO Box 226

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To: Kate McEneaney  
Epsilon Associates

From: Mark S. Bartlett, P.E.  
Quincy, MA

File: Vineyard Wind 198802613

Date: March 15, 2019

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**Reference: Supplemental Submittals for Vineyard Wind Substation Stormwater Report**

In response to a Cape Cod Commission review, Stantec is providing the following supplemental materials in support of the Stormwater Management Report that was submitted to the MEPA office with the Supplemental Draft Environmental Impact Report (SDEIR) on August 3, 2018.

1. A completed "Checklist for Stormwater Report" as required by the MADEP Stormwater Policy, stamped and dated March 15, 2019.
2. Calculations documenting compliance with MA Stormwater Policy Standard 4 (Water Quality), showing that the treatment train meets the 80% TSS removal requirement and, the 44% TSS removal pretreatment requirement (required because the stormwater discharge will occur within a water supply Zone II protection area). MA Stormwater Policy Standard 6 defines Zone II Water supply protection areas as a "sensitive area" deserving of higher TSS removal standards (see Standard 4).
3. Revised substation drawing detail sheets see attached revised substation plans, revised to include cross sections for certain treatment train features (e.g. swales, forebays, deep sumps, Petro-Barriers).
4. Regarding the Commission's question to "Identify that test pits and subsurface conditions either were analyzed or will be prior to final plan": Please refer to the last paragraph of *Section 1.3 Analysis Overview* of the Stormwater Management Report which notes the following: "Onsite soils include two gravely loamy sands: Plymouth Barnstable Complex, rolling, very boulder Hydrological Soil Group A; and Plymouth Barnstable complex, hilly, very bouldery (Hydrological Soil Group A) according to the online Web Soil Survey of the USADA Natural Resources Conservation Service (NRCS). **No test pits have been excavated on Site, but soils will be thoroughly tested as part of final design and permitting.** Based on a site inspection, and reliable NRCS soils data, a Rawls rate of 8.27 in/hr was assumed as the site soils infiltration rate. This infiltration rate will be updated accordingly once on-site soil evaluations have taken place." (bold text added here for emphasis)
5. Regarding the Commission's question to "provide additional information to show that the equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume": MA Stormwater Policy Standard 4 (Water Quality) allows for Stormwater BMPs to be sized (with calculations provided), based on a 1-inch Water Quality Volume for sites within a Zone II setting. This has been done as noted in 2 above.

**Stantec Consulting Services Inc.**

**Mark Bartlett** P.E.  
Senior Associate

Phone: 508 591 4331  
Fax: 617 786 7962  
Mark.Bartlett@stantec.com

Attachment: Stormwater Checklist and supporting calculations, and revised substation drawings C.C.



# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the [Massachusetts Stormwater Handbook](#). The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

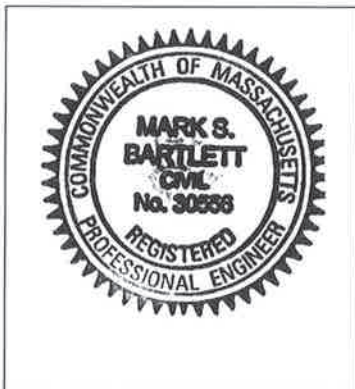
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



*Mark S. Bartlett*

3/15/2019

Signature and Date

## Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



# Checklist for Stormwater Report

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## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
  - Credit 1
  - Credit 2
  - Credit 3
- Use of “country drainage” versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
  - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - is within the Zone II or Interim Wellhead Protection Area      A long term Pollution Prevention Plan will be developed and issued as part of the final design package.
    - is near or to other critical areas
    - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - involves runoff from land uses with higher potential pollutant loads.
  - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.





# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - The ½" or 1" Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

### Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - Limited Project
  - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - Bike Path and/or Foot Path
  - Redevelopment Project
  - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.
- A draft Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan was submitted as part of the Stormwater Management Report dated August 3, 2018.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

### Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - Name of the stormwater management system owners; An Operation and Maintenance Plan will be submitted as part of the final deign package.
  - Party responsible for operation and maintenance;
  - Schedule for implementation of routine and non-routine maintenance tasks;
  - Plan showing the location of all stormwater BMPs maintenance access areas;
  - Description and delineation of public safety features;
  - Estimated operation and maintenance budget; and
  - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

Table 1 Required Recharge Volume

Vineyard Wind Substation

As shown in Vol 3. Chapter 1 Page 15 of the Massachusetts Stormwater Handbook

Required Recharge Volume determined by the following equation:

$$R_v = F \times A_{imp} \quad \text{where:}$$

$R_v$  Required Recharge Volume

F Target Depth Factor (based on Soil Type)

$A_{imp}$  Impervious Area

Given:

NRCS Hydrologic Soil Type - A

Subcatchment	$A_{imp}$	$A_{imp}$	F	$R_v$	$R_v$
	ft. <sup>2</sup>	acre	inch	acre-ft	ft. <sup>3</sup>
PR TB-1	16517	0.38	0.6	0.0190	826
PR TB-2	11354	0.26	0.6	0.0130	568
PR TB-3	0	0.00	0.6	0.0000	0
PR TB-4	0	0.00	0.6	0.0000	0

Totals for the site                      27871.00      0.64      2.40      0.03      1393.55

Table 1

Table 2 Simple Dynamic Method for Recharge

Vineyard Wind Substation

As shown in Vol 3. Chapter 1 Page 19 of the Massachusetts Stormwater Handbook

Using the following equations

$$A = R_v / (D+KT)$$

$$V = A \times D$$

where

- R<sub>v</sub> Required Recharge Volume
- A Minimum Req'd surface area of the bottom of the infiltration structure
- V Storage Volume
- D depth of the infiltration facility
- K Rawls rate for saturated hydraulic conductivity
- T allowable drawdown

Use

$$k = 8.27 \text{ in/hr}$$

$$T = 2 \text{ hours}$$

Subcatchment	R <sub>v</sub>	D	A	V <sub>req</sub>	Receiving Recharge Facility	V <sub>provided</sub>	V <sub>provided</sub> > V <sub>req</sub>
	ft. <sup>3</sup>	ft	ft. <sup>2</sup>	ft. <sup>3</sup>		ft. <sup>3</sup>	Yes/No
TB-1,TB-2, TB-3	1,394	7.50	156.96	1,177	Stormwater Infiltration Basin	45,320	Yes
PR TB-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Totals for the site                      1,394                      8                      157                      1,177                      N/A                      45,320                      Yes

Table 3 Drawdown  
Vineyard Wind Substation

Using the following equations

$$\text{Time}_{\text{drawdown}} = R_v / (K * \text{Bottom Area})$$

As shown in Vol 3. Chapter 1 Page 25 of the Massachusetts Stormwater Handbook

$\text{Time}_{\text{drawdown}}$  Drawdown time for Infiltration BMP, must be < 72 hours

$R_v$  Required Recharge Volume

Bottom area Bottom Area of Recharge Structure

K Rawls rate for saturated hydraulic conductivity

K= 8.27 in/hr

Subcatchment	$R_v$	Bottom Area	$\text{Time}_{\text{drawdown}}$	$\text{Time}_{\text{drawdown}} < 72 \text{ hours}$
	ft. <sup>3</sup>	ft. <sup>2</sup>	hours	Yes/No
TB-1, TB-2, TB-3	1,394	3666	0.55	Yes
PR TB-4	N/A	N/A	N/A	N/A

Totals for the stie            1,394            3,666            1.38 Yes

Table 3

Table 4 Water Quality Volume

Vineyard Wind Substation

As shown in Vol 3. Chapter 1 Page 32 of the Massachusetts Stormwater Handbook

$$V_{WQ} = (D_{WQ}/12 \text{ in/ft}) * (A_{imp} * 43,560 \text{ ft.}^2/\text{acre})$$

where

$V_{WQ}$  Water Quality Volume

$D_{WQ}$  Water Quality Depth

$A_{imp}$  Impervious Area

$D_{WQ}$  1 in

Subcatchment	$A_{imp}$ ft. <sup>2</sup>	$A_{imp}$ acre	$V_{WQ}$ ft. <sup>3</sup>	$V_{provided}$ ft. <sup>3</sup>	$V_{provided} > V_{req}$ Yes/No	WQV Provided By:
TB-1, TB-2, TB-3	27,871	0.64	2323	45,320	Yes	Stormwater Infiltration Basin
PR TB-4	0	0.00	0	N/A	Yes	N/A

Total for the Site                      27,871      0.64      2,323      45,320    Yes                      N/A

Table 5 TSS Removal Worksheet  
 Vineyard Wind Substation  
 As shown in Vol 3. Chapter 1 Page 34 of the Massachusetts Stormwater Handbook

Treatment Train No. 1		For Subcatchments TB-1, TB-2 (Substation Yard)			
A	B	C	D	E	
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)	
Grass Channel	50%	100%	50%	50%	
Sediment Forebay	N/A	N/A	N/A	N/A	
Deep Sump Catch Basin	25%	50%	13%	38%	
Infiltration Basin	50%	37.50%	19%	19%	
Pre-Treatment TSS Removal =			0.63		
Total TSS Removal =			0.81		

Treatment Train No. 2		For Subcatchments TB-1, TB-2 (Within Containment Areas)			
A	B	C	D	E	
BMP	TSS Removal Rate	Starting TSS Load*	Amount Removed (BxC)	Remaining Load (C-D)	
Petro-Barrier*	50%	100%	50%	50%	
Oil/Water & Sediment Tank	25%	50%	13%	38%	
Deep Sump Catch Basin	25%	38%	9%	28%	
Infiltration Basin	50%	28%	14%	14%	
Pre-Treatment TSS Removal =			0.72		
Total TSS Removal =			0.86		

\*Upon speaking to the representatives at Soilidification Products International it is believed the Petro-Barrier achieves 80 - 90% TSS removal so a value of 50% was used in the above analysis for conservative purposes.



## Vineyard Wind

### Grassed Channel Sizing Calculation

According to the Massachusetts Stormwater Handbook<sup>1</sup> – “Design grass channels to maximize contact with vegetation and soil surface to promote greater gravity separation of solids during the storm associated with the water quality event (either ½” or 1-inch of runoff). Design the channel such that the velocity does not exceed 1 foot per second during the 24-hour storm associated with the water quality event.”

There are two (2) subcatchments within the current HydroCAD model which produce runoff draining to the two (2) proposed grassed channels on the site. It should be noted, no other subcatchments produce runoff which is captured by the grassed channels. Subcatchment PR TB-1 flows to the grassed channel on the west side of the site and PR TB-2 flows to the grassed channel on the east side of the site. **Table 1** outlines the runoff produced by these two (2) subcatchments during water quality events.

**Table 1**

Subcatchment	24-Hour Storm Event (in)	Runoff Produced (cfs)
PR TB-1	1"	0
	2"	0.08
PR TB-2	1"	0
	2"	0.05

**Table 1** shows during the 1” water quality event no runoff is produced by the two subcatchments which discharge to the grassed channels. However, to go one step further and ensure the grassed channel is effectively treating the stormwater runoff a 2” 24-hour storm event was analyzed. The 2” storm event produces a maximum of 0.08 cfs of runoff within the grassed channel. The calculations attached this report demonstrate a discharge of 0.08 cfs produces a velocity within the grassed channel of 0.52 ft/s. This is well below the maximum of 1 ft/s as set forth by the Massachusetts Stormwater Handbook. For this reason the grassed channels have been adequately sized and designed to facilitate the treatment of stormwater as outlined in the Massachusetts Stormwater Handbook.

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<sup>1</sup> The excerpt from the Massachusetts Stormwater Handbook can be found in Structural BMPs – Volume 2, Chapter 2 page 75.

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## Grass Channel

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### Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

### Input Data

Roughness Coefficient	0.045	
Channel Slope	0.01000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	0.08	ft <sup>3</sup> /s

### Results

Normal Depth	0.07	ft
Flow Area	0.15	ft <sup>2</sup>
Wetted Perimeter	2.44	ft
Hydraulic Radius	0.06	ft
Top Width	2.42	ft
Critical Depth	0.04	ft
Critical Slope	0.09126	ft/ft
Velocity	0.52	ft/s
Velocity Head	0.00	ft
Specific Energy	0.07	ft
Froude Number	0.36	
Flow Type	Subcritical	

### GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

### GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.07	ft
Critical Depth	0.04	ft
Channel Slope	0.01000	ft/ft

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Sediment Forebay Sizing  
 Vineyard Wind Substation  
 As shown in Vol 2. Chapter 2 Page 13-16 of the Massachusetts Stormwater Handbook

Minimum Sizing of the sediment forebays based on the ability to hold 0.1 in/impervious acre

Tributary Area	Impervious Area (sf)	Impervious Area (ac)	Rainfall (0.1")	V <sub>req</sub> (ft <sup>3</sup> )	V <sub>provided</sub> (ft <sup>3</sup> )	V <sub>provided</sub> > V <sub>req</sub>
PR TB-1	16,517	0.38	0.1	137.6	456	Yes
PR TB-2	11,354	0.26	0.1	94.6	456	Yes

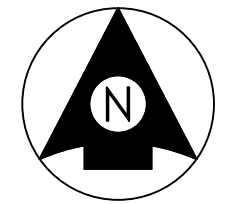


OCS-A  
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MASS  
USA

# VINEYARD WIND



## UPLAND 220kV TRANSMISSION CABLE SUBSTATION CIVIL PLANS

### INDEX OF SHEETS

SHEET NO.	TITLE
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02	EXISTING CONDITIONS
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04	PROPOSED GRADING AND DRAINAGE (AIS)
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06	DETAIL SHEET 2
07	DETAIL SHEET 3
08	DRAINAGE PROFILE



**LOCUS MAP**  
N.T.S.

**THIS PLAN SET IS PRELIMINARY AND CONCEPTUAL, AND IT HAS BEEN ISSUED FOR PERMITTING PURPOSES ONLY; AND, IT IS NOT INTENDED FOR CONSTRUCTION PURPOSES.**

REV.	DATE	REVISION DESCRIPTION	STATUS	DRAWN	CHKD	APPRVD
0.2	2019-03-15	REVISED PER CLIENT REQUEST	IFT	W.A.S.	M.S.B.	K.E.F.
0.1	2018-12-03	REVISED PER CLIENT REQUEST	IFT	L.K.H.	M.S.B.	K.E.F.
0	2018-11-15	ISSUE FOR ITT BID	IFT	L.K.H.	M.S.B.	K.E.F.

CONTRACTOR:

**Stantec**  
Stantec Consulting Services Inc.  
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Quincy, MA U.S.A. 02169-0982

CLIENT:

**VINEYARD WIND**  
700 Pleasant Street, Suite 510  
New Bedford, MA, 02740

PROJECT:

**VINEYARD WIND OFFSHORE WIND PROJECT  
SUBSTATION**

TITLE:

**COVER**

DOC ID:

**VW-OSP-STC-DW-0001-000**

SHEET	DWG. NO.	SCALE	FORMAT/SIZE	REV.
000	000	AS SHOWN	ANSI D	0
OF 008	SHEET - 000			

**SEDIMENTATION AND EROSION CONTROL NOTES**

IT IS THE INTENT OF THE CONTRACT PLANS AND DETAILS TO CONTROL EROSION AND SEDIMENTATION IN ALL PORTIONS OF THE SITE. THE CONTRACTOR IS TO IMPLEMENT THE EROSION AND SEDIMENTATION CONTROLS INDICATED ON THE PLANS, IN ACCORDANCE WITH THE FOLLOWING NOTES, BUT IS ALERTED TO THE FACT THAT ADDITIONAL MEASURES MAY BE REQUIRED TO COMPLY WITH THIS INTENT, AS FIELD CONDITIONS MAY WARRANT. SHOULD SUCH MEASURES BE DETERMINED TO BE REQUIRED OR ORDERED BY THE ENGINEER, THEY ARE TO BE IMPLEMENTED IMMEDIATELY. IN ADDITION, THE CONTRACTOR SHALL PREPARE AND SUBMIT FOR ENGINEER'S REVIEW A SURFACE WATER SUPPLY PROTECTION PLAN (SWPPP) AND FILE A NOTICE OF INTENT WITH THE U.S. EPA AS REQUIRED UNDER THE NPDES CONSTRUCTION GENERAL PERMIT PROGRAM.

