



STATE OF MARYLAND
DEPARTMENT OF INFORMATION TECHNOLOGY

TORFP #: F50B7400021
NORTH CALVERT CLIFFS SHA
TO Financial Proposal

#	Project Line Item	Price
Site Preparation Work		
1	Survey and mark the Limits of Disturbance (LOD) in accordance with the attached construction drawings.	\$
2	Clearing and grading.	\$
3	Furnish and install sediment and erosion control systems and any necessary storm water management features in accordance with the attached drawings.	\$
4	Furnish and install a stabilized construction entrance in accordance with the construction drawings.	\$
5	Construct the tower foundation per tower manufacturer's specifications.	\$
6	Construct one (1) 12x38ft. equipment shelter foundation.	\$
7	Construct one (1) 4x20ft. Concrete foundation for one (1) 1,000 gallon LP fuel tank.	\$
8	Install tower and shelter ground rings per the latest version of Motorola R56 installation standards.	\$
9	Upon completion of tower, shelter and site improvements, the TO Contractor shall furnish and install surface materials in accordance with Attachment # 33 Construction Drawings. TO Contractor shall restore all areas of grass or existing pavement which have been disturbed during construction.	\$
10	Install an eight (8) ft. high-galvanized chain link fence with two (2) feet of barbed wire on top, with a twenty (20) ft. wide, double leaf vehicle gate; and two (2) five (5) foot man gates around the site (includes tower, equipment shelter as shown on Attachment #33 Construction Drawings.	\$
Installation		
11	Purchase and delivery of one (1) fully functional, 430 ft. above ground level, three (3) legged, solid legged, heavy duty, self-supporting, two-way microwave radio tower.	\$
12	Tower Erection	\$
13	Purchase and install tower lighting equipment on the 430 ft. tower (Total finished height of the tower including all appurtenances will be 448 ft.) as per FAA Advisory Circular AC70/7460-1-L or latest revision.	\$

14	Purchase and installation of one (1) 12x38x10 ft. concrete equipment shelter (height is inside dimension).	\$
15	Purchase and installation of one (1) new 1,000 gallon LP fuel tank with hookup to the generator and shall include first LP fill-up.	\$
16	Purchase and install one (1) extruded metal, 24-inch wide, no cantilever ice-bridge.	\$
17	Purchase and installation, per local utility standard, of an electrical backboard of steel post and unistrut construction to include CT cabinet if required, wire trough, main disconnect, at least one (1) electric company approved meter socket with room to accommodate a minimum of three (3) additional meters.	\$
18	Purchase and installation of conduits per specifications.	\$
19	Purchase and connection of electrical wiring.	\$
20	Supply bollards as needed in accordance with the attached construction drawings.	\$
Total Evaluated Price NORTH CALVERT CLIFFS SHA (Items 1 through 20 added)		\$0.00

Submitted by:

Authorized Signature

Title

Printed Name of Authorized Signature

Federal Employer Number

Company

Date

Phone #

Address

SUBMIT COMPLETED DOCUMENT AS A PDF WITH SIGNATURE



CATS + FA 13
 Construction Schedule
 Big Savage and Blooming Rose Road Communications
 Tower Site Construction

Line	Item	Vendor submitted schedule	Date requirements (calendar days)
-----	Notice to proceed [NTP] (Provided by DoIT with approved purchase order)	-----	-----
1	Clearing and Grading		NTP + # Days
2	Shelter/Tower Foundation poured		NTP + # Days
3	Tower Delivery		NTP + # Days
4	Shelter Delivery		NTP + # Days
5	Tower Erection (will trigger request for tower inspection)		NTP + # Days
6	Final Grounding (will trigger request for R56 and punch list inspection)		NTP + # Days
7	Site Completion (to include punch list and R56 corrections)		NTP + # Days
8	Closeout documents submitted for state review		NTP + # Days
	Vendor Signature:		

Instructions: Vendors will submit this document with their signed/sealed bid proposal. Construction completion will be used to compare and evaluate supplied bids. The submitted schedule will also serve as the contractor's binding schedule for the project. Projects not completed within the scheduled completion shown on the schedule will be subject to an assessment for liquidated damages.

The vendor will write the number of days past the NTP in the boxes provided.



STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

11/17/2016

REQUEST FOR ADVERTISEMENT AND NOTICE TO PROCEED

Roxann King - Procurement Officer
Information Technology
301 W. Preston Street, Room 1304
Baltimore, MD 21201

Re: North Calvert Cliffs SHA Tower Site Construction
Project No: CATS+ F50B7400021

Enclosed please find the Prevailing Wage Determination and Instructions for Contractors for the project referenced above.

Upon advertisement for bid or proposal of this project, you are requested to submit to this office the date and name of publication in which such advertisement appeared.

Once awarded, you are further directed to submit to this office, the NOTICE TO PROCEED for the project, complete with the date of notice, the name of the general contractor, and the dollar amount of the project. In addition, we ask that a representative of the prevailing wage Unit be invited to attend the Pre-Construction Conference.

Any questions concerning this matter may be referred to PrevailingWage@dllr.state.md.us

Sincerely,

Enclosures
Wage Determination
Instruction for the Contractor

Prevailing Wage Unit

PREVAILING WAGE INSTRUCTIONS FOR THE CONTRACTOR & SUBCONTRACTOR

The contractor shall electronically submit completed copies of certified payroll records to the Commissioner of Labor & Industry, Prevailing Wage Unit by going on-line to <https://www.dllr.state.md.us/prevwage> and following the instructions for submitting payroll information (NOTE: A contractor must register prior to submitting on-line certified payroll information).

If you have technical questions regarding electronic submittal, contact the Department at prevailingwage@dllr.state.md.us.

All certified payroll records shall have an accurate week beginning and ending date. The contractor shall be responsible for certifying and submitting to the Commissioner of Labor and Industry, Prevailing Wage Unit all of their subcontractors' payroll records covering work performed directly at the work site. By certifying the payroll records, the contractor is attesting to the fact that the wage rates contained in the payroll records are not less than those established by the Commissioner as set forth in the contract, the classification set forth for each worker or apprentice conforms with the work performed, and the contractor or subcontractor has complied with the provisions of the law.

A contractor or subcontractor may make deductions that are (1) required by law; (2) required by a collective bargaining agreement between a bona fide labor organization and the contractor or subcontractor; or (3) contained in a written agreement between an employee and an employer undertaken at the beginning of employment, if the agreement is submitted by the employer to the public body awarding the public work and is approved by the public body as fair and reasonable.

A contractor or subcontractor is required to submit information on-line on their fringe benefit packages including a list of fringe benefits for each craft employed by the contractor or subcontractor, by benefit and hourly amount. Where fringe benefits are paid in cash to the employee or to an approved plan, fund, or program, the contribution is required to be indicated.

Payroll records must be electronically submitted and received within 14 calendar days after the end of each payroll period. If the contractor is delinquent in submitting payroll records, processing of partial payment estimates may be held in abeyance pending receipt of the records. In addition, if the contractor is delinquent in submitting the payroll records, the contractor shall be liable to the contracting public body for liquidated damages. The liquidated damages are \$10.00 for each calendar day the records are late.

Only apprentices registered with the Maryland Apprenticeship and Training Council shall be employed on prevailing wage projects. Apprentices shall be paid a percentage of the determined journey person's wage for the specific craft.

Overtime rates shall be paid by the contractor and any subcontractors under its contracts and agreements with their employees which in no event shall be less than time and one-half the prevailing hourly rate of wages for all hours worked in excess of ten (10) hours in any one calendar day; in excess of forty (40) hours per workweek; and work performed on Sundays and legal holidays.

Contractors and subcontractors employing a classification of worker for which a wage rate was not issued SHALL notify the Commissioner of Labor & Industry, Prevailing Wage Unit, for the purpose of obtaining the wage rate for said classification PRIOR TO BEING EMPLOYED on the project. To obtain a prevailing wage rate which was NOT listed on the Wage Determination, a contractor or subcontractor can look on the DLLR webpage under prevailing wage.

Contractors and subcontractors shall maintain a valid copy of proper State and county licenses that permit the contractor and a subcontractor to perform construction work in the State of Maryland. These licenses must be retained at the worksite and available for review upon request by the Commissioner of Labor and Industry's designee.

**Each contractor under a public work contract subject to Section 17-219 shall:

1. Post a clearly legible statement of each prevailing wage rate to be paid under the public work contract; and
2. Keep the statement posted during the full time that any employee is employed on the public work contract.
3. The statement of prevailing wage rates shall be posted in a prominent and easily accessible place at the site of the public work.

****Penalty - Subject to Section 10-1001 of the State Government Article, the Commissioner may impose on a person that violates this section a civil penalty of up to \$50.00 per violation.**

Under the Maryland Apprenticeship and Training Council requirements, consistent with proper supervision, training and continuity of employment and applicable provisions in collective bargaining agreements, a ratio of one journey person regularly employed to one apprentice shall be allowed. No deviation from this ratio shall be permitted without prior written approval from the Maryland Apprenticeship and Training Council.

Laborers may NOT assist mechanics in the performance of the mechanic's work, NOR USE TOOLS peculiar to established trades.

ALL contractors and subcontractors shall employ only competent workers and apprentices and may NOT employ any individual classified as a HELPER or TRAINEE on a prevailing wage project.

The State Apprenticeship and Training Fund (Fund) law provides that contractors and certain subcontractors performing work on certain public work contracts are required to make contributions toward apprenticeship. See §17-601 through 17-606, State Finance and Procurement, Annotated Code of Maryland. Contractors and subcontractors have three options where they can choose to make their contributions: (1) participate in a registered apprenticeship training program; (2) contribute to an organization that has a registered apprenticeship training program; or (3) contribute to the State Apprenticeship and Training Fund.

The Department of Labor, Licensing and Regulation (DLLR) is moving forward with final adoption of regulations. The regulations were published in the December 14, 2012 edition of the Maryland Register.

IMPORTANT: Please note that the obligations under this law will become effective on JULY 1, 2013. This law will require that contractors and certain subcontractors make contributions toward apprenticeship and report those contributions on their certified payroll records that they submit pursuant to the prevailing wage law.

The Department is offering outreach seminars to any interested parties including contractors, trade associations, and any other stakeholders. Please contact the Department at prevailingwage@dllr.state.md.us or (410) 767-2968 for seminar times and locations. In addition, information regarding this law will be provided at pre-construction meetings for projects covered by the Prevailing Wage law.