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING EROSION CONTROL MEASURES IN ORDER TO PREVENT THE OFF-SITE TRACKING OF EARTH, SEDIMENT, AND DEBRIS; AND FOR GENERALLY CONTROLLING THE EROSION AND SEDIMENT TRANSPORT DURING THE CONSTRUCTION PROCESS. SITE SPECIFIC CONDITIONS MAY REQUIRE MODIFICATIONS IN THE FIELD, BUT THE CONTRACTOR MUST ENSURE THAT THAT MEASURES IMPLEMENTED IN THE FIELD MEET THE MINIMUM REQUIREMENTS OF THESE PLANS.
2. ALL WORK SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, THE PROVISIONS OF ALL APPLICABLE PERMITS AND APPROVALS ISSUED BY LOCAL, STATE & FEDERAL REGULATION FOR ACTIVITIES INVOLVING WETLANDS, WATERCOURSES AND/OR EROSION CONTROLS. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, MAY 2003.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF SILT FENCES. DRAINAGE SWALES, EARTH DIKES, TEMPORARY SETTLING BASINS, CHECK DAMS AND TEMPORARY OR PERMANENT SEDIMENT BASINS. SUCH PRACTICES DIVERT FLOWS FROM EXPOSED SOILS, LIMIT RUNOFF AND THE DISCHARGE OF POLLUTANTS FROM EXPOSED AREAS OF THE SITE TO THE DEGREE ATTAINABLE. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE WORK, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL REMAIN IN PLACE UNTIL ALL SITE WORK IS COMPLETED AND GROUND COVER IS ESTABLISHED (AT LEAST 75% UNIFORM COVERAGE BY NEW SEEDLINGS).
4. IN GENERAL, WORK REQUIRING EROSION CONTROL INCLUDES EXCAVATIONS, FILLS, RETAINING WALLS, DRAINAGE, SWALES AND DITCHES, DRAINAGE BASINS, ROUGH AND FINISH GRADING, AND STOCKPILING OF EARTH.
5. AREAS SUBJECT TO EROSION SHALL BE MINIMIZED IN TERMS OF TIME AND AREA. DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMIT OF SILT FENCE ACTIVITIES.
6. EROSION CONTROL MEASURE SHALL BE INCORPORATED IN THE SEQUENCE OF CONSTRUCTION TO PREVENT SEDIMENT LADEN WATER FROM LEAVING THE SITE.
7. EARTHWORK ACTIVITY SHALL BE PERFORMED IN A MANNER SUCH THAT RUNOFF IS DIRECTED TO TEMPORARY DRAINAGE SWALES AND SEDIMENTATION BASINS. IN NO CASE SHALL RUNOFF FROM ROADWAYS OR OTHER AREAS, UPGRADIENT FROM EMBANKMENTS, BE ALLOWED TO RUN DOWN ANY CUT OR FILL SLOPE, WITHOUT THE APPROVAL OF THE ENGINEER.
8. THE CONTRACTOR SHALL, AT ALL TIMES, HAVE A STOCKPILE OF HAY BALES, SILT FENCE, CRUSHED STONE, AND CATCH BASIN FILTER BAGS ADEQUATE TO REINFORCE/REPLACE EROSION AND SEDIMENT CONTROLS AS NEEDED.
9. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE MAINTAINED IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD SO THAT ALL AREAS ARE STABILIZED TO PREVENT THE MOVEMENT OF SOIL, SILT, SEDIMENT AND DEBRIS INTO DRAINAGE SYSTEMS OR WATERWAYS ON AND NEAR CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL INSPECT THE EROSION CONTROLS DAILY AND CLEAN ACCUMULATED MATERIALS FROM BEHIND THEM, AS NECESSARY. ALL EROSION AND SEDIMENTATION CONTROL MEASURES FOUND TO BE IN NEED OF REPAIR OR REPLACEMENT SHALL BE IMMEDIATELY CORRECTED, SO AS TO MAINTAIN THE INTEGRITY OF THE EROSION AND SEDIMENTATION CONTROL SYSTEM.
10. IN ORDER TO MINIMIZE EROSION AND SEDIMENT RUNOFF FROM THE SITE, THE CONTRACTOR SHOULD MAINTAIN EXISTING VEGETATION WHERE POSSIBLE AND STABILIZE THE DISTURBED PORTIONS OF THE SITE AS QUICKLY AS POSSIBLE. THE CONTRACTOR SHALL PHASE CONSTRUCTION TO MINIMIZE THE AREA OF DISTURBED EARTH OPEN TO THE ELEMENTS AT ANY GIVEN TIME. THIS SHALL BE ACHIEVED BY THE FOLLOWING METHODS OR OTHER BEST MANAGEMENT PRACTICES (BMP's):
  - A. LOAMING AND SEEDING CUT SLOPES IMMEDIATELY UPON COMPLETION OF SUBGRADE PREPARATION, AND SECURING SUCH NEWLY ESTABLISHED SLOPES WITH EROSION CONTROL NETTING AND/OR MULCH.
  - B. PLACING AND COMPACTING PAVEMENT GRAVEL BASE AND SUB-BASE IMMEDIATELY UPON COMPLETION OF SUBGRADE PREPARATION.
  - C. LIMITING STRIPPING AND STOCKPILING OF LOAM TO AREAS SLATED FOR IMMEDIATE CONSTRUCTION AND STABILIZATION (I.E. PLACEMENT OF GRAVELS, LOAM AND SEED, EROSION CONTROL MATTING).
11. THE CONTRACTOR MUST ALSO ANTICIPATE INCREASED RUNOFF FROM STEEPER SLOPES AND DURING HIGH GROUNDWATER CONDITIONS. THIS MAY OCCUR DURING THE WET SEASON (TYPICALLY MARCH THROUGH APRIL) OR AFTER SIGNIFICANT PRECIPITATION EVENTS.
12. SEDIMENT REMOVED FROM CONTROL STRUCTURES SHALL BE DISPOSED OF LEGALLY OFF SITE. NO EQUIPMENT OR MATERIAL OF ANY KIND SHALL BE STOCKPILED OR DEPOSITED IN ANY REGULATED AREA, UNLESS SPECIFICALLY SHOWN ON THE CONTRACT PLANS OR AUTHORIZED BY PROJECT PERMITS/APPROVALS.
13. STOCKPILED SOIL SHALL BE SURROUNDED WITH SILTATION FENCES TO PREVENT AND CONTROL SILTATION AND EROSION. STOCKPILES THAT WILL REMAIN EXPOSED FOR MORE THAN 30 DAYS, SHALL BE STABILIZED WITH MULCH OR SEED FOR TEMPORARY VEGETATIVE COVER.
14. TEMPORARY STORAGE OF MATERIALS ON-SITE SHALL BE LOCATED GREATER THAN 100- FEET FROM WETLAND AREAS, AND AS APPROVED BY THE ENGINEER. THERE SHALL BE NO LONG-TERM STORAGE OF MATERIAL ON-SITE OR ON-ROUTE. MATERIAL NOT USED ON-SITE OR ON-ROUTE SHALL BE TRUCKED TO AN ACCEPTABLE OFF-SITE DISPOSAL LOCATION.
15. ALL DISTURBED SURFACES SHALL BE STABILIZED WITHIN 14 DAYS AFTER CONSTRUCTION IN ANY PORTION OF THE SITE THAT HAS BEEN COMPLETED OR WHERE CONSTRUCTION HAS TEMPORARILY CEASED.
16. ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY OR FINAL STABILIZATION WITH MULCH OR MULCH NETTING, OR SEED FOR TEMPORARY VEGETATIVE COVER, WITHIN 14 DAYS OF THE INITIAL DISTURBANCE. AFTER THIS TIME, ANY DISTURBANCE IN THE AREA MUST BE STABILIZED AT THE END OF EACH WORK DAY. THE FOLLOWING EXCEPTIONS APPLY:
  - A. STABILIZATION IS NOT REQUIRED IF WORK IS TO CONTINUE IN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST FOR THE NEXT 24 HOURS.
  - B. STABILIZATION IS NOT REQUIRED IF THE WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION WITH A DEPTH OF 2 FEET OR GREATER.
17. CULVERT/PIPE INLETS AND OUTFALLS SHALL BE STABILIZED WITH STONE FOR PIPE ENDS OR OTHER APPROVED PERMANENT EROSION CONTROL MEASURES, IMMEDIATELY FOLLOWING PIPE INSTALLATION.
18. THERE SHALL BE NO DIRECT DISCHARGE FROM ANY REQUIRED DEWATERING OPERATIONS INTO ANY WETLAND, WATERCOURSE, OR DRAINAGE SYSTEM AND THEN ONLY AS ALLOWED BY REGULATORY PERMITS. ANY DEWATERING DISCHARGE CONTAINING SETTLEABLE SOLIDS (SEDIMENTS) SHALL BE PASSED THROUGH A SEDIMENTATION CONTROL BASIN, FRACTIONATION TANK OR SIMILAR TREATMENT, APPROVED BY THE ENGINEER, TO REMOVE THESE SOLIDS. CONTRACTOR SHALL MAINTAIN SAID SEDIMENT CONTROL DEVICES THROUGHOUT THE ENTIRE DEWATERING OPERATION AND SHALL CEASE DEWATERING, IF DEFICIENCIES ARE NOTED, UNTIL THE DEFICIENCIES ARE CORRECTED.
19. THE CONTRACTOR SHALL INSPECT ALL PORTIONS OF THE SITE IN ANTICIPATION OF RAINFALL EVENTS TO DETERMINE IF SITE GRADING IS SUFFICIENT TO PREVENT EROSION OF SLOPES AND/OR THE TRANSPORTATION OF SEDIMENTS

- TO WETLANDS OR WATERCOURSES, WITHIN THE PROJECT LIMITS. SHOULD ADDITIONAL MEASURES BE REQUIRED, THEY ARE TO BE IMPLEMENTED IMMEDIATELY. IN NO CASE SHALL THE INSTALLATION OF ADDITIONAL MEASURES, NECESSARY TO PROTECT SLOPES WITHIN THE PROJECT LIMITS, BE DELAYED BEYOND THE COMMENCEMENT OF PRECIPITATION.
20. EROSION CONTROL MEASURES SHALL BE INSPECTED EVERY WEEK, DURING AND AFTER EVERY RAIN EVENT GREATER THAN 0.5 INCHES. ANY NECESSARY REPLACEMENT OF REPAIR SHALL BE PERFORMED PROMPTLY BY THE CONTRACTOR
  21. ALL DISTURBED EARTH SLOPES SHALL BE STABILIZED WITH PERMANENT VEGETATIVE COVER AS SOON AS POSSIBLE. DISTURBED AREAS, THAT ARE NOT SUBJECT TO CONSTRUCTION TRAFFIC, SHALL RECEIVE A PERMANENT OR TEMPORARY VEGETATIVE COVER AS SOON AS FINAL CONTOURS ARE ESTABLISHED. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A VEGETATIVE COVER, DISTURBED AREAS SHALL BE THOROUGHLY MULCHED. MULCHED AREAS SHALL BE SEED AS SOON AS WEATHER CONDITIONS ALLOW.
  22. ALL SLOPES STEEPER THAN 2H:1V SHALL BE COVERED WITH MODIFIED ROCKFILL AND AN APPROVED EROSION CONTROL MATTING.
  23. CONTRACTOR SHALL REMOVE ALL SEDIMENTATION CONTROL SYSTEMS, REMOVE ALL ACCUMULATED SEDIMENTS, AND SEED THE DISTURBED AREAS, WHEN THE CONTROL SYSTEMS ARE NO LONGER REQUIRED. CONTRACTOR SHALL REQUEST AND RECEIVE PERMISSION FROM THE ENGINEER PRIOR TO REMOVING ANY CONTROL SYSTEM.
  24. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL SILT AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS FROM EACH DRAINAGE STRUCTURE UPON COMPLETION OF THE PROJECT.
  25. OBJECTS AND/OR AREAS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND ELEVATION.
  26. ALL DISTURBED AREAS NOT OCCUPIED BY PAVEMENT, SIDEWALK OR RIPRAP SHALL BE COVERED WITH 4" (MIN.) OF LOAM AND SEED.
  27. PERMANENT SEEDING SHALL OCCUR BETWEEN MARCH 1 AND JUNE 15, OR BETWEEN AUGUST 15 AND OCTOBER 15.

**GENERAL CONSTRUCTION NOTES**



1. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN ON THIS PLAN SET SHALL BE CONSIDERED APPROXIMATE. THEREFORE, PRIOR TO THE START OF ANY WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY ALL APPROPRIATE AGENCIES AND UTILITY COMPANIES, AND VERIFY THE ACTUAL LOCATION OF ALL UTILITIES SHOWN OR NOT SHOWN ON THIS PLAN. CONTACT DIG-SAFE AT 188-344-7233 (1-888-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO THE START OF EXCAVATING.
2. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, AND PROCEDURES; AND FOR THE SAFETY PRECAUTIONS AND PROGRAMS REQUIRED FOR THE WORK UNDER THIS CONTRACT. THE CONTRACT DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY AND THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING ALL SAFETY BARRIERS, WARNING FLASHERS, STEEL PLATES FOR COVERING TRENCHES AND EXCAVATIONS, AS REQUIRED FOR THE PROTECTION OF WORKERS AND THE PUBLIC. COMPLY WITH OSHA REGULATIONS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL NECESSARY CONSTRUCTION PERMITS REQUIRED FOR THIS PROJECT.
4. PRIOR TO CONSTRUCTION, CONSTRUCTION FENCE OR OTHER SUITABLE FORM OF DEMARCATION SHALL BE INSTALLED AT THE LIMITS OF THE AREAS TO BE DISTURBED.
5. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL DESIGNATE A STAGING AREA FOR STORAGE OF CONSTRUCTION EQUIPMENT AND MATERIALS, AND SUCH AREA SHALL BE PRE-APPROVED BY TOWN OR OWNERS ENGINEER.
6. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DEVELOP A CONSTRUCTION PHASING PLAN AND THAT EROSION CONTROL MEASURES ARE INSTALLED AND MAINTAINED. (SEE EROSION CONTROL NOTES.)
7. WORK WITHIN PUBLIC WAYS SHALL COMPLY WITH APPLICABLE MUNICIPAL AND STATE REQUIREMENTS.
8. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAKING ALL NECESSARY ARRANGEMENTS AND FOR PERFORMING ANY NECESSARY WORK INVOLVED IN CONNECTION WITH THE DISCONTINUANCE OR JURISDICTION OF THE UTILITY COMPANIES, SUCH AS ELECTRICITY, TELEPHONE, CABLE OR FIBER OPTIC, WATER, AND SEWER SYSTEMS, OR ANY SYSTEMS WHICH WILL BE IMPACTED BY THE WORK TO BE PERFORMED PER THE PLANS.
9. UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER, THE CONTRACTOR SHALL MAINTAIN ALL EXISTING UTILITIES.
10. THE CONTRACTOR SHALL EXERCISE EXTREME CARE WHEN EXCAVATING AND BACKFILLING IN THE VICINITY OF EXISTING UTILITIES, INCLUDING BUT NOT LIMITED TO SHORING AND THE USE OF HAND EXCAVATION WHERE APPROPRIATE.
11. ALL EXISTING PIPING AND STRUCTURES EXPOSED DURING EXCAVATION SHALL BE ADEQUATELY SUPPORTED, BRACED, OR OTHERWISE PROTECTED DURING CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE REQUIREMENTS OF ALL GOVERNING CODES AND REGULATIONS.
12. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
13. NO CHANGES ARE TO BE MADE UNLESS AUTHORIZED BY THE DESIGN ENGINEER.
14. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL SAFETY CODES, REGULATIONS, LEGAL REQUIREMENTS, AND PERMIT CONDITIONS.
15. CONSTRUCTION SEQUENCE SHALL BE COORDINATED TO MINIMIZE DISTURBANCE OF EXISTING CONDITIONS.
16. IF REQUIRED BY THE CONTRACTOR, OVERHEAD LINES SHALL BE RELOCATED BY THE UTILITY COMPANY AT THE CONTRACTOR'S EXPENSE.
17. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT EXISTING RAILROAD TRACKS, ALL RETAINING WALLS, WALKS, STREETS, PAVEMENTS, HIGHWAY GUARDS, CURBING, EDGING, TREES, AND PLANTINGS ON OR OFF THE PREMISES OF THE WORK, AND SHALL REPAIR AND REPLACE OR OTHERWISE MAKE GOOD AT CONTRACTOR'S OWN EXPENSE ANY ITEMS DAMAGED AS A RESULT OF THE CONTRACTOR'S WORK.
18. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT SITE ALL CONSTRUCTION DEBRIS, STUMPS, RUBBISH AND DEBRIS FOUND THEREON. STORAGE OF SUCH MATERIALS ON THE PROJECT SITE OR ROUTE WILL NOT BE PERMITTED. ALL MATERIALS TO BE REMOVED AND DISPOSED SHALL BE DISPOSED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS. THE CONTRACT SHALL LEAVE THE PROJECT SITE IN SAFE, CLEAN AND LEVEL CONDITION.
19. ALL SURFACES DISTURBED BY THIS WORK SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AS DETAILED OR AS SPECIFIED BY THE ENGINEER.
20. ALL MANHOLES AND, DRAINAGE STRUCTURES, OR VAULT STRUCTURES IN PAVED AREAS SHALL HAVE THEIR RIMS SET TO FINISHED GRADE REGARDLESS OF ANY ELEVATIONS OTHERWISE SHOWN, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
21. ALL WORK SHALL COMPLY WITH THE PROJECT'S REGULATORY PERMITS AND AGREEMENTS.
22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SPECIFYING HOW TO "REPAIR, REPLACE, PROTECT, AND MAINTAIN"

- ALL EXISTING ABOVE GROUND AND UNDERGROUND UTILITIES DURING CONSTRUCTION. THIS SHALL INCLUDE SHOP DRAWING SUBMITTALS TO THE PROJECT ENGINEER.
23. UTILITY TRENCHES THAT REQUIRE REPAIRS AND/OR REPLACEMENT OF EXPOSED UNDERGROUND UTILITIES MAY NOT BE BACKFILLED UNTIL THE COMPLETED UTILITY WORK HAS BEEN INSPECTED AND APPROVED BY THE APPROPRIATE UTILITY INSPECTOR.
  24. CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL. DUST CONTROL SHALL INCLUDE THE WATERING OF UNPAVED ROAD SURFACES AND SWEEPING OF PAVED SURFACES. SWEEPING SHALL OCCUR ON THE PAVED SURFACES WITHIN THE SITE AND OFF THE SITE STREETS, PARKING AREAS AND WHERE VEHICLE TRACKING OF SEDIMENTS HAS OCCURRED.
  25. DURING CONSTRUCTION, TRENCHES ARE NOT TO BE LEFT IN A CONDITION THAT WOULD DIRECT RUNOFF AROUND TREATMENT AND DETENTION FACILITIES.
  26. ALL SITE WORK SHOULD BE SECURED AT THE END OF THE WORK DAY TO REDUCE EROSION AND SEDIMENT PROBLEMS. THIS INCLUDES AS APPLICABLE, COVERING STOCKPILES OF SEDIMENT, INSTALLING TEMPORARILY VEGETATION OR BY USING GEOTEXTILES TO COVER DISTURBED AREAS WITH STEEPER SLOPES.
  27. DEWATERING OPERATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE U.S. EPA NPDES PHASE 1 CONSTRUCTION ACTIVITY GENERAL PERMIT FOR CONSTRUCTION SITES THAT ARE GREATER THAN 1 ACRE.
  28. EXCESS MATERIAL SHALL BE STOCKPILED AT A PROPER UPLAND LOCATION. STOCKPILES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE AND PERIODIC INSPECTIONS SHALL BE PERFORMED FOR SLOPE STABILITY. STOCKPILES ARE TO BE PROPERLY SECURED TO PREVENT EROSION AND SEDIMENT RUNOFF.
  29. **CLEARING AND GRUBBING** - GRUB AND REMOVE STUMPS ROOTS TO A DEPTH OF 24 INCHES BELOW SITE SUBGRADE OR EXISTING GROUND, STRIP AVAILABLE TOPSOIL AND STOCKPILE FOR USE WITHIN THE PROJECT PERIMETER.
  30. **EXCAVATION** - COMPLETELY REMOVE ANY PEAT OR OTHER ORGANIC MATERIALS AND REPLACE WITH APPROVED FILL MATERIALS AND COMPACT.
  31. **MATERIALS** - FILL MATERIAL SHALL BE SUITABLE EXISTING MATERIAL OBTAINED FROM EXCAVATIONS OR BORROW FROM OFF SITE SOURCES, AND SHALL BE GRANULAR SOILS FREE FROM ROOTS, ORGANIC MATERIAL, RUBBISH, STONES OVER 6" IN DIAMETER AND FROZEN SOIL. FILLS SHALL NOT BE CONSTRUCTED WITH MATERIAL FROM ROCK EXCAVATION.
  32. **COMPACTION** - PLACE FILL MATERIAL IN SUCCESSIVE HORIZONTAL LAYERS 8 TO 12 INCHES IN LOOSE DEPTH AND COMPACT WITH APPROVED EQUIPMENT TO AT LEAST 90% OF LABORATORY MAXIMUM DENSITY (ASTM D 1557 METHOD D). COMPLETELY COMPACT EACH LAYER BEFORE PLACING THE NEXT LAYER. DO NOT PLACE, SPREAD OR COMPACT FILL MATERIAL WHILE GROUND OR FILL MATERIAL IS FROZEN OR PARTIALLY THAWED AND DURING UNFAVORABLE WEATHER CONDITIONS. FILL MATERIAL WHICH HAS AN EXCESSIVE MOISTURE CONTENT SHALL NOT BE COMPACTED UNTIL THE MATERIAL HAS BEEN AERATED BY GRADING, HARROWING OR OTHER METHODS TO REMOVE EXCESS MOISTURE.