**For additional information, contact:
Division of Labor and Industry
Maryland Apprenticeship and Training
1100 North Eutaw Street, Room 606
Baltimore, Maryland 21201
(410) 767-2246
E-Mail Address: matp@dllr.state.md.us.**

STATE OF MARYLAND

DEPARTMENT OF LABOR, LICENSING AND REGULATION
DIVISION OF LABOR AND INDUSTRY
PREVAILING WAGE SECTION
1100 N. Eutaw Street, Room 607
Baltimore, MD 21201
(410) 767-2342

The wage rates to be paid laborers and mechanics for the locality described below is announced by order of Commissioner of Labor and Industry.

It is mandatory upon the successful bidder and any subcontractor under him, to pay not less than the specific rates to all workers employed by them in executing contracts in this locality. Reference: Annotated Code of Maryland State Finance and Procurement, Section 17-201 thru 17-226.

These wage rates were taken from the locality survey of 2015 for Calvert County, issued pursuant to the Commissioner's authority under State Finance and Procurement Article Section 17-209, Annotated Code of Maryland or subsequent modification.

**Note: If additional Prevailing Wage Rates are needed for this project beyond those listed below, contact the Prevailing Wage Unit. Phone: (410) 767-2342, email: prevailingwage@dllr.state.md.us.

Name and Title of Requesting Officer: Roxann King - Procurement Officer
Department, Agency or Bureau: Information Technology
301 W. Preston Street, Room 1304 Baltimore, MD 21201

Project Number
CATS+ F50B7400021

Location and Description of work:
Calvert County: Tower site construction and turnkey installation services.

Determination Number
32010

Date of Issue: Nov 17, 2016

BUILDING CONSTRUCTION

CLASSIFICATION	MODIFICATION REASON	BASIC HOURLY RATE	BORROWED FROM	FRINGE BENEFIT PAYMENT
BRICKLAYER	AD	\$27.21		\$8.30
BRICKLAYER/SAWMAN	AD	\$35.51	037	\$0.00
CARPENTER	AD	\$27.56		\$9.14
CARPENTER - SHORING SCAFFOLD BUILDER	AD	\$27.56		\$9.14
CARPET LAYER	AD	\$27.83		\$10.27
CEMENT MASON	AD	\$27.15		\$9.77
COMMUNICATION INSTALLER TECHNICIAN	AD	\$24.63		\$11.20 a + b
DRYWALL - SPACKLING, TAPING, & FINISHING	AD	\$23.99	017	\$6.66
ELECTRICIAN	AD	\$42.40		\$15.08
ELEVATOR MECHANIC	AD	\$41.09		\$31.97
FIREPROOFER - BY HAND	AD	\$19.99	017	\$0.00

FIREPROOFER - SPRAYER	AD	\$39.75		\$11.20
GLAZIER	AD	\$23.09	037	\$7.26
INSULATION WORKER	AD	\$33.13		\$14.04
IRONWORKER - FENCE ERECTOR	AD	\$28.83	017	\$14.80
IRONWORKER - ORNAMENTAL	AD	\$26.88	037	\$17.24
IRONWORKER - REINFORCING	AD	\$27.50		\$18.88
IRONWORKER - STRUCTURAL	AD	\$30.65		\$18.13
MILLWRIGHT	AD	\$31.99		\$9.28
PAINTER	AD	\$24.89		\$9.15
PILEDRIIVER	AD	\$26.79		\$8.88
PLASTERER	AD	\$27.00	017	\$5.95
PLUMBER	AD	\$38.92		\$16.66 a
POWER EQUIPMENT OPERATOR - BACKHOE	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - BULLDOZER	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - CONCRETE PUMP	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - CRANE	AD	\$36.49		\$12.97 a + b
POWER EQUIPMENT OPERATOR - CRANE - TOWER	AD	\$36.49		\$12.97 a + b
POWER EQUIPMENT OPERATOR - DRILL - RIG	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - EXCAVATOR	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - FORKLIFT	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - GRADALL	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - GRADER	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - GUARD RAIL POST DRIVER	AD	\$25.75	037	\$11.80
POWER EQUIPMENT OPERATOR - LOADER	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - MECHANIC	AD	\$27.88		\$12.97
POWER EQUIPMENT OPERATOR - PAVER	AD	\$28.68	037	\$16.68
POWER EQUIPMENT OPERATOR - ROLLER - ASPHALT	AD	\$25.00		\$0.00
POWER EQUIPMENT OPERATOR - ROLLER - EARTH	AD	\$22.30		\$12.97
POWER EQUIPMENT OPERATOR - SKID STEER (BOBCAT)	AD	\$25.93		\$12.97
POWER EQUIPMENT OPERATOR-VACCUM TRUCK	AD	\$25.93		\$12.97
RESILIENT FLOOR	AD	\$27.83		\$10.27
ROOFER/WATERPROOFER	AD	\$28.20	017	\$9.54
SHEETMETAL WORKER	AD	\$39.79		\$16.91
SPRINKLERFITTER	AD	\$31.87	037	\$18.37
STEAMFITTER/PIPEFITTER	AD	\$38.89		\$20.22
TILE & TERRAZZO FINISHER	AD	\$21.96	037	\$9.61
TILE & TERRAZZO MECHANIC	AD	\$27.50	037	\$10.78
TRUCK DRIVER - DUMP	AD	\$21.65	017	\$3.58
TRUCK DRIVER - DUMP - ARTICULATING	AD	\$25.00	017	\$8.65
TRUCK DRIVER - LOWBOY	AD	\$20.00	017	\$3.16
TRUCK DRIVER - TRACTOR TRAILER	AD	\$22.00		\$0.96
LABORER GROUP II				
LABORER - ASPHALT RAKER	AD	\$22.63	037	\$7.66
LABORER - COMMON	AD	\$22.63	037	\$7.66
LABORER - CONCRETE PUDDLER	AD	\$22.63	037	\$7.66
LABORER - CONCRETE TENDER	AD	\$22.63	037	\$7.66