**GENERAL CONSTRUCTION NOTES**

1. THE CONTRACTOR IS CAUTIONED THAT THE DRAINAGE BASIN IS DESIGNED TO INFILTRATE STORMWATER PRIMARILY THROUGH THE BOTTOM AND SIDES OF THE BASIN. CONSTRUCTION TECHNIQUES THAT WOULD POTENTIALLY DIMINISH THE INFILTRATION CAPACITY OF THE UNDERLYING SOILS ARE TO BE AVOIDED. COMPACTION AND SILTATION OF THE BASIN DURING CONSTRUCTION IS PROHIBITED.
  - A. DO NOT UTILIZE ANY PORTION OF THE BASIN FLOOR AS A STORAGE AREA FOR MATERIAL AND HEAVY EQUIPMENT.
  - B. DO NOT COMPACT SOILS IN THE BASIN FLOOR.
  - C. DO NOT PLACE GRAVEL OR OTHER MATERIALS TO STABILIZE THE BASIN FLOOR FOR CONSTRUCTION VEHICULAR TRAVEL ACCESS.
  - D. STRICT COMPLIANCE WITH THE EROSION CONTROL PLAN AND PROJECT SWPPP IS NECESSARY.
  - E. BASIN CONSTRUCTION SHALL OCCUR AT THE EARLY STAGES OF THE PROJECT CONSTRUCTION SO THAT THEY ARE FULLY VEGETATED AND STABILIZED PRIOR TO RECEIVING STORMWATER.
  - F. DO NOT USE THE INFILTRATION BASIN AS A TEMPORARY SEDIMENT BASIN OR A DE-WATERING BASIN WITHOUT PRIOR APPROVAL OF OWNERS ENGINEER. IF USED AS A TEMPORARY STORMWATER BASIN DURING CONSTRUCTION, THE BASIN SHALL BE EXCAVATED TO A DEPTH AND ELEVATION THAT ARE 1-FT (MINIMUM) ABOVE PROPOSED FINISHED GRADE; AND PRIOR TO COMPLETION, BASIN SHALL BE CLEANED OF ALL SEDIMENT AND DEBRIS, THEN EXCAVATED TO FINISHED GRADES.

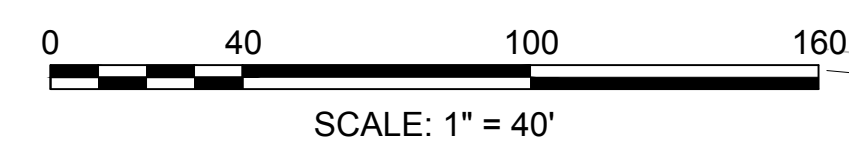
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0.2	2019-03-15	REVISED PER CLIENT REQUEST	IFT	W.A.S.	M.S.B.	K.E.F.
0.1	2018-12-03	REVISED PER CLIENT REQUEST	IFT	L.K.H.	M.S.B.	K.E.F.
0	2018-11-15	ISSUE FOR ITT BID	IFT	L.K.H.	M.S.B.	K.E.F.
REV.	DATE	REVISION DESCRIPTION	STATUS	DRAWN	CHKD	APPROVD
CONTRACTOR:						
 Stantec Consulting Services Inc. 400 Crown Colony Drive Suite 200 Quincy, MA U.S.A. 02169-0982						
CLIENT:						
 700 Pleasant Street, Suite 510 New Bedford, MA 02740						
PROJECT:						
<b>VINEYARD WIND OFFSHORE WIND PROJECT SUBSTATION</b>						
TITLE:						
<b>GENERAL NOTES</b>						
DOC ID:						
<b>VW-OSP-STC-DW-0001-001</b>						
SHEET OF	001 008	DWG. NO. SHEET -	001	SCALE	AS SHOWN	FORMAT/SIZE
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NOTES:

1. THE EXTENTS OF THE SITE ARE WITHIN AN IWPA ZONE II.
2. ACCORDING TO THE FLOOD RATE INSURANCE MAP FOR BARNSTABLE COUNTY MASSACHUSETTS PANEL 566 MAP NUMBER 25001C0566J WITH THE EFFECTIVE DATE OF JULY 16, 2014 THE ENTIRE SITE IS WITHIN FLOOD ZONE X (AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN).
3. THE PARCEL IS LOCATED WITHIN THE TOWN OF BARNSTABLE MASSACHUSETTS IN BARNSTABLE COUNTY MAP 314 BLOCK 21. A FORMAL FORM A PROCESS WILL BE CONDUCTED AT A LATER DATE TO FORMALLY SUBDIVIDE THIS PARCEL.
4. EXISTING SITE INFORMATION (PROPERTY LINES, TOPOGRAPHY, ETC.) ARE FROM PLAN ENTITLED "EXISTING CONDITIONS PLAN, DATED 04/23/18, BY BAXTER NYE ENGINEERING & SURVEYING, 78 NORTH STREET - 3RD FLOOR, HYANNIS MA 02601.
5. EXCEPT AS NOTED IN NOTE 4 ABOVE, ALL OTHER EXISTING GROUND FEATURES AND TOPOGRAPHY ARE BASED ON ONE OF THE FOLLOWING SOURCES;
  - A. TOWN OF BARNSTABLE GEOGRAPHIC INFORMATION SYSTEM (GIS)
  - B. TOWN OF BARNSTABLE DPW AS-BUILT RECORDS FOR UTILITY SYSTEMS AS AVAILABLE.
6. ACCORDING TO MASSGIS THE SITE IS NOT WITHIN THE NHESP PRIORITY HABITATS OF RARE WILDLIFE OR THE NHESP ESTIMATED HABITATS OF RARE WILDLIFE.
7. ACCORDING TO MASSGIS THERE ARE NO CERTIFIED VERNAL POOLS OR POTENTIAL VERNAL POOLS LOCATED ON THE PROJECT SITE.
8. ACCORDING TO MASSGIS THERE ARE NO WETLANDS LOCATED ON OR WITHIN 100' OF THE PROJECT SITE.
9. ACCORDING TO MASSGIS THE SITE IS NOT LOCATED WITHIN AN AREA OF CRITICAL ENVIRONMENTAL CONCERN.
10. SOILS IN THE SITE AREA (PER NRCS) ARE "PLYMOUTH-BARNSTABLE COMPLEX" ROLLING, VERY BOULDERY GRAVELLY COARSE SAND; WITH DEPTH TO GROUNDWATER > 80-INCHES; AND HYDROLOGIC SOIL GROUP "A".
11. PER CURRENT ASSESSORS RECORDS THE RECORDS: THE LOCUS IS COMPRISED OF THE FOLLOWING:
 

OWNER: FLAGSHIP STORAGE HYANNIS LLC  
 DEED BOOK 29714 PAGE 64  
 RECORD PLAN BOOK 434 PAGE 55  
 ASSESSORS MAP 314  
 PARCEL 021
12. A TITLE SEARCH HAS NOT BEEN PERFORMED FOR THIS SITE. THERE MAY BE RIGHTS BY OTHERS, EASEMENT, TAKINGS, MORTGAGES, RIGHT OF WAYS ETC. NOT DEPICTED. IF DETERMINED TO BE NECESSARY, A TITLE SEARCH SHALL BE PERFORMED BY OTHERS AND SUPPLIED TO BAXTER NYE ENGINEERING & SURVEYING.
13. EXISTING SEWER INFORMATION OBTAINED FROM TOWN HALL, "HYANNIS COMMERCIAL ZONE MUNICIPAL SEWER PROJECT SHEET 20 OF 32" AS WELL AS FIELD LOCATED MANHOLES AND IS SHOWN AS APPROXIMATE ONLY.
14. TOWN WATER SERVICE SHOW ON THIS PLAN FROM WATER DEPARTMENT SKETCH 1558 AND IS APPROXIMATE ONLY.
15. ELECTRIC LINE SHOWN ON THIS PLAN WAS FIELD LOCATED INDICATING UNDERGROUND SERVICE FROM POLE 1400/36.



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CONTRACTOR:

**Stantec**  
 Stantec Consulting Services Inc.  
 400 Crown Colony Drive Suite 200  
 Quincy, MA U.S.A. 02169-0982

CLIENT:

**VINEYARD WIND**  
 700 Pleasant Street, Suite 510  
 New Bedford, MA, 02740

PROJECT  
**VINEYARD WIND OFFSHORE WIND PROJECT  
 SUBSTATION**

TITLE  
**EXISTING CONDITIONS**


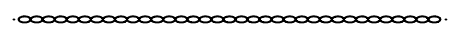

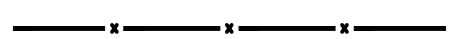

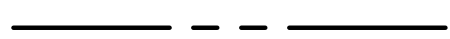
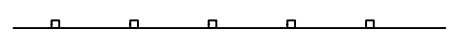

DOC ID:  
**VW-OSP-STC-DW-0001-002**

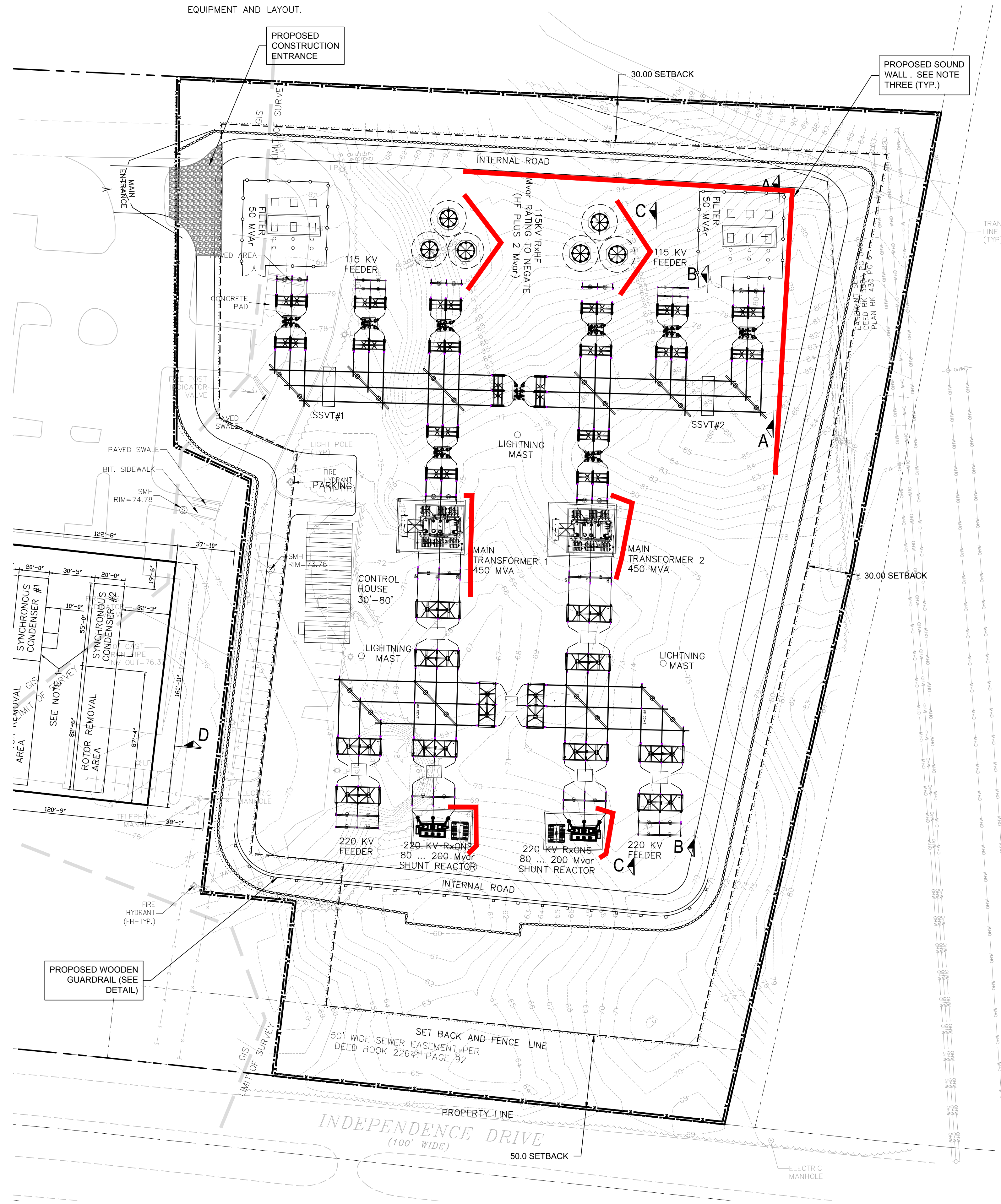
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NOTES:



1. THE SITE LAYOUT WAS DEVELOPED USING A PROPOSED SUBSTATION LAYOUT WHICH IS SUBJECT TO CHANGE.
2. DETAILED DESIGN OF WALLS, GRADING, AND OTHER DRAINAGE FEATURES WILL BE COMPLETED AND SUBMITTED AS PART OF THE CONSTRUCTION PLAN AND DOCUMENTS AT A LATER DATE.
3. PROPOSED SOUND WALLS TO BE COMPLETED AS PART OF FINAL DESIGN PLAN.
4. THIS SITE PLAN IS ONLY FOR CIVIL WORK, SEE OTHER PLANS FOR SUBSTATION

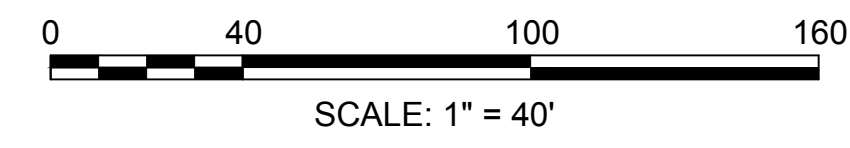
Legend

-  ZONING SETBACKS
-  RETAINING WALL
-  SOUND WALL (CONFIRMATION REQUIRED)
-  SECURITY FENCE
-  PROPOSED PROPERTY LINE
-  EXISTING PROPERTY LINE
-  PROPOSED GUARDRAIL
-  PROPOSED BORING/WELL LOCATION #30



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CLIENT:						
 700 Pleasant Street, Suite 510 New Bedford, MA, 02740						
PROJECT:						
VINEYARD WIND OFFSHORE WIND PROJECT SUBSTATION						
TITLE:						
PROPOSED EQUIPMENT LAYOUT (AIS)						
DOC ID:						
VW-OSP-STC-DW-0001-003						
SHEET 003 OF 008	DWG. NO. SHEET - 003	SCALE AS SHOWN	FORMAT/SIZE ANSI D	REV: 0		

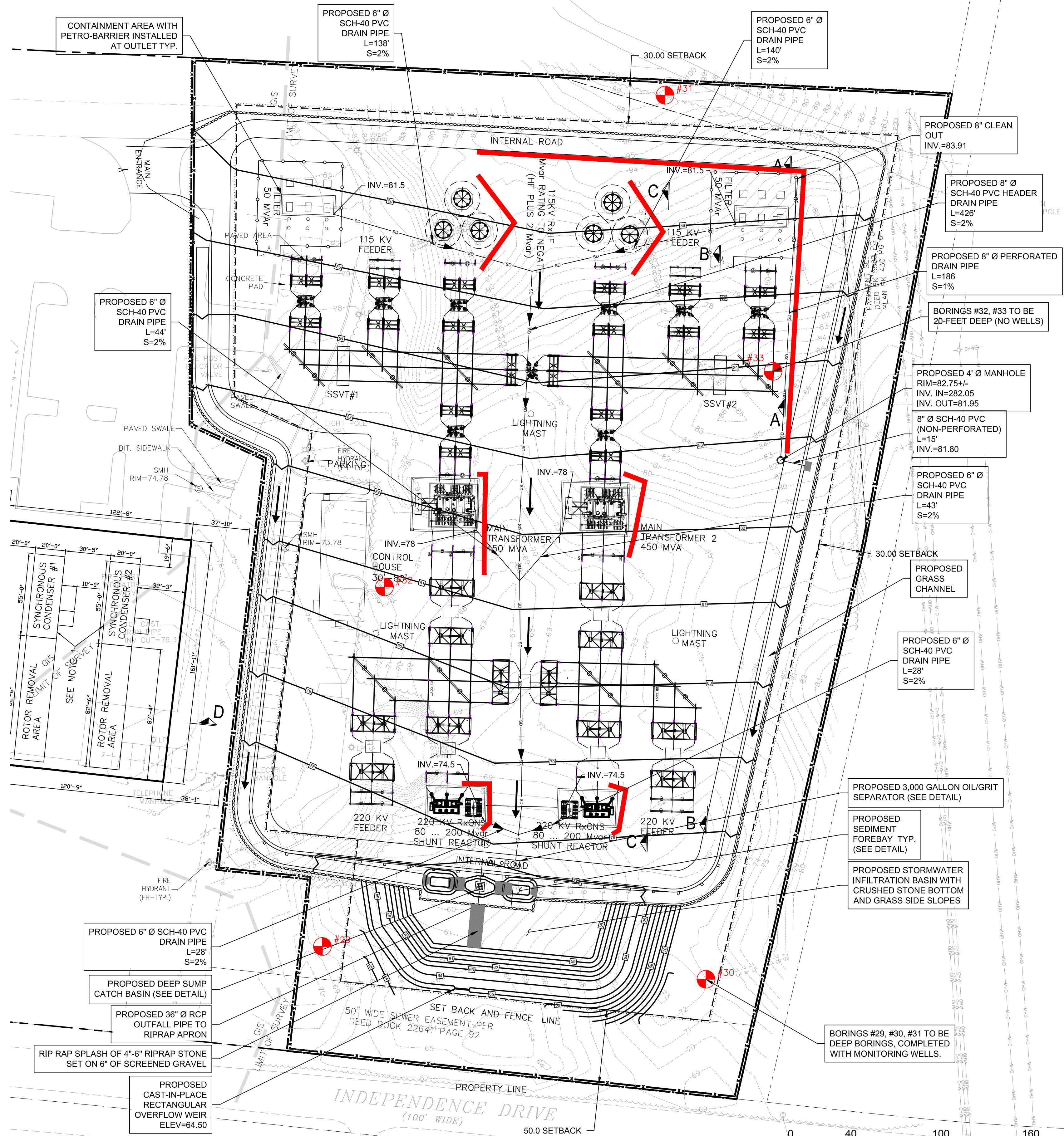


NOTES:

- STRAW WATTLES OR OTHER SILTATION CONTROLS SHALL BE PLACED ALONG ALL DOWN GRADIENT LIMITS OF WORK BEFORE THE START OF ANY CONSTRUCTION ACTIVITIES.
- ALL CONSTRUCTION ACTIVITIES MUST CONFORM WITH THE EROSION CONTROL PLAN WHICH CAN BE FOUND IN THE STORMWATER REPORT PRODUCED BY STANTEC CONSULTING SERVICES INC.
- DETAILED DESIGN OF DRAINAGE STRUCTURES WILL BE COMPLETED AND SUBMITTED AS PART OF THE CONSTRUCTION PLANS AND DOCUMENTS AT A LATER DATE.
- EACH CONTAINMENT OUTLET TO INCLUDE OIL BARRIER DEVICE BELOW FROST LINE SET IN ACCESS MANHOLE FOR INSPECTION AND MAINTENANCE (REFER TO DETAILS).
- SUBSTATION YARD AREA TO BE DOUBLE WASHED 3/4" MINUS CRUSHED STONE, 12-INCH THICK, PLACED OVER SELECT GRANULAR FILL, 12-INCH THICK, COMPACTED IN TWO 6-INCH LIFTS.
- ACCESS ROAD & PARKING AREA TO BE 2-1/2" BASE COURSE WITH 1-1/2" FINISH COURSE. PAVEMENT SUBGRADE TO BE 4-INCHES OR DENSE GRADED CRUSHED STONE OVER 8-INCHES OF COMPACTED GRAVEL BORROW TYPE "B".
- GRASS SWALE TO BE 8' WIDE x 12" DEEP WITH 3:1 SIDE SLOPES AND 2' BOTTOM WIDTH.
- STORMWATER INFILTRATION BASIN SHALL HAVE DOUBLE WASHED CRUSHED STONE (3/4" MINUS) BASE 6-INCHES THICK ON EXISTING SAND & GRAVEL SOILS. SIDE SLOPES (3:1) SHALL BE STABILIZED WITH 6" LOAM AND SPREAD WITH EROSION CONTROL NETTING PINNED IN PLACE.
- GRASS SEED MIX SHALL BE A MIX OF RED FESCUE & HARD FESURE, WITH A MINIMUM OF THREE VARIETIES OF EACH SPECIES. SEED SHALL NOT HAVE LESS THAN 90% GERMINATION, NOT LESS THAN 85% PURE SEED AND NOT MORE THAN 0.5% WEED SEED, THE MIX APPLICATION IS 4LBS PER 1,000 SF WITH A TYPICAL DISTRIBUTION OF 600,000 SEEDS PER POUND, WHICH IS APPROXIMATELY 175 PONDS PER ACRE. ANY AREA RE-VEGETATED SHALL BE MONITORED CONTINUOUSLY UNTIL IT HAS RE-ESTABLISHED.
- THE SIDE SLOPES AND BOTTOM OF THE SWALES SHALL INCORPORATE EROSION CONTROL BLANKETS, PINNED IN POSITION, TO PROTECT THE GRASS SEED, THE BLANKETS SHALL REMAIN IN PLACE UNTIL THE SEED HAS GERMINATED AND A GRASS COVER IS ESTABLISHED.
- CONTRACT SHALL GUARANTEE ALL GRASS FOR ONE YEAR FROM ACCEPTANCE OF FINISHED PLANTING.
- SEDIMENT FOREBAY SIZING BASED ON SPECIFICATIONS OUTLINED IN THE MASSACHUSETTS STORMWATER HANDBOOK. THE SEDIMENT FOREBAYS ARE SIZED BY USING THE EQUATION 0.1 INCH OF RAINFALL PER ACRE OF IMPERVIOUS AREA (WITHIN THE PROPER SUBCATCHMENT AREA). PLEASE REFER TO PLANS AND DETAILS FOR ADDITIONAL INFORMATION ON THE SEDIMENT FOREBAYS.

Legend

- FLOW ARROW
- STORM DRAIN FLOW ARROW
- STORM DRAIN
- RETAINING WALL
- LIMIT OF WORK/EROSION CONTROL
- BOUNDARY SOUND WALL (CONFIRMATION REQUIRED)
- SECURITY FENCE
- PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE
- PROPOSED GUARDRAIL
- ZONING SETBACKS
- PROPOSED BORING/WELL LOCATION



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CONTRACTOR:

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400 Crown Colony Drive Suite 200  
Quincy, MA U.S.A. 02169-0982

CLIENT:

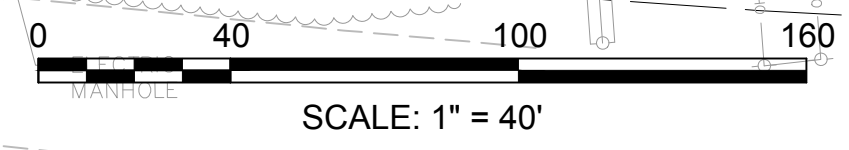
VINEYARD WIND  
700 Pleasant Street, Suite 510  
New Bedford, MA, 02740

PROJECT:  
**VINEYARD WIND OFFSHORE WIND PROJECT  
SUBSTATION**

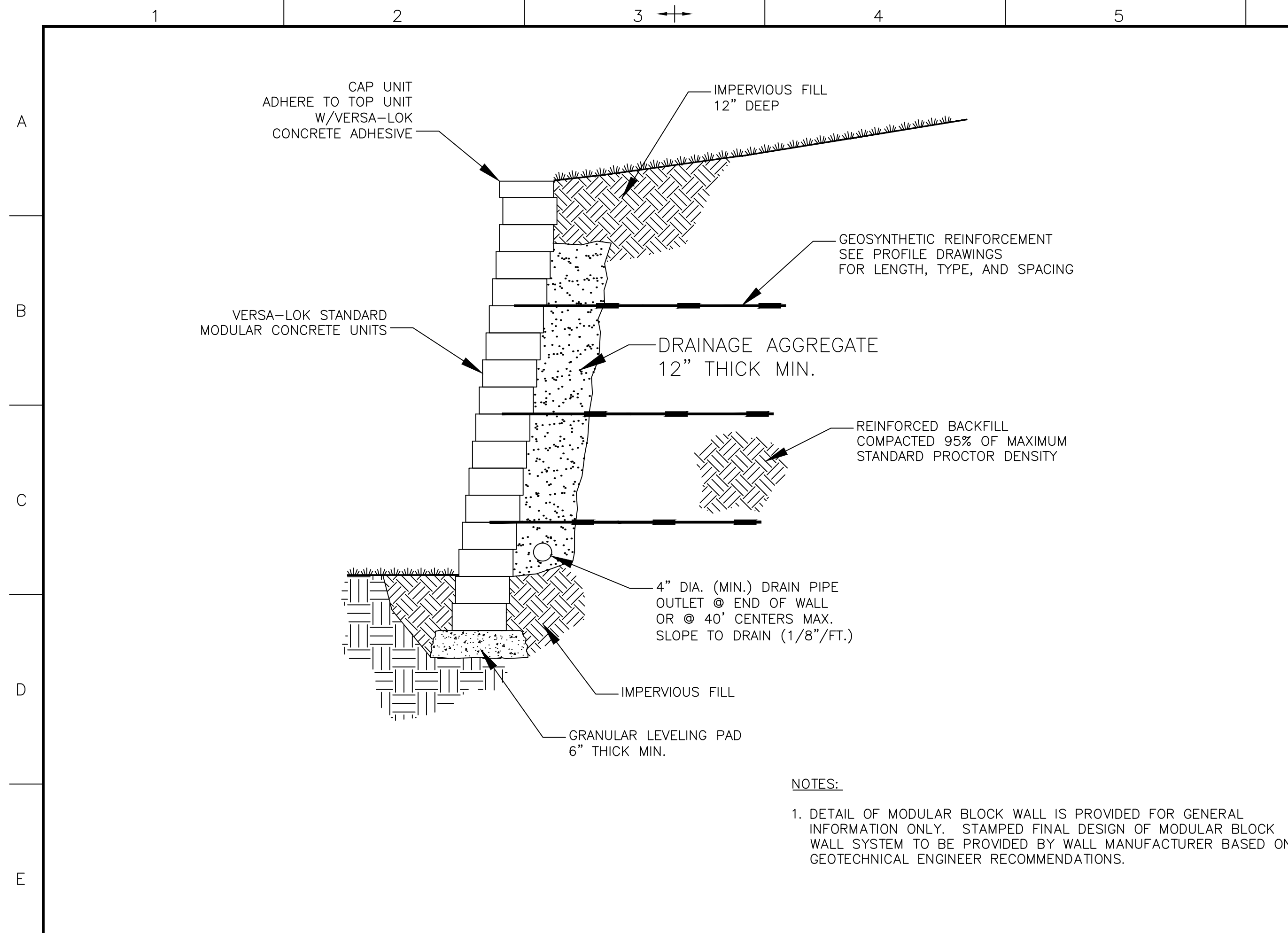
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**PROPOSED GRADING & DRAINAGE (AIS)**

DOC ID:  
**VW-OSP-STC-DW-0001-004**

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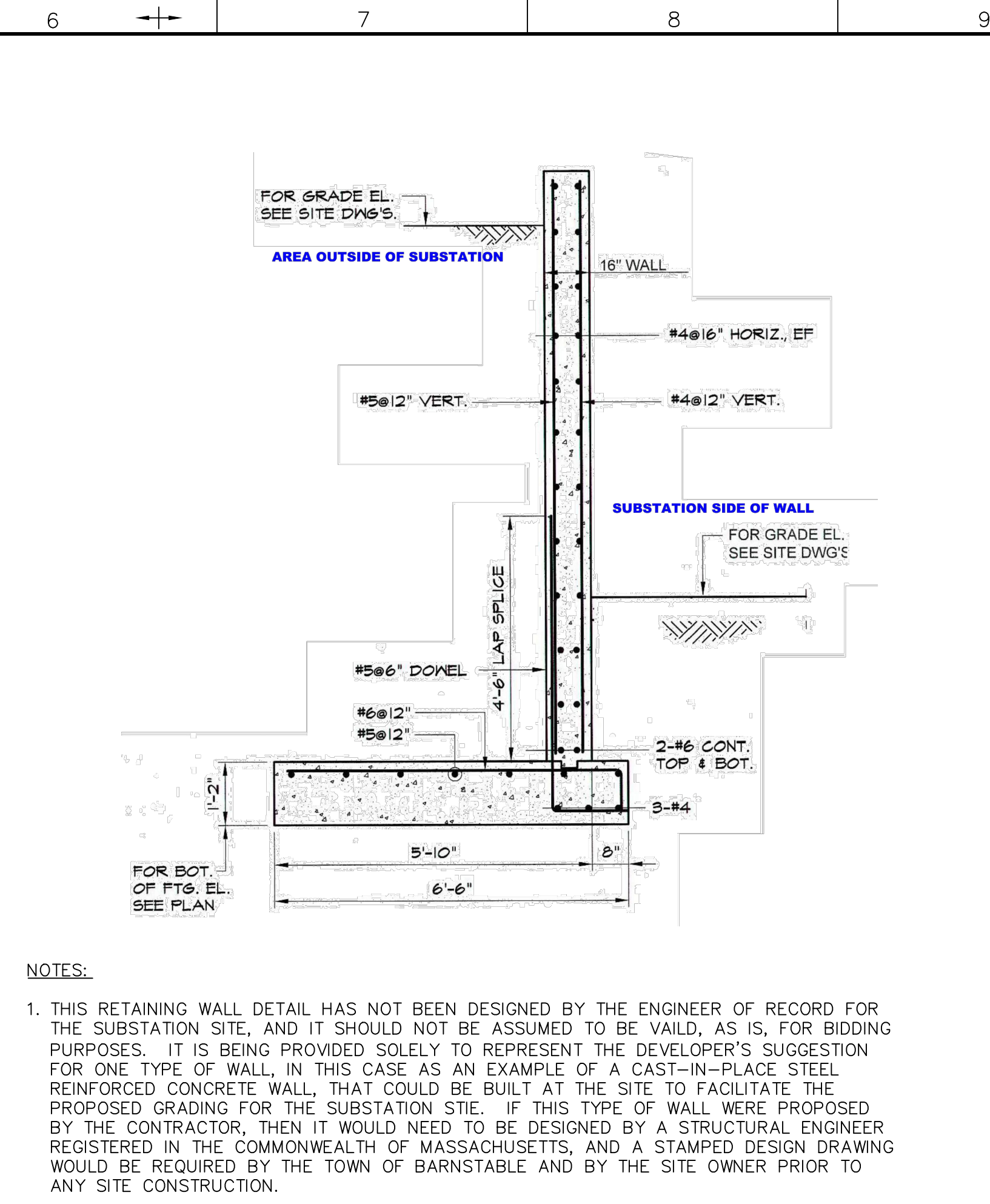




**NOTES:**

1. DETAIL OF MODULAR BLOCK WALL IS PROVIDED FOR GENERAL INFORMATION ONLY. STAMPED FINAL DESIGN OF MODULAR BLOCK WALL SYSTEM TO BE PROVIDED BY WALL MANUFACTURER BASED ON GEOTECHNICAL ENGINEER RECOMMENDATIONS.

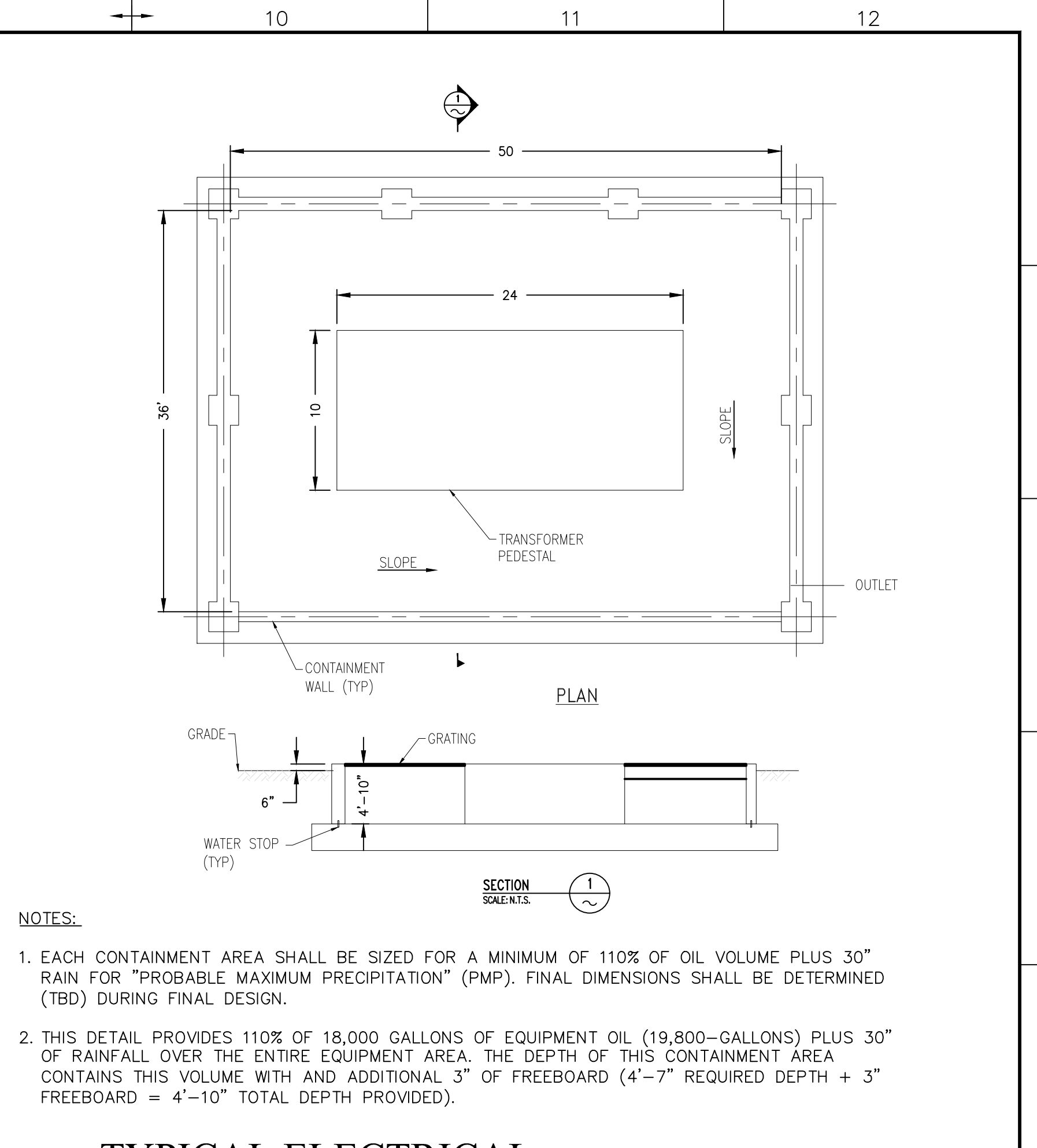
**01 REINFORCED CONCRETE RETAINING WALL**  
NOT TO SCALE



**NOTES:**

1. THIS RETAINING WALL DETAIL HAS NOT BEEN DESIGNED BY THE ENGINEER OF RECORD FOR THE SUBSTATION SITE, AND IT SHOULD NOT BE ASSUMED TO BE VALID, AS IS, FOR BIDDING PURPOSES. IT IS BEING PROVIDED SOLELY TO REPRESENT THE DEVELOPER'S SUGGESTION FOR ONE TYPE OF WALL, IN THIS CASE AS AN EXAMPLE OF A CAST-IN-PLACE STEEL REINFORCED CONCRETE WALL, THAT COULD BE BUILT AT THE SITE TO FACILITATE THE PROPOSED GRADING FOR THE SUBSTATION SITE. IF THIS TYPE OF WALL WERE PROPOSED BY THE CONTRACTOR, THEN IT WOULD NEED TO BE DESIGNED BY A STRUCTURAL ENGINEER REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS, AND A STAMPED DESIGN DRAWING WOULD BE REQUIRED BY THE TOWN OF BARNSTABLE AND BY THE SITE OWNER PRIOR TO ANY SITE CONSTRUCTION.