LABORER - CONCRETE VIBRATOR	AD	\$22.63	037	\$7.66
LABORER - DENSITY GAUGE	AD	\$22.63	037	\$7.66
LABORER - FIREPROOFER - MIXER	AD	\$22.63	037	\$7.66
LABORER - FLAGGER	AD	\$22.63	037	\$7.66
LABORER - GRADE CHECKER	AD	\$22.63	037	\$7.66
LABORER - HAND ROLLER	AD	\$22.63	037	\$7.66
LABORER - JACKHAMMER	AD	\$22.63	037	\$7.66
LABORER - LANDSCAPING	AD	\$22.63	037	\$7.66
LABORER - LAYOUT	AD	\$22.63	037	\$7.66
LABORER - LUTEMAN	AD	\$22.63	037	\$7.66
LABORER - MORTAR MIXER	AD	\$22.63	037	\$7.66
LABORER - PLASTERER - HANDLER	AD	\$22.63	037	\$7.66
LABORER - TAMPER	AD	\$22.63	037	\$7.66

LABORERS GROUP I

LABORER - AIR TOOL OPERATOR	AD	\$22.63	037	\$7.66
LABORER - ASPHALT PAVER	AD	\$22.63	037	\$7.66
LABORER - BLASTER - DYNAMITE	AD	\$22.63	037	\$7.66
LABORER - BURNER	AD	\$22.63	037	\$7.66
LABORER - CONCRETE SURFACER	AD	\$22.63	037	\$7.66
LABORER - HAZARDOUS MATERIAL HANDLER	AD	\$22.63	037	\$7.66
LABORER - MASON TENDER	AD	\$22.63	037	\$7.66
LABORER - PIPELAYER	AD	\$22.63	037	\$7.66
LABORER - SCAFFOLD BUILDER	AD	\$22.63	037	\$7.66

FRINGE REFERENCES AS NOTED:

- a. PAID HOLIDAYS: New Year Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.
- b. PAID VACATIONS: Employees with 1 year service - 1 week paid vacation;
2 years service - 2 weeks paid vacation;
10 years service - 3 weeks paid vacation.

Incidental Craft Data: Caulker, Man Lift Operator, Rigger, Scaffold Builder, and Welder receive the wage and fringe rates prescribed for the craft performing the operation to which welding, scaffold building, rigging, operating a Man Lift, or caulking is incidental.

These **Informational Prevailing Wage Rates** may not be substituted for the requirements of pre-advertisement or onsite job posting for a public work contract that exceeds \$500,000 in value and either of the following criteria are met: (1) the contracting body is a unit of State government or an instrumentality of the State and there is any State funding for the project; or (2) the contracting body is a political subdivision, agency, person or entity (such as a county) and the State funds 50% or more of the project.

Modification Codes:

- (AD) 17-209 Annual Determination from Survey Wage Data Received
- (CH) 17-211 Commissioners' Hearing
- (CR) 17-208 Commissioners' Review
- (SR) 17-208 Survey Review by Staff

Each "Borrowed From" county is identified with the FIPS 3-digit county code unique for the specific jurisdiction in Maryland.

For additional information on the FIPS (Federal Information Processing Standard) code, see <http://www.census.gov/datamap/fipslist/AllSt.txt>

The Prevailing Wage rates appearing on this form were originally derived from Maryland's annual Wage Survey. The Commissioner of Labor & Industry encourages all contractors and interested groups to participate in the voluntary Wage Survey, detailing wage rates paid to workers on various types of construction throughout Maryland.

A mail list of both street and email addresses is maintained by the Prevailing Wage Unit to enable up-to-date prevailing wage information, including Wage Survey notices to be sent to contractors and other interested parties. If you would like to be included in the mailing list, please forward (1) your Name, (2) the name of your company (if applicable), (3) your complete postal mailing address, (4) your email address and (5) your telephone number to PWMAILINGLIST@dllr.state.md.us. Requests for inclusion can also be mailed to: Prevailing Wage, 1100 N. Eutaw Street - Room 607, Baltimore MD 21201-2201.



**ATTACHMENT 23
TECHNICAL SPECIFICATIONS
TORFP WORK# F50B7400021**

1. Summary

This task order is for the purchase and turnkey installation of one (1) 430-foot self-supporting tower, one (1) 12x38 ft. concrete equipment shelter foundation, along with one (1) 12x38 ft. two room equipment shelter containing a 75kW backup generator and one (1) 1000 gallon propane tank with associated foundation for the State Highway Administration (SHA) at the following location:

NORTH CALVERT CLIFFS SHA

East side of Md. Rt.2/4, 2000 ft. N. of Sawmill Rd.