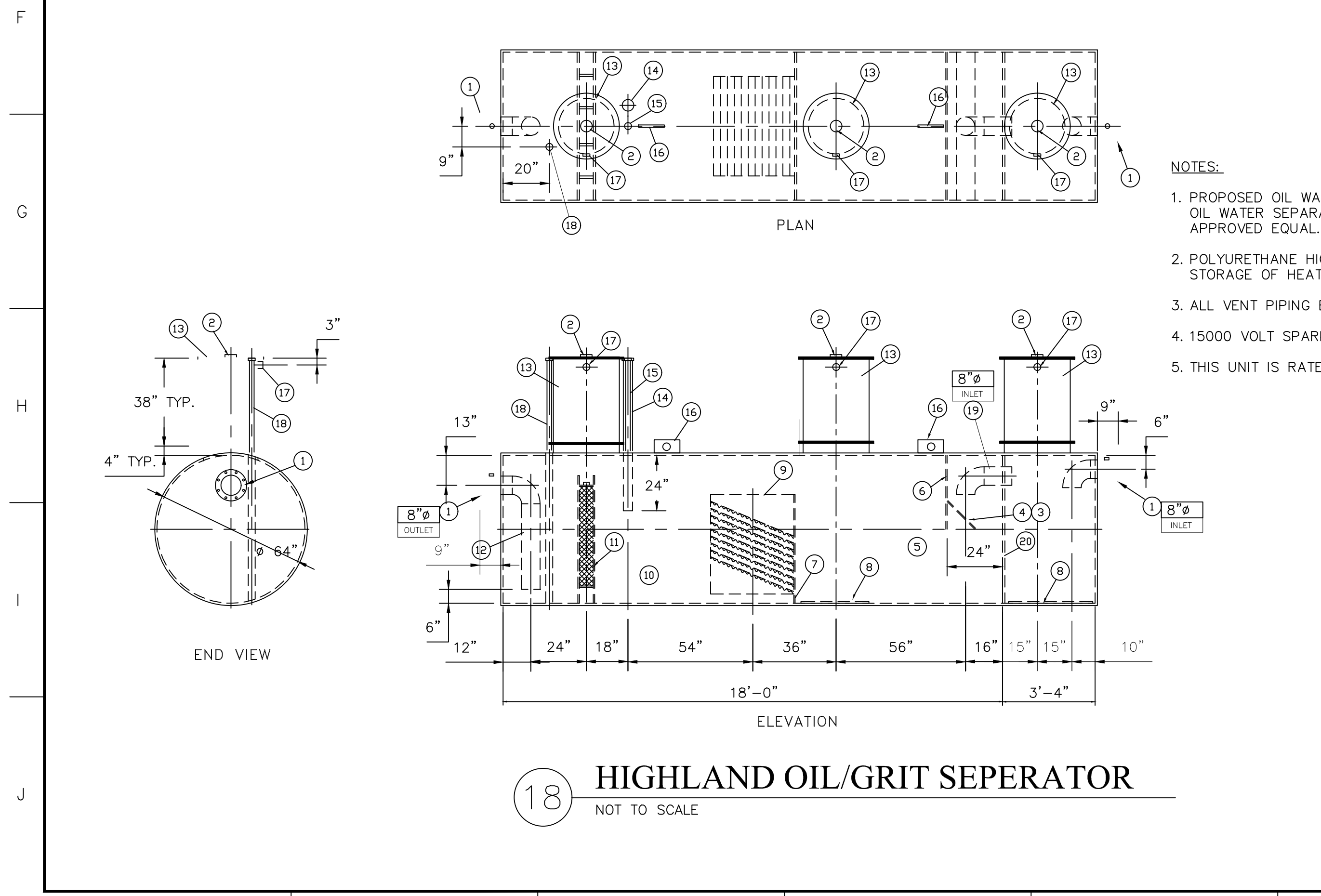
**02 RETAINING WALL DETAIL**  
NOT TO SCALE



**NOTES:**

1. EACH CONTAINMENT AREA SHALL BE SIZED FOR A MINIMUM OF 110% OF OIL VOLUME PLUS 30" RAIN FOR "PROBABLE MAXIMUM PRECIPITATION" (PMP). FINAL DIMENSIONS SHALL BE DETERMINED (TBD) DURING FINAL DESIGN.
2. THIS DETAIL PROVIDES 110% OF 18,000 GALLONS OF EQUIPMENT OIL (19,800-GALLONS) PLUS 30" OF RAINFALL OVER THE ENTIRE EQUIPMENT AREA. THE DEPTH OF THIS CONTAINMENT AREA CONTAINS THIS VOLUME WITH AN ADDITIONAL 3" OF FREEBOARD (4'-7" REQUIRED DEPTH + 3" FREEBOARD = 4'-10" TOTAL DEPTH PROVIDED).

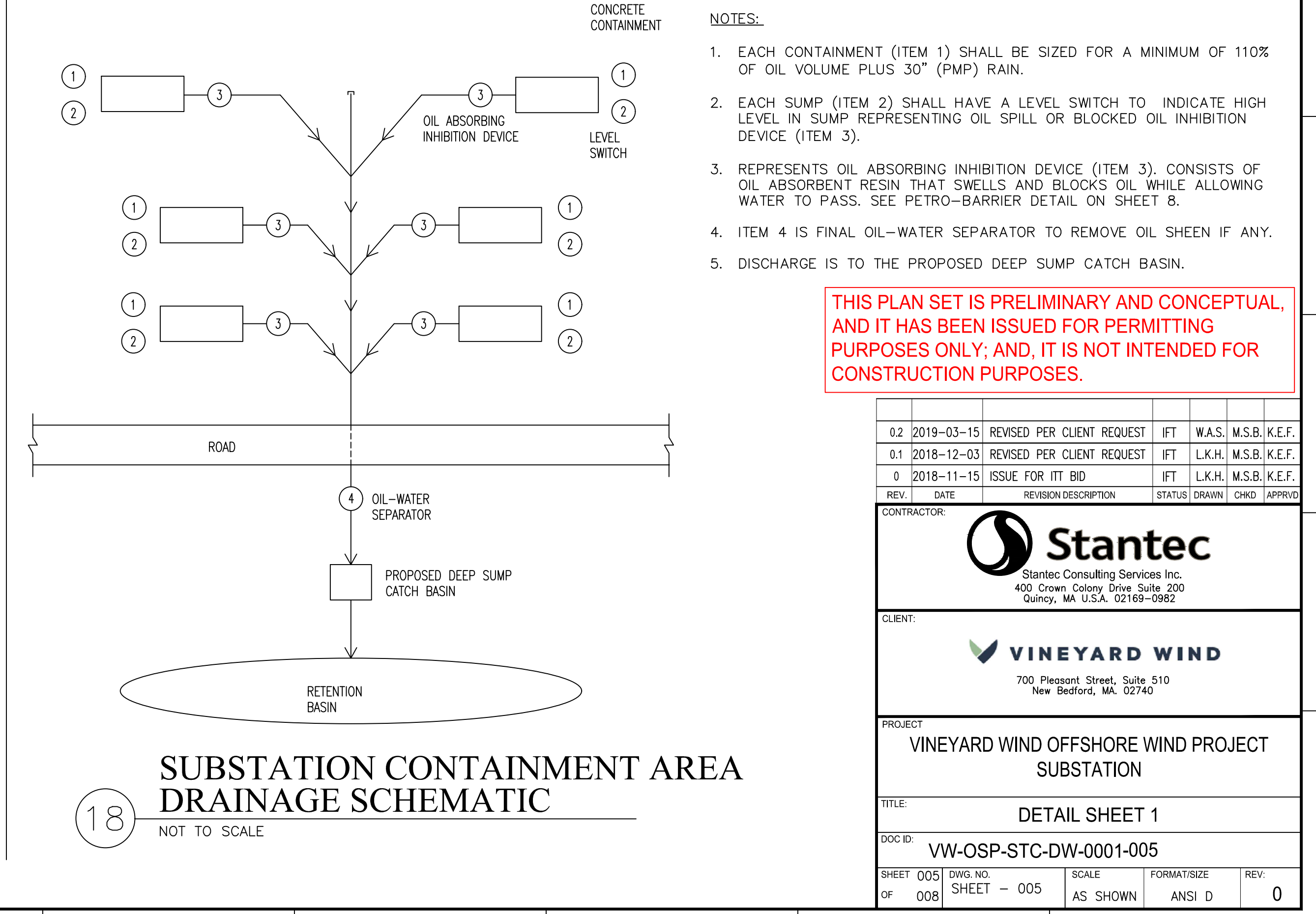
**03 TYPICAL ELECTRICAL EQUIPMENT CONTAINMENT**  
NOT TO SCALE



**NOTES:**

1. PROPOSED OIL WATER SEPARATOR TO BE HIGHLAND 3,000 GALLON OIL WATER SEPARATOR HTC-G, HIGHGUARD, DOUBLE WALL OR APPROVED EQUAL.
2. POLYURETHANE HIGHGUARD TANK IS NOT APPROVED FOR THE STORAGE OF HEATED PRODUCTS.
3. ALL VENT PIPING BY INSTALLER.
4. 15000 VOLT SPARK TEST PROVIDED AT FACTORY.
5. THIS UNIT IS RATED FOR A FLOW RATE OF 300 GPM OR 0.67 CFS.

**18 HIGHLAND OIL/GRIT SEPERATOR**  
NOT TO SCALE



**NOTES:**

1. EACH CONTAINMENT (ITEM 1) SHALL BE SIZED FOR A MINIMUM OF 110% OF OIL VOLUME PLUS 30" (PMP) RAIN.
2. EACH SUMP (ITEM 2) SHALL HAVE A LEVEL SWITCH TO INDICATE HIGH LEVEL IN SUMP REPRESENTING OIL SPILL OR BLOCKED OIL INHIBITION DEVICE (ITEM 3).
3. REPRESENTS OIL ABSORBING INHIBITION DEVICE (ITEM 3). CONSISTS OF OIL ABSORBENT RESIN THAT SWELLS AND BLOCKS OIL WHILE ALLOWING WATER TO PASS. SEE PETRO-BARRIER DETAIL ON SHEET 8.
4. ITEM 4 IS FINAL OIL-WATER SEPARATOR TO REMOVE OIL SHEEN IF ANY.
5. DISCHARGE IS TO THE PROPOSED DEEP SUMP CATCH BASIN.

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**18 SUBSTATION CONTAINMENT AREA DRAINAGE SCHEMATIC**  
NOT TO SCALE

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CONTRACTOR: **Stantec**  
Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
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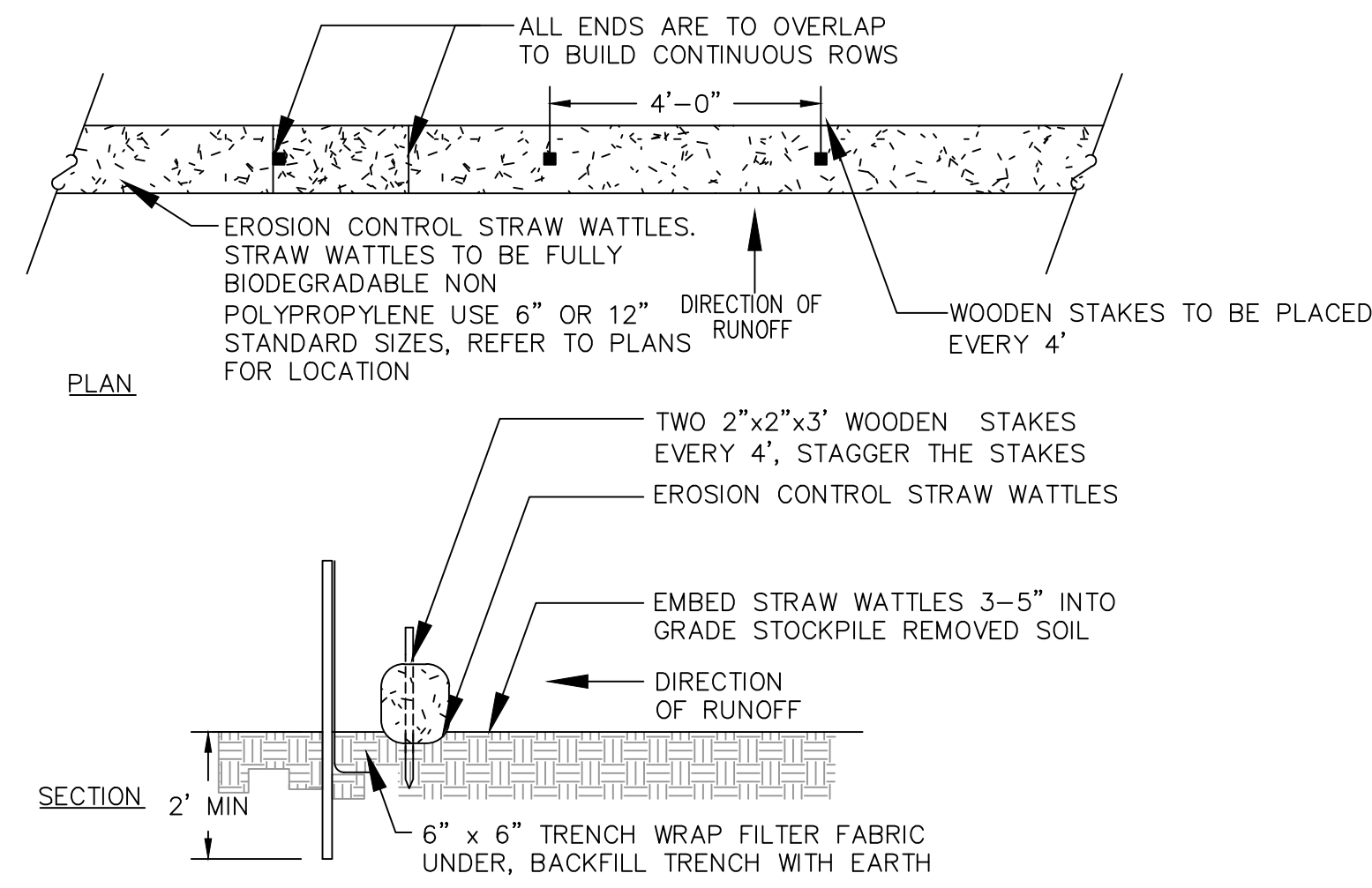
CLIENT: **VINEYARD WIND**  
700 Pleasant Street, Suite 510  
New Bedford, MA, 02740

PROJECT: **VINEYARD WIND OFFSHORE WIND PROJECT SUBSTATION**

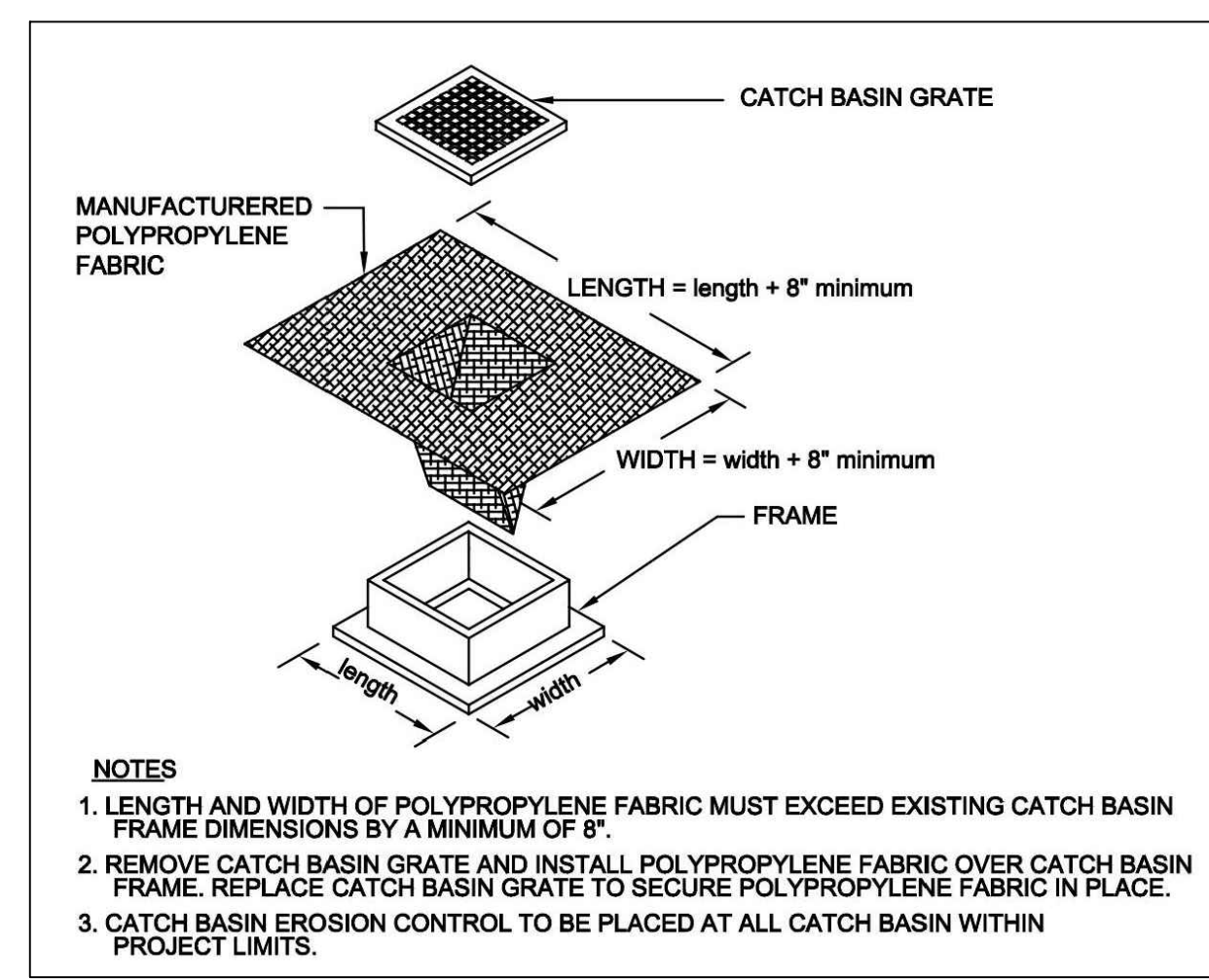
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DOC ID: **VW-OSP-STC-DW-0001-005**

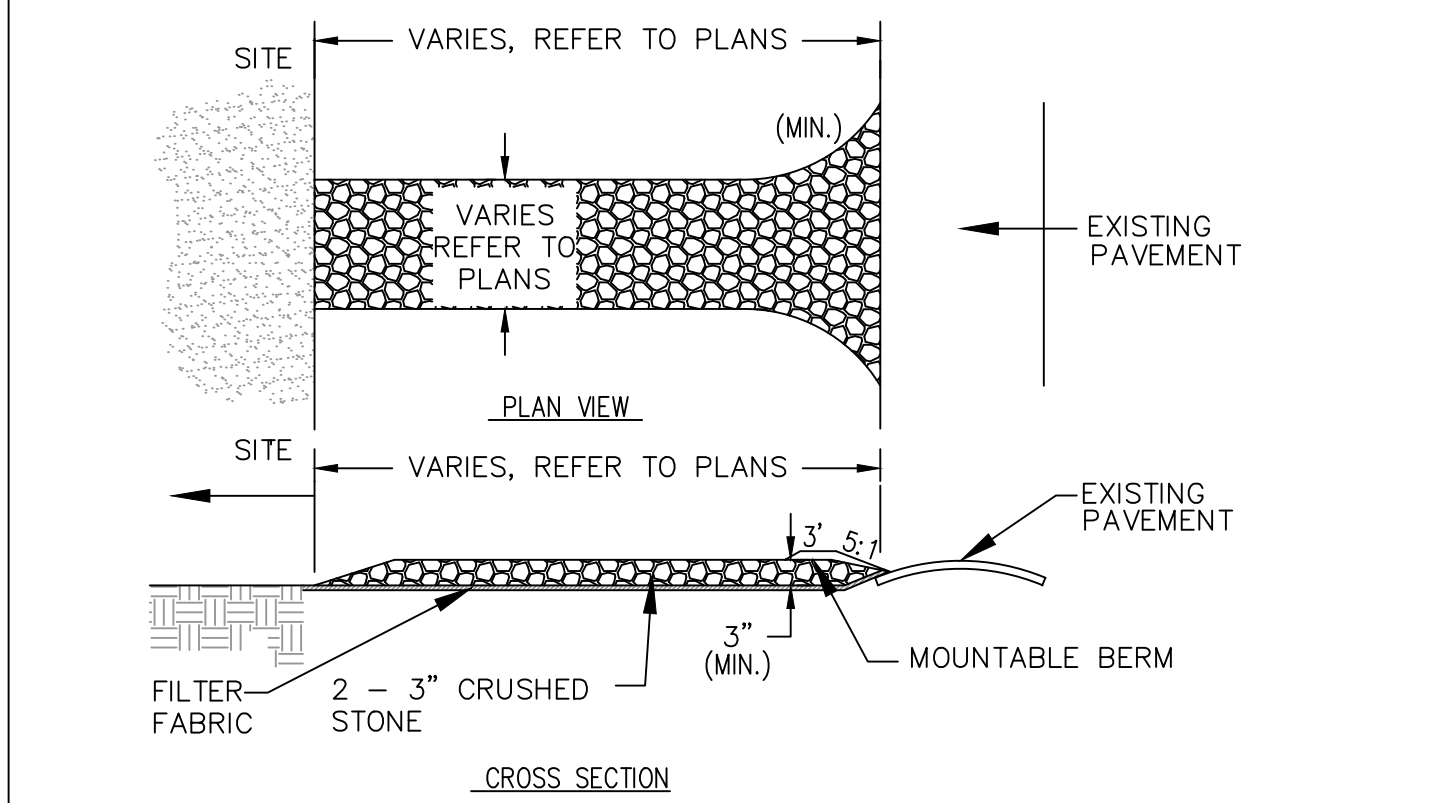
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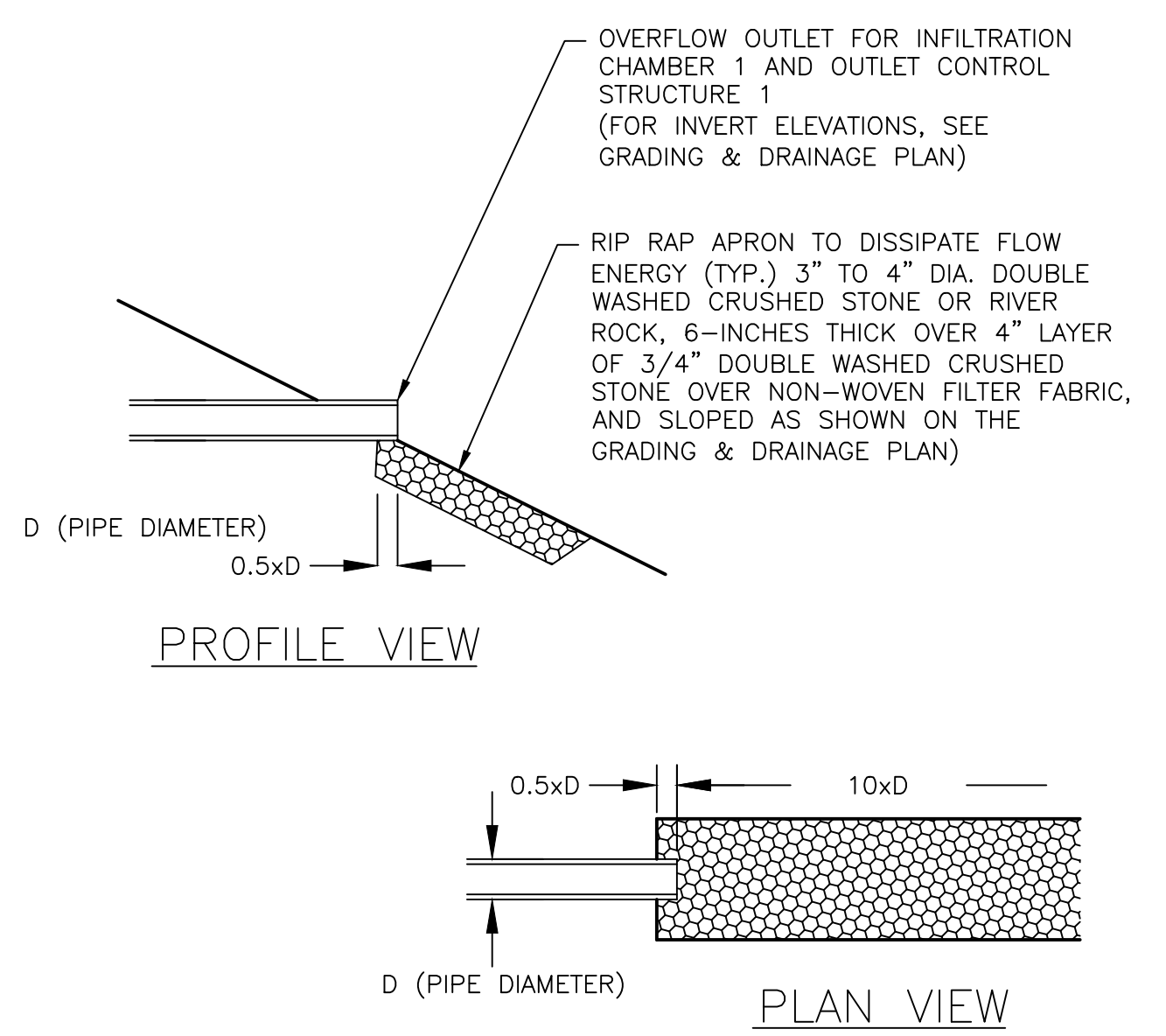
**STRAW WATTLES WITH SILTATION BARRIER**  
NOT TO SCALE