Lusby, MD. 20657

Grid Coordinates: Latitude: N38-26-20.35, Longitude: W76-28-03.66

The TO Contractor shall comply with all applicable sections of the MD State Highway Administration Standards of Construction Specifications for Construction and Materials, July 2008 (Grey Book).

TO Contractors will only use approved tower and shelter designs. The following manufacturers have preapproved designs:

Nello Towers www.nelloinc.com

Tower Innovations www.towerinnovations.net

Sabre Towers www.sabreindustriesinc.com

Valmont www.valmont.com

Cellxion www.cellxion.com

Fibrebond www.fibrebond.com

Thermobond www.thermobond.com

2. TORFP Specifications

The TO Contractor shall provide all coordination, functions, labor, materials, insurance and purchase items required to install a fully functional microwave and wireless communications site in accordance with the following specifications:

A. Site Preparation Work

1. TO Contractor shall perform locating of any buried electrical and/or telephone cables on all of the property affected by the tower site construction and installation of electrical and communications conduits.
2. The TO Contractor shall follow the approved sequence of constructions as shown in the attached construction drawings. Any deviations must be approved by the County, MDE and/or the DOIT project manager, as required.
3. TO Contractors may use subcontractors who have experience in civil / site work, Erosion and Sediment Control (E&S) implementation and Storm Water Management (SWM) and Storm Drain (SD) construction, etc in the context of SHA projects and, if required, meeting MDE requirements. TO Contractors without green and yellow cards must use approved subcontractors to install and maintain soil and erosion controls who do have these certificates.
4. TO Contractor shall, if applicable, coordinate and meet with County or MDE environmental inspectors to obtain and ensure compliance with permits and regulations for maintaining sediment and erosion control. This will be done at least 7 days prior to any construction.
5. The TO Contractor will maintain an A or B rating for the E&S controls for the duration of the project. Grades of C, D or F may result in liquidated damages.
6. The TO Contractor will clear, grade, survey and mark the Limits of Disturbance (LOD) in accordance with the attached construction drawings.
7. The TO Contractor shall, if required, furnish and install sediment and erosion control systems and **any necessary** storm water management features in accordance with the attached drawings. Sediment and erosion control systems may include but are not limited to: silt fencing, silt stakes, hay bales, etc. Disposition of any spoils shall be conducted in accordance with the most current version of Maryland Department of the Environment (MDE) policy. Details are provided in Attachment #33 - Construction Drawings. Deviations from the drawings require County or MDE approval as appropriate. **A watertight container shall be placed on site to contain up to and including the following: Approved Construction drawings, daily completed SWM/ES inspection logs, all applicable permits for construction, and copies of all materials related to the construction of the site (e.g., concrete delivery tickets, stone delivery tickets, MDI). The container must be placed in a conspicuous location on the site.** The site will be subject to random and scheduled inspections. Sites left dormant shall be stabilized prior to departure in accordance with County or MDE standards as appropriate. Sites are subject to inspection even during dormant periods. Maintenance of all E&S measures shall be required until approval is granted to remove each feature. One individual, designated by the TO

- Contractor, will be responsible for the supervision of all E&S controls and issues. This individual shall have a current green and yellow card.
8. The TO Contractor shall furnish and install a stabilized construction entrance in accordance with the construction drawings. Near completion of the site improvements the stabilized construction entrance will be restored to match the grade of the existing access road in accordance with the approved construction drawings.
 9. All concrete supplied shall originate from a State certified / SHA approved plant. Supplied concrete shall meet SHA and tower design specifications and comply with Section 902 of the Grey Book. TO Contractors shall use an SHA-approved concrete mix that complies with the tower and shelter foundation designers' specifications.
 10. The TO Contractor shall construct the tower foundation per tower manufacturer's specifications.
 11. The TO Contractor shall construct one (1) 12x38ft. equipment shelter foundation. The foundation design shall be approved by the shelter manufacturer. At a minimum the footers shall extend at least 6 inches below the local frost line. The construction of the concrete foundation shall contain an integrated continuous stoop for the doors.
 12. The TO Contractor shall construct one (1) 4x20ft. Concrete foundation for one (1) 1,000 gallon LP fuel tank. The foundation shall be constructed on compacted dirt and no less than 3 inches of 57 stone. The foundation shall be at least six inches above final grade and be reinforced with rebar or 6x6 metal mesh.
 13. The TO Contractor shall install tower and shelter ground rings per the latest version of Motorola R56 installation standards. This shall include at least two test wells. Test wells shall not interfere with vehicular traffic. Locations will be verified by the State Project Manager.
 14. Upon completion of tower, shelter and site improvements, the TO Contractor shall furnish and install surface materials in accordance with Attachment # 33 Construction Drawings. TO Contractor shall restore all areas of grass or existing pavement which have been disturbed during construction.
 15. The TO Contractor shall install an eight (8) ft. high-galvanized chain link fence with two (2) feet of barbed wire on top, with a twenty (20) ft. wide, double leaf vehicle gate; and two (2) five (5) foot man gates around the site (includes tower, equipment shelter as shown on Attachment #33 Construction Drawings. The fence materials shall be bonded/ grounded in accordance with the latest version of R56. The TO Contractor shall utilize sufficiently sized insulated copper wire to bond the fence fabric and barbed wire. The insulation shall be UV rated and black or grey in color. If the copper is not tinned, anti-oxidation compound shall be furnished for any mechanical connections. The TO Contractor shall provide chains and combination

style commercial grade padlocks for the security and man gates. The State Project Manager shall be given the combination and shall control access to the site.

B. Tower Specifications

1. The tower shall be a solid steel leg constructed, self-supporting, 430-ft tower (total height is 448ft. with all appurtenances). The tower shall be constructed of high-strength steel. All components and hardware are to be hot-dip galvanized with a zinc coating (per EIA standards) after fabrication. A zinc coating shall be permanently fused to the steel, so all surfaces are protected and no painting is required for rust protection. Upon delivery, the tower shall be subject to approval by the State Project Manager.
2. Exact placement of the tower and shelter shall be coordinated by the TO Contractor with the State Project Manager.
3. The tower shall be required to meet or exceed the latest **EIA 222-G** standards for this type of tower. It will be **designed to carry the number and type of antennas as per attached 430-ft State Tower loading plan (see TORFP Attachment # 25- Typical 430-ft State Tower Loading Plan)**. The tower and associated installation shall conform to all local, County, State and Federal Equipment Shelter codes. The State of Maryland shall be responsible for obtaining Federal Aviation Administration (FAA) approval and permits. The tower shall be designed with the following 222-G design criteria:

Three second wind gust:	120 MPH
Three second wind gust concurrent with radial ice:	40 MPH
Concurrent radial ice:	1/2IN
Structure classification:	III
Exposure category:	C
Topographic category:	1
Crest Height:	N/A

4. The bottom 20 feet (minimum) of the tower shall have K-bracing construction to allow for ingress and egress under the tower. The top 60 ft. (minimum) of the tower shall contain no slope.
5. Spacing between tower legs shall not exceed 40 ft. Although drilled caissons are recommended for this particular site due to space limitations, if a pad and pier foundation is used, limit the size of the pad to no more than 55x55ft.

6. Proper and thorough grounding and bonding methods in accordance with currently published Motorola R56 standards shall be employed to provide maximum lightning protection.
7. The TO Contractor shall use soil borings supplied by the State for analysis to assure that the engineered tower foundation and the calculated ground loadings are acceptable. The TO Contractor shall furnish two (2) copies of the foundation designs and the ground loading calculations certified by a Maryland registered Professional Engineer (P.E.) to the State Project Manager. The TO Contractor shall furnish a statement that the engineered tower foundations and the calculated ground loadings meet the manufacturer's recommended requirements.
8. Step bolts on one leg, safety climb and grounding bars shall be furnished and installed by the TO Contractor as part of the tower. Safety climb stand offs shall be of sufficient length to ensure the safety climb does not rub on the flanges. Step bolt mounts shall be permanently attached to the side of the climbing leg instead of the face/apex of the climbing leg. Tower ground bus bars shall be grounded to the tower ground ring and bonded directly to the tower structure through the use of stainless steel hardware. Tower ground bus bars shall be a minimum of ¼"x4"x24", (minimum 33 hole pairs) copper bars. One tower bus bar shall be provided for each shelter installed.
9. The tower shall be designed to accommodate two (2) "State" cable ladders (supplied by the TO Contractor) and one (1) "Cellular" cable ladder (supplied by others). The "State" cable ladders shall be designed in accordance with the Tower Layout (Attachment #28). The "State" cable ladders shall be a "rail" configuration with cable ladder side rails and rungs to accommodate at least fifteen (15) ¾ inch snap-ins and be at least three (3) FT wide. If the cable ladders are required to meet, a single ladder shall extend to the top of the tower. The single cable ladder shall accommodate at least fifteen (15) ¾ inch snap-ins and be at least three (3) FT wide. The State Project Manager shall determine where the two cable ladders meet and transition to the single cable ladder. The cable ladders shall be mounted on the same face and the outside edge of the tower. The ladders shall each originate on opposite outer edges of the face of the tower. They shall originate approximately one foot from the leg of the tower and shall remain one foot from the edge of the tower. One foot edge spacing shall be maintained to the point where both cable ladders meet. From that point, a single cable ladder shall extend, centered on the face, to the top of the tower. Cable ladders shall not be positioned back to back. The "Cellular" cable ladder shall be designed in accordance with the Tower layout (Attachment #28). The cellular cable ladder shall be a "rail" configuration with cable ladder side rails and rungs to accommodate at least fifteen (15) ¾ in. snap-ins and be at least three (3) ft. wide and shall extend the full height of the tower. The feed lines shall be arranged in accordance with the Tower Loading Plan (Attachment #25). Feed Lines heights shall terminate at its corresponding antenna on the Tower Loading Plan (Attachment #25). The tower shall be designed in compliance with the State loading plan, the above configuration and all other applicable sections of this Task Order.