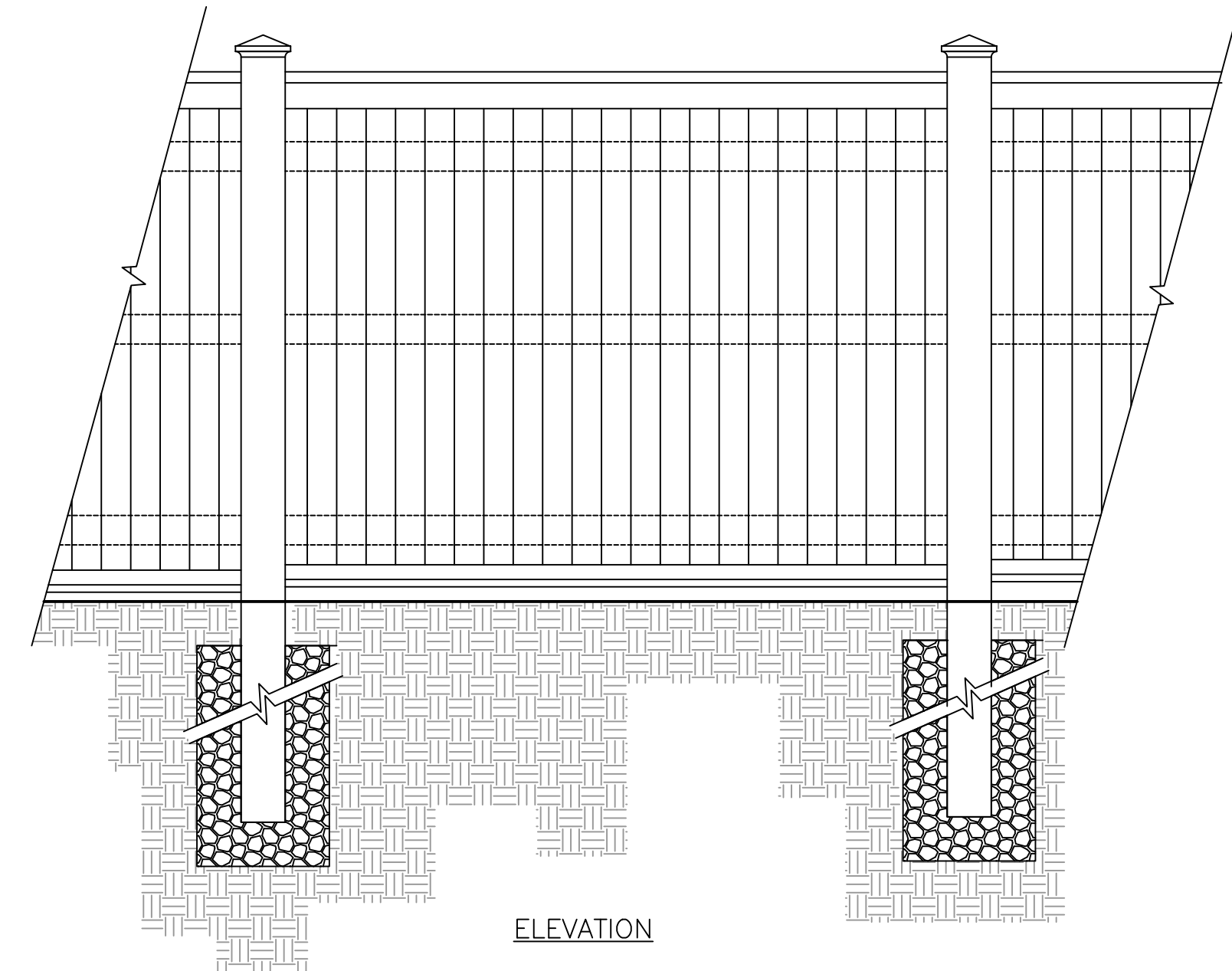
**CATCH BASIN EROSION CONTROL PROTECTION - SILT SACK**  
NOT TO SCALE



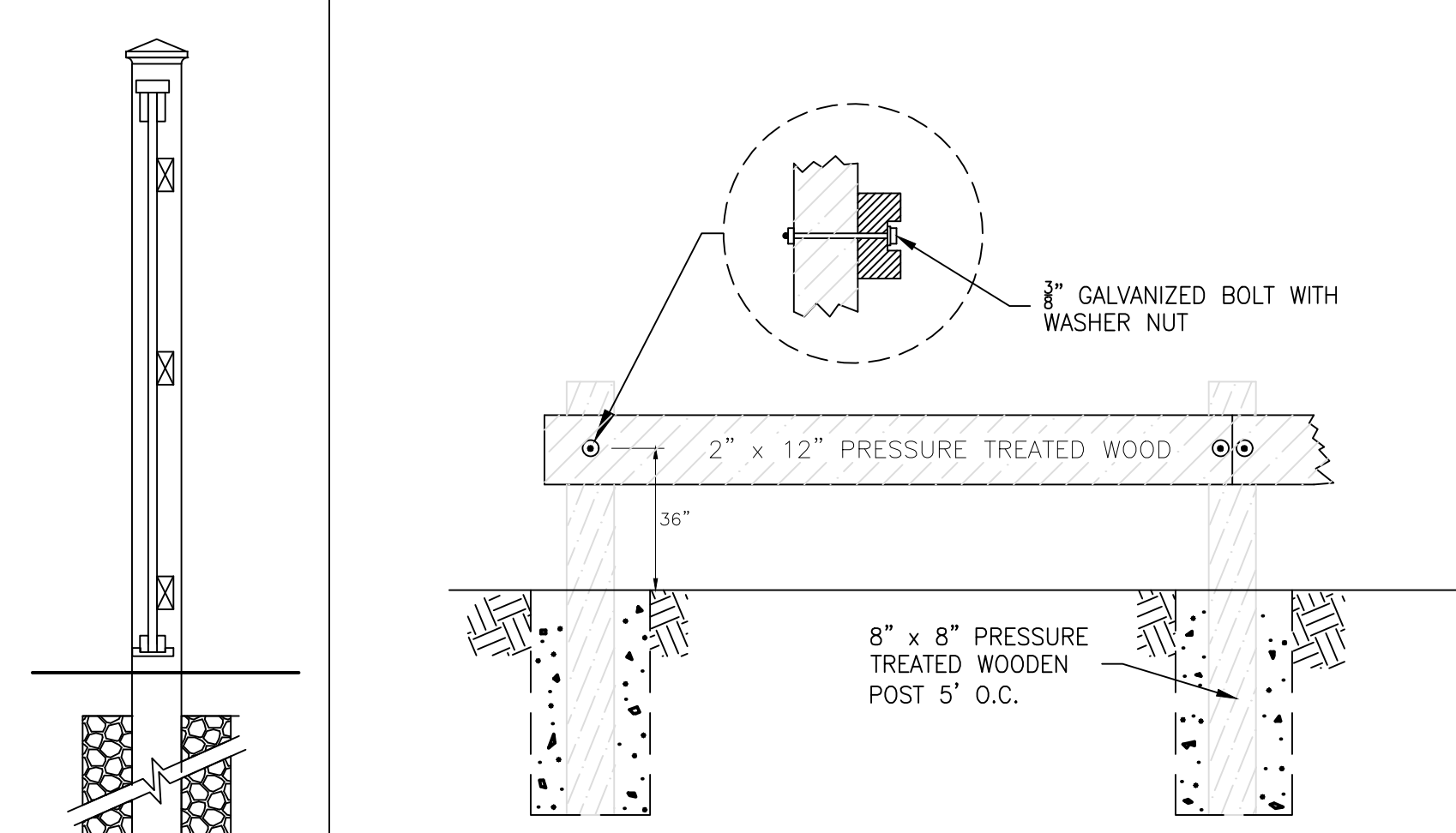
**STABILIZED CONSTRUCTION ENTRANCE**  
NOT TO SCALE



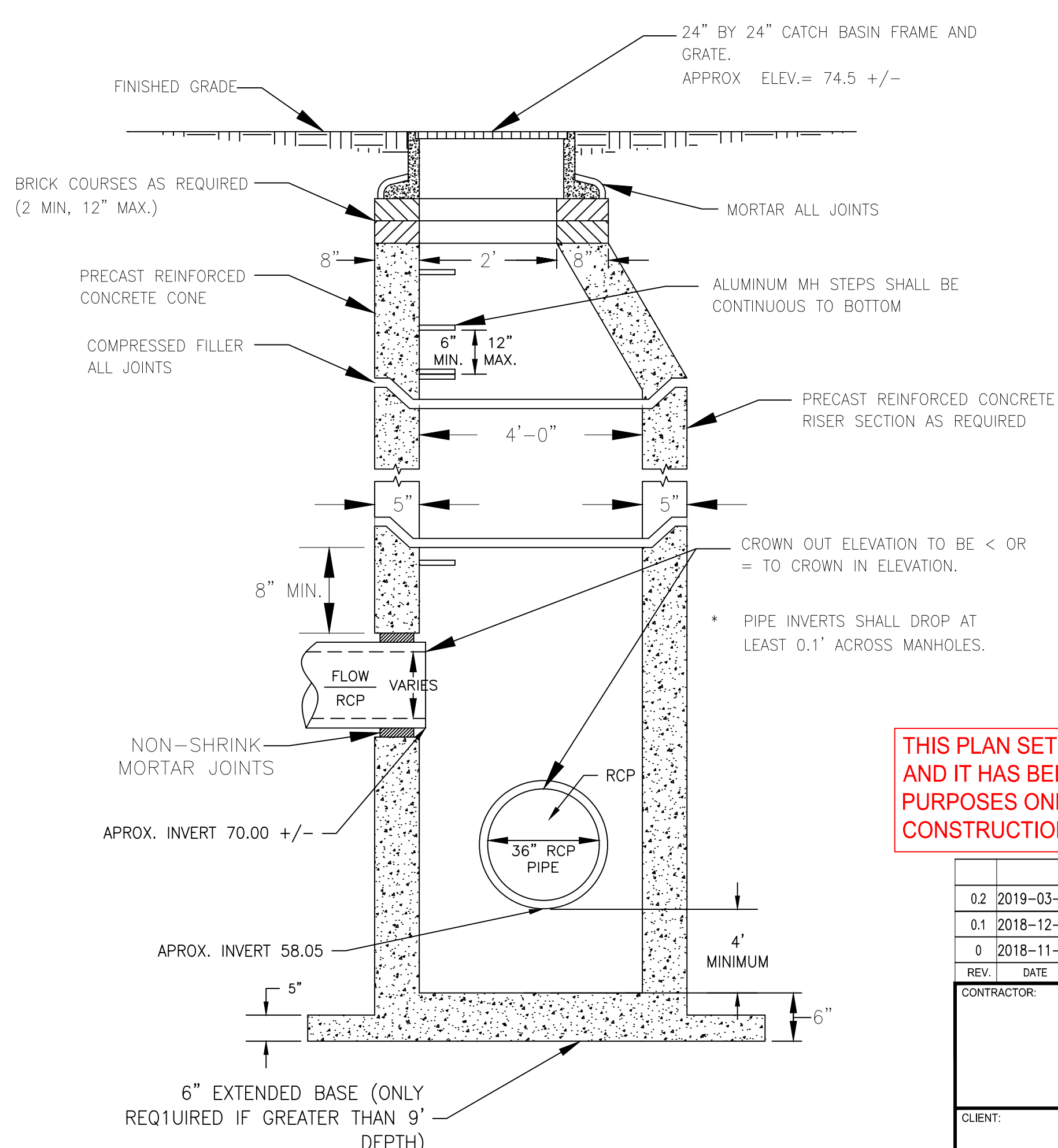
**RIP RAP APRON DETAIL**  
NOT TO SCALE



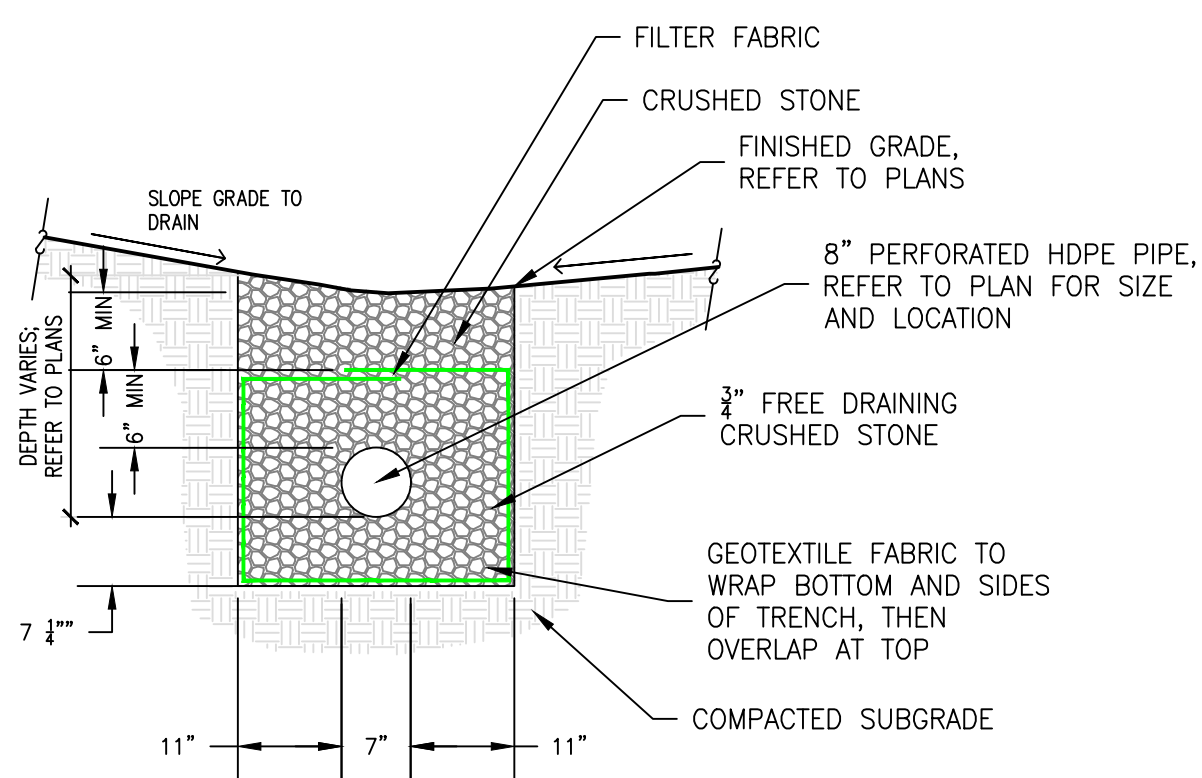
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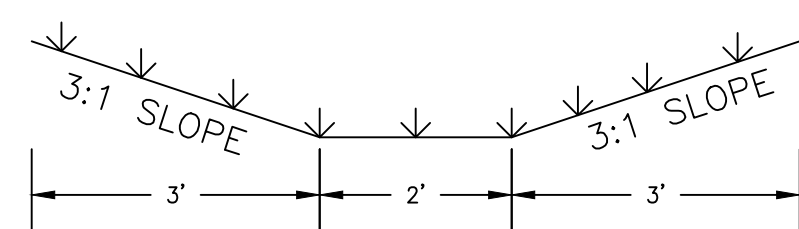
**WOODEN ACCESS ROAD GUARDRAIL DETAIL**  
NOT TO SCALE



**DEEP SUMP CATCH BASIN**  
NOT TO SCALE



**PERFORATED PIPE DETAIL**  
NOT TO SCALE



**GRASS CHANNEL**  
NOT TO SCALE

- NOTES:
1. GRASS SWALE TO BE 8' WIDE x 12" DEEP WITH 3:1 SIDE SLOPES AND 2' BOTTOM WIDTH.
  2. SLOPE WITHIN THE BOTTOM OF THE CHANNEL TO BE 1% MAXIMUM. PLEASE REFER TO THE PLANS FOR ADDITIONAL INFORMATION

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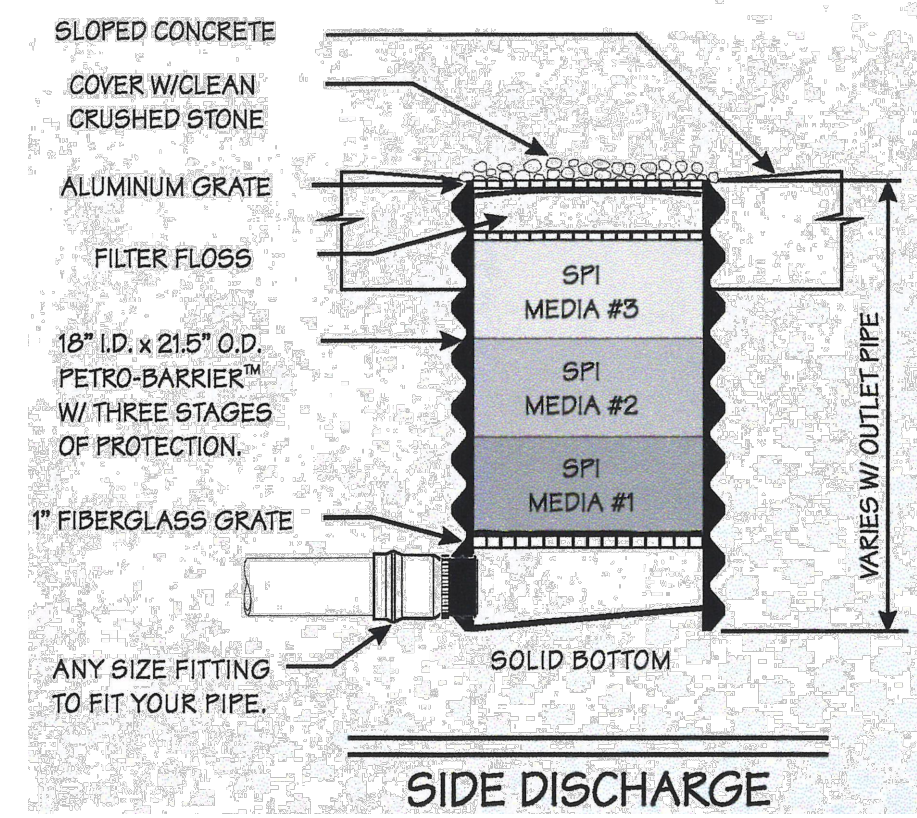
**VINEYARD WIND**  
700 Pleasant Street, Suite 510  
New Bedford, MA, 02740

PROJECT: **VINEYARD WIND OFFSHORE WIND PROJECT SUBSTATION**

TITLE: **DETAIL SHEET 2**

DOC ID: **VW-OSP-STC-DW-0001-006**

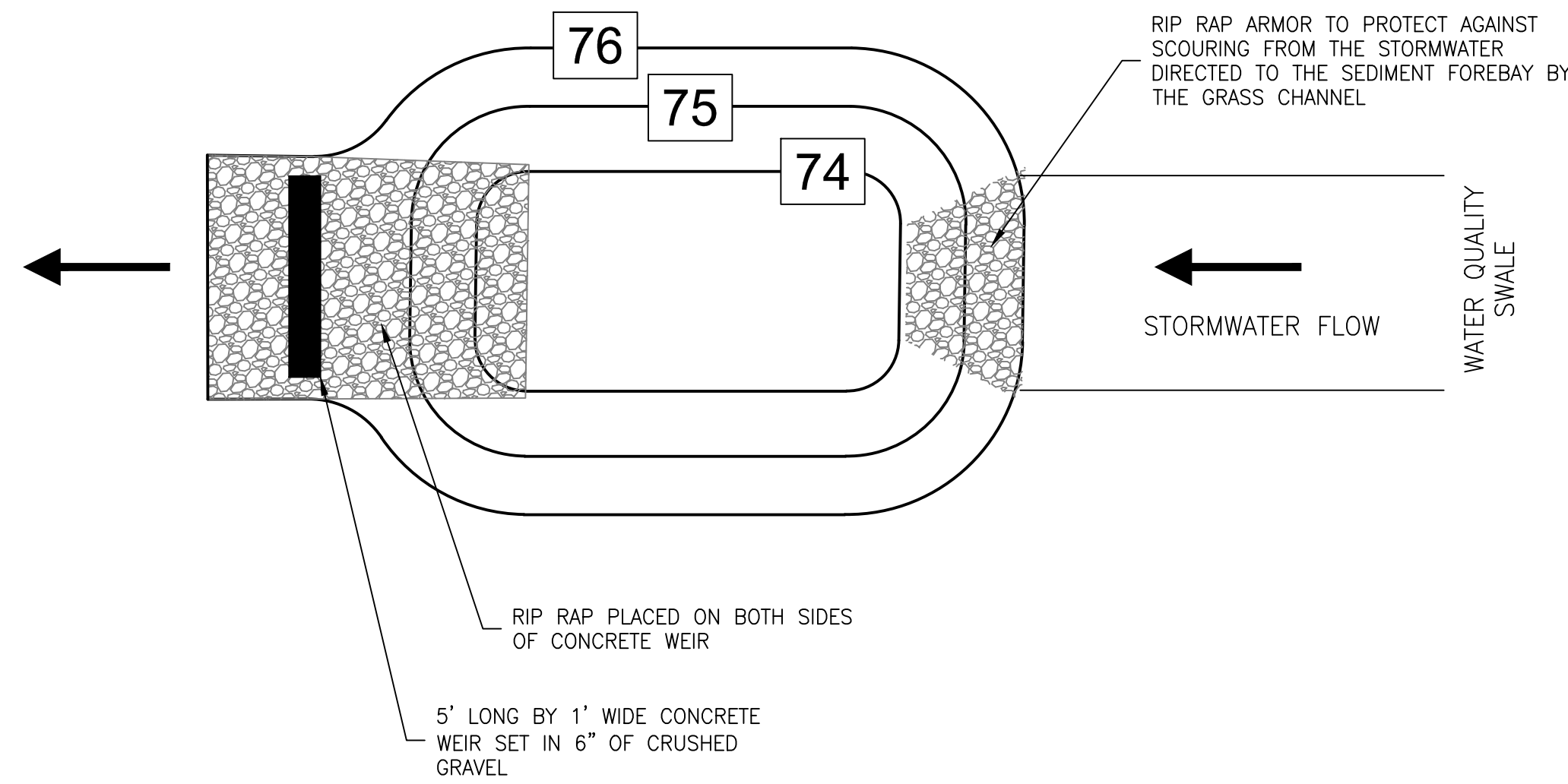
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006 OF 008	SHEET - 006	AS SHOWN	ANSI D	0



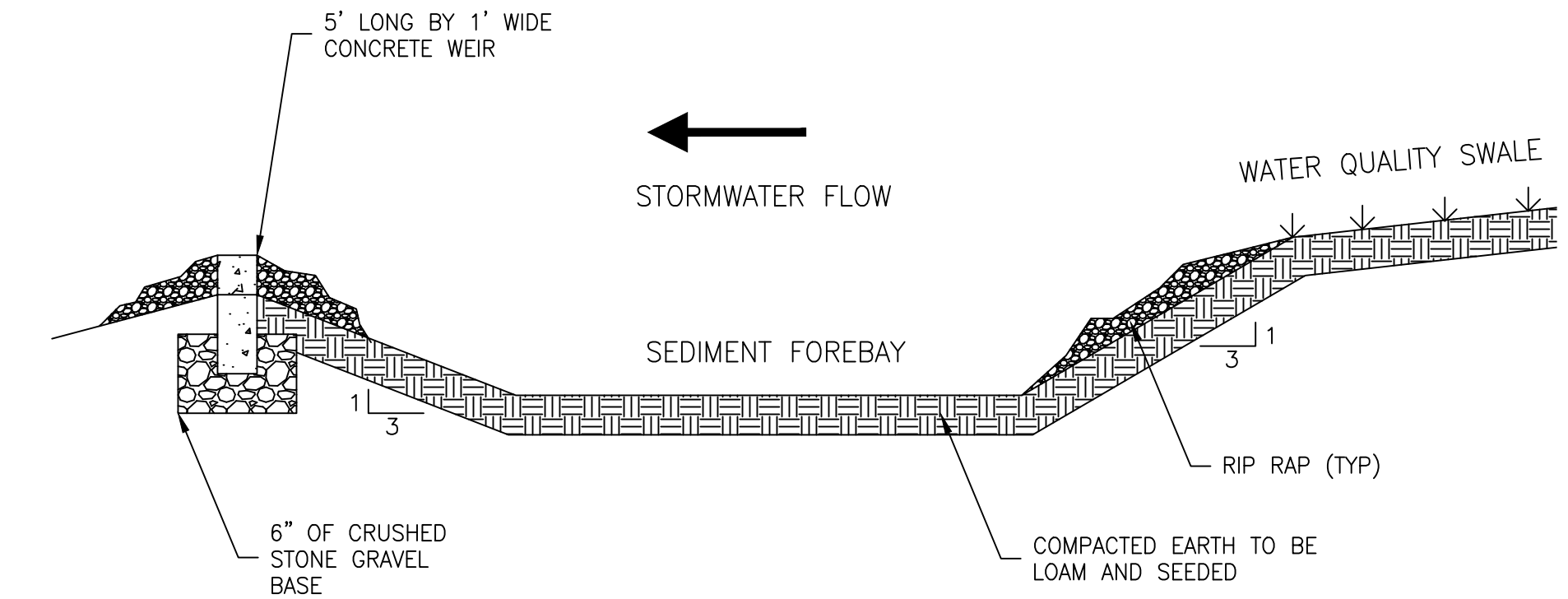
**CONTAINMENT AREA PETRO-BARRIER (TYP.)**  
NOT TO SCALE

**NOTES:**

1. PETRO-BARRIER TO BE MANUFACTURED BY SOLIDIFICATION PRODUCTS INTERNATIONAL INC.
2. PETRO-BARRIERS TO BE LOCATED UNDERNEATH THE DRAINAGE OUTLET AT ALL CONTAINMENT AREAS. CONTAINMENT AREAS MUST BE SWEEPED CLEAN BEFORE THE INSTALLATION OF THE PETRO-BARRIERS TO ENSURE THEY DO NOT BECOME CLOGGED DURING THE FIRST PRECIPITATION EVENT.