10. All leg and leg flange material shall be ASTM A-572 grade 50 ($F_y \geq 50$ ksi). All other material shall be ASTM A36 ($F_y \geq 36$ ksi).
11. Anchor bolts shall comply with ASTM A449 and be any number or size determined by the tower designer to comply with the requested load requirements.
12. Tower foundation concrete strength shall be at least 4000 PSI or the tower foundation designer's recommendation; whichever is greater. Concrete testing shall be conducted in accordance with DoIT's concrete inspection policy memorandum (see TORFP Attachment #24). Test cylinders shall be crushed and results provided to the State Project Manager prior to stacking the tower. Tower erection shall NOT commence until verification is provided that the concrete has reached the minimum compressive strength. Compressive strength can be tested prior to 28 days to expedite the tower erection, but this does not exclude the TO Contractor's responsibility to supply 28 day crush reports.
13. Non-chloride, non-corrosive concrete set accelerate may be utilized in compliance with ASTM-C-494 type C and ACI-318.
14. Water reducing admixture may be utilized in compliance with ASTM-C-494.
15. All admixtures shall be dispensed into fresh concrete and sufficiently mixed. All admixtures must be added separately.
16. There shall be a minimum concrete cover of 3" on all steel.
17. Crown top of piers for drainage and chamfer all exposed concrete edges 1".
18. Compact backfill in 9" lifts. Remove all forms prior to backfill.
19. The TO Contractor shall purchase and install tower lighting equipment on the 430 ft. tower (Total finished height of the tower including all appurtenances will be 448 ft.) as per FAA Advisory Circular AC70/7460-1-L or latest revision according to the following specifications:
 - i. The TO Contractor **shall use tower lighting manufacturer trained and certified personnel** to install tower lighting equipment on the 430 ft. tower.
 - ii. The side markers shall be installed using stainless steel hose clamps, not plastic cable ties.
 - iii. The tower lighting system shall be an all LED system by Flash Technology Systems (<http://www.flashtechnology.com/>) (Part # FTS370d LED SMART IR with NVG compatibility using infrared "IR" LEDs) or approved equivalent and manufactured to specifications for FAA type L-864/ L-865 and FAA-AC 150/5345-43E.

- iv. The TO Contractor shall install a dual, medium intensity, Type E-2 LED system that provides white flashing LEDs for day operation and red flashing LEDs (with IR LEDs) for night operation as per FAA requirements. The L-810 side markers shall also utilize NVG-compatible LED technology. A 15 foot beacon extension assembly, with safety climb, shall be installed with flash head and lightning rod mounts and step bolts spaced alternately at approximately 15 inch intervals from the tower flange to the beacon. The beacon extension shall be centrally mounted and not anchored to just one tower leg. It shall be anchored to all three tower legs to distribute weight evenly. The beacon extension can be solid like the other legs on the tower or hollow, but no less than 4.5 IN outside diameter and ¼ IN wall thickness. The design must be approved by the State Project Manager prior to shipment.
- v. The lighting rod shall extend at least four (4) Ft. above the top of the beacon. No part of the lightning rod or mount that obstructs the beacon shall be larger than 7/8" in diameter.
- vi. The tower lighting system shall be supplied with remote and onsite diagnostics capabilities including software and direct connect cable.
- vii. TO Contractor shall supply temporary power to the lighting controller until permanent power is supplied. This shall include all materials and labor to install temporary power and may include the use of a portable generator or a utility approved metering device, means of disconnect and receptacles. Delays in permanent power will be evaluated on a case by case basis and solutions will be directed by the State Project Manager.
- viii. The supplied tower lighting system shall include 5-year parts warranty.
- ix. The lighting controller shall be bonded to the internal halo inside the generator room.

C. Equipment Shelter Specifications

12x38 ft Shelter with 75 Kw Generator:

1. Shelter installations must be in conformance with manufacturer's requirements for application of warranties provided by the manufacturer as well as be compliant with the current version Motorola R56 grounding requirements.
2. The equipment shelter supplied shall be a one-piece concrete communications equipment shelter and include a 75 Kw vapor propane fueled generator, 400-amp integrated load center, such as a Transtector ISP Series, incorporating the main service disconnect, manual transfer switch, surge protection and load center, and 200-amp sub feed with installation. The supplied equipment shelter shall be nominally sized 12x38x10 ft. (height is inside dimension) and configured with two rooms as depicted in TORFP Attachment # 26 – Typical Equipment Shelter With Generator.
3. The double room shelter shall be provided with a NEMA 4, 250 Volt D.C., 600 Volt A.C. 200 amp, weatherproof emergency generator receptacle such as Appleton AJA20044-200, mounted on the front of the shelter to allow connection of a 50kW