**PLAN VIEW**



**PROFILE VIEW**

**SEDIMENT FOREBAY DETAIL**  
NOT TO SCALE

**NOTES:**

1. BOTTOM AREA OF SEDIMENT FOREBAY TO BE A MINIMUM OF 77 S.F.
2. PLEASE SEE PLANS FOR LOCATION AND GRADING DETAIL FOR THE SEDIMENT FOREBAYS.

**THIS PLAN SET IS PRELIMINARY AND CONCEPTUAL, AND IT HAS BEEN ISSUED FOR PERMITTING PURPOSES ONLY; AND, IT IS NOT INTENDED FOR CONSTRUCTION PURPOSES.**

REV.	DATE	REVISION DESCRIPTION	STATUS	DRAWN	CHKD	APPRVD
0.2	2019-03-15	REVISED PER CLIENT REQUEST	IFT	W.A.S.	M.S.B.	K.E.F.
0.1	2018-12-03	REVISED PER CLIENT REQUEST	IFT	L.K.H.	M.S.B.	K.E.F.
0	2018-11-15	ISSUE FOR ITT BID	IFT	L.K.H.	M.S.B.	K.E.F.

**CONTRACTOR:**

Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy, MA U.S.A. 02169-0982

**CLIENT:**

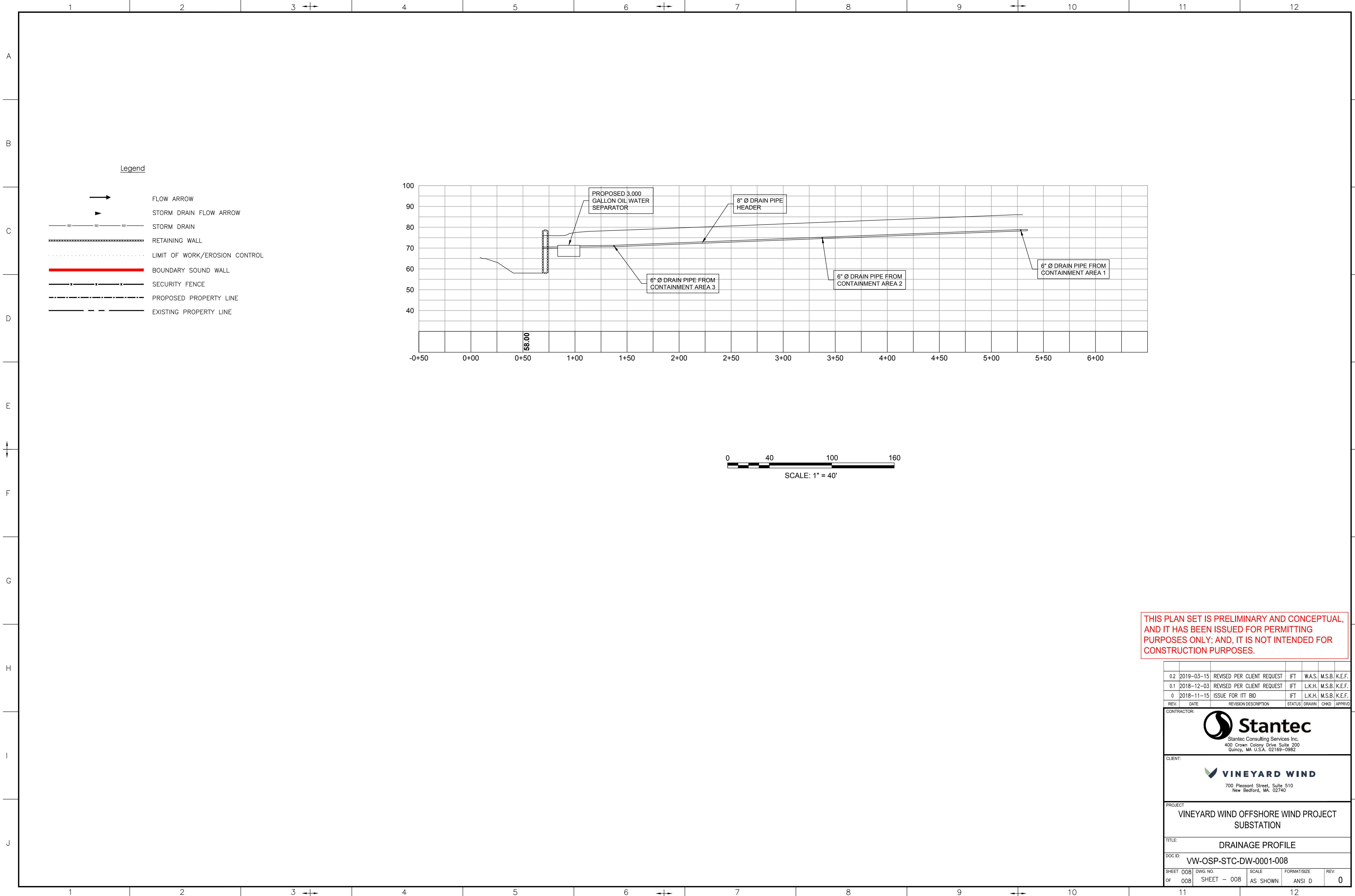
VINEYARD WIND  
700 Pleasant Street, Suite 510  
New Bedford, MA, 02740

**PROJECT:**  
VINEYARD WIND OFFSHORE WIND PROJECT  
SUBSTATION

**TITLE:**  
DETAIL SHEET 3

**DOC ID:**  
VW-OSP-STC-DW-0001-007

SHEET 007 OF 008	DWG. NO. SHEET - 007	SCALE AS SHOWN	FORMAT/SIZE ANSI D	REV. 0
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**Legend**

- FLOW ARROW
- STORM DRAIN FLOW ARROW
- STORM DRAIN
- RETAINING WALL
- LIMIT OF WORK/EROSION CONTROL
- BOUNDARY SOUND WALL
- SECURITY FENCE
- PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE

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**CONTRACTOR:**

Stantec Consulting Services Inc.  
400 Crown Colony Drive Suite 200  
Quincy, MA U.S.A. 02169-0982

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**CLIENT:**

VINEYARD WIND  
700 Pleasant Street, Suite 510  
New Bedford, MA, 02740

---

**PROJECT:**  
VINEYARD WIND OFFSHORE WIND PROJECT  
SUBSTATION

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**TITLE:**  
DRAINAGE PROFILE

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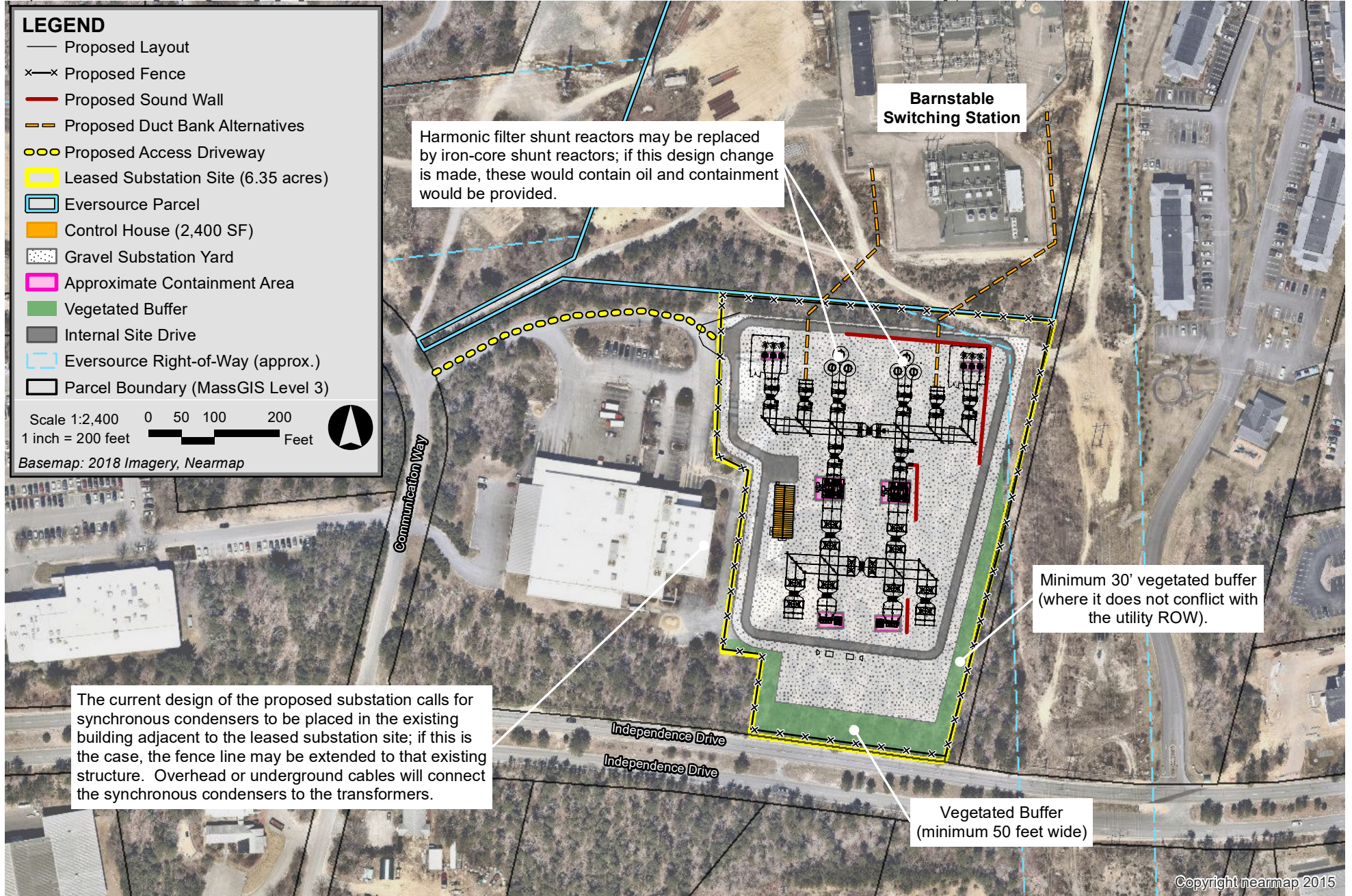
**DOC ID:**  
VW-OSP-STC-DW-0001-008

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SHEET 008 OF 008	DWG. NO. SHEET - 008	SCALE AS SHOWN	FORMAT/SIZE ANSI D	REV. 0
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This product is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.



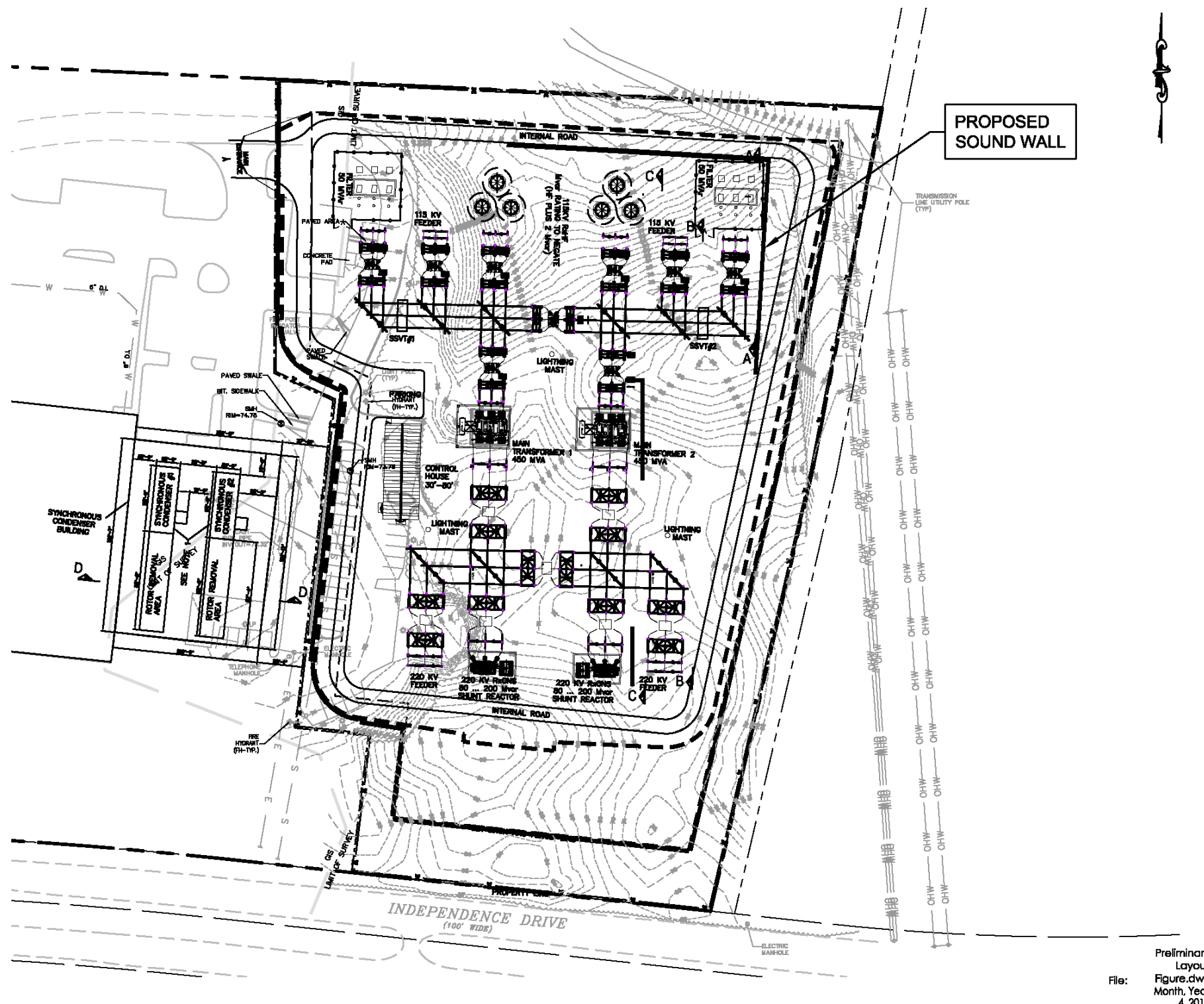
This product is for informational purposes and may not be suitable for legal, engineering, or surveying purposes.

**NOTES:**

1. THE EXTENTS OF THE SITE ARE WITHIN AN IWPA ZONE II.
2. ACCORDING TO THE FLOOD RATE INSURANCE MAP FOR BARNSTABLE COUNTY MASSACHUSETTS PANEL 566 MAP NUMBER 25001C0566J WITH THE EFFECTIVE DATE OF JULY 16, 2014 THE ENTIRE SITE IS WITHIN FLOOD ZONE X (AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN).
3. THE PARCEL IS LOCATED WITHIN THE TOWN OF BARNSTABLE MASSACHUSETTS IN BARNSTABLE COUNTY MAP 314 BLOCK 21. A FORMAL FORM A PROCESS WILL BE CONDUCTED AT A LATER DATE TO FORMALLY SUBDIVIDE THIS PARCEL.
4. THE SITE LAYOUT WAS DEVELOPED USING A PROPOSED SUBSTATION LAYOUT WHICH IS SUBJECT TO CHANGE.
5. EXISTING SITE INFORMATION (PROPERTY LINES, TOPOGRAPHY, ETC.) ARE FROM PLAN ENTITLED "EXISTING CONDITIONS PLAN, DATED 04/23/18, BY BAXTER NYE ENGINEERING & SURVEYING, 78 NORTH STREET - 3RD FLOOR, HYANNIS MA 02601.
6. ACCORDING TO MASSGIS THE SITE IS NOT WITHIN THE NHESP PRIORITY HABITATS OF RARE WILDLIFE OR THE NHESP ESTIMATED HABITATS OF RARE WILDLIFE.
7. ACCORDING TO MASSGIS THERE ARE NO CERTIFIED VERNAL POOLS OR POTENTIAL VERNAL POOLS LOCATED ON THE PROJECT SITE.
8. ACCORDING TO MASSGIS THERE ARE NO WETLANDS LOCATED ON OR WITHIN 100' OF THE PROJECT SITE.
9. ACCORDING TO MASSGIS THE SITE IS NOT LOCATED WITHIN AN AREA OF CRITICAL ENVIRONMENTAL CONCERN.
10. SOILS IN THE SITE AREA (PER NRCS) ARE "PLYMOUTH-BARNSTABLE COMPLEX" ROLLING, VERY BOULDERY GRAVELLY COARSE SAND; WITH DEPTH TO GROUNDWATER > 80-INCHES; AND HYDROLOGIC SOIL GROUP "A".
11. DETAILED DESIGN OF WALLS, GRADING, AND OTHER DRAINAGE FEATURES WILL BE COMPLETED AND SUBMITTED AS PART OF THE CONSTRUCTION PLAN AND DOCUMENTS AT A LATER DATE.

**Legend**

- RETAINING WALL
- SOUND WALL
- SECURITY FENCE
- - - PROPOSED PROPERTY LINE
- EXISTING PROPERTY LINE



PROPOSED SOUND WALL

Preliminary  
Layout  
File: Figure.dwg  
Month, Year  
4, 2018

ORIGINAL SHEET - ANSI B

**Legend**

**Notes**



SCALE: 1" = 100'

**Client/Project**

VINEYARD WIND  
VINEYARD WIND CONNECTOR  
HYANNIS, MA

**Figure No.**

2.0

**Title**

PROPOSED SUBSTATION  
LAYOUT



400 CROWN COLONY DRIVE SUITE 200  
QUINCY, MA 02169

SCALE: 1"=300'

Vineyard Wind Connector





## AIS LAYOUT WITH SOUND WALLS

Vineyard Wind Connector



Figure 2-10a  
Substation Rendering





**EXISTING VIEW LOOKING TOWARD EAST SIDE OF SITE**



**AIS LAYOUT SOUNDWALL - LOOKING TOWARD EAST SIDE OF SITE**



**AIS LAYOUT SOUNDWALL 50% - LOOKING TOWARD EAST SIDE OF SITE**



**EXISTING VIEW LOOKING NORTH ON EAST SIDE OF SITE**





**AIS LAYOUT SOUNDWALL 50% - LOOKING NORTH ON EAST SIDE OF SITE**