- portable Emergency Generator in case of failure of the internal generator during a power outage. The generator receptacle shall be located in such a place that it will not interfere with the operation of the equipment room door. The receptacle's operation will be controlled by operating the manual transfer switch inside the equipment shelter.
4. The TO Contractor shall furnish a compatible Appleton plug such as AP20044CD with 50 Ft of conductors terminated in a pig tail. The plug shall be designed to interface a portable generator with the Appleton receptacle mounted on the building. The plug shall be weatherproof and the conductors will be adequately insulated and weatherproofed. They shall be sized to safely connect a 50 kW emergency generator and mitigate any voltage drop. The cable assembly shall be provided with each shelter and installed inside the generator compartment on an adequately sized hose bib in accordance with the attached shelter layout. If made of a conductive material the cable holder shall be bonded per the latest version of R56.
 5. Two 16-port cable entry points complete with weatherproof caps shall be provided for antenna cable entry. One entry point shall be located on the long side of the Equipment Shelter and the second entry point shall be located on the end wall of the Equipment Shelter between the air conditioner units. These locations are shown in the supplied TORFP Attachment #26. Each port within both assemblies shall be four (4) inches in diameter, and shall be located with the top of the assembly located directly under the cable rack, in four (4) rows of four (4) ports each. In addition to the cable entry points, one single four inch PVC conduit sleeve for communications conduits and one single two inch PVC conduit sleeve for installation of S. O. cables to the tower lighting system, both with temporary end caps shall be installed. The actual location of these penetrations and sleeves must be confirmed with the State Project Manager prior to the fabrication of the shelter.
 6. Cable ladders (24 inches wide) shall be mounted from the ceiling using all-thread and "cherry" insulators eight feet above the finished floor as measured from the floor to the bottom of the cable ladder, as shown in Attachment # 26 – Typical Equipment Shelter with Generator.
 7. Two 5-ton 230/208V-Single-phase, dual (redundant) wall-mounted, vertical, self-contained HVAC units with 5-kw heat strips shall be installed at the locations specified on the equipment shelter drawing. Separate circuit breakers for each unit shall be installed in the main load circuit panel. The provided HVAC units shall have sufficient capacity for the Equipment Shelter size supplied, fully loaded with equipment. Each unit shall contain a time delay startup relay, low ambient control, and a forced air resistive heat strip. The HVAC controller shall include a humidity control feature. The outside portions of the units shall be weather/rodent and tamper proof.
 8. The shelter shall be equipped with 16" ventilation fans with gravity operated back draft louvers and 16" gravity intake damper with filter and hood (bug and rodent

- intrusion resistant). Each fan shall be connected to a thermostatic device to allow automatic fan on-off control. The openings shall be provided with shutters and weather hoods. All required exhaust piping and intake and exhaust plenums required for the manufacturer's recommended air flow shall be included as part of the installed equipment. All openings in the shelter structure for the provision of entry or exit of cables, equipment, ventilation, etc. must be sealed to prevent the invasion of the shelter interior by insects, rodents and external moisture.
9. Electric baseboard heater strips shall supply heating for the generator room. A thermostat mounted on the wall opposite the heater shall control the heater strips. The heater strips shall be sufficient for the size of the generator room to maintain a room temperature of 72 degrees F.
 10. Insulation shall be non-combustible, with a vapor barrier. Wall and floor thickness shall provide an R-11 (minimum) rating, and the roof shall have an R-19 (minimum) rating.
 11. Concrete Construction – The wall outer finish shall be natural stone aggregate finish with an aesthetically pleasing earth tone.
 12. Each foundation shall be comprised of concrete piers or concrete pad with steel reinforcement. The top of the finished foundation shall be 6 inches above finished grade. The foundations shall level each shelter such that all foundation to shelter contact points shall have equal loads. The equipment shelter is to rest flush on the poured concrete foundation without showing any gaps between shelter and pad and to be level to within ½ degree. The shelter shall have an integrated continuous stoop for the doors, and steps if necessary, to provide safe entry into the shelter. Installations requiring stoops more than 24 inches above grade shall have safety rails installed.
 13. The minimum floor loading design shall be 300lbs. per square foot.
The minimum roof loading design shall be 100lbs. per square foot.
The minimum wall loading design shall be 34 lbs. per square foot.
The minimum wind loading design shall be 50 lbs. per square foot.
 14. Two reinforced steel finished doors shall be located on the shelter, per the attached drawings. The doors shall be finished to match the appearance of the shelter. The doors shall be pre-hung, gasket sealed, insulated, approximately 3 foot by 7 foot, and in a metal frame. Doors shall be supplied with door-closer, magnetic weather stripping, drip strip over door, doorstop, door sweep and a 42-inch door canopy. Door checks and door stops shall be provided along with a three (3) point locking system for maximum security. The doors shall have non-removable ball bearing hinges and deadbolt locks with tamper plates installed. These deadbolt locks shall be security type with removable cylinders, such as “Best” locks. Each generator and equipment room door shall be bonded to its frame with welding cable of an appropriate gauge in accordance with the latest version of R56. Braided cable shall not be used.

15. The equipment shelter floor shall be covered with 1/8", 12" x 12" vinyl tile, light in color (beige, tan or white). The walls shall be trimmed with a 4-inches high and 1/8 inch thick rubber base trim against the floor.
16. The walls shall be covered with a minimum of white wood-grained paneling or white vinyl over 1/2 inch plywood. The equipment shelter shall have a 3/4" X 4ft X 8ft plywood telephone mounting board installed as per attached shelter layout drawing TORFP Attachment # 26 – Typical Equipment Shelter with Generator.
17. Electrical installation and wiring shall conform to the latest version of the National Electrical Code. Surface mounted, grounded, duplex outlets shall be provided at five (5) foot intervals (where possible) around the interior walls. All wiring shall be installed in surface mount EMT conduit. Outlets shall be installed 18 inches above finished floor. Horizontal runs of conduit shall be installed a minimum of 7 1/2 feet above the floor whenever possible with vertical connections to the surface mounted devices to minimize interference with installing equipment against the wall. Two weatherproof outlets shall be installed on the exterior of the shelter. These outlets shall be located at both ends of the shelter. In addition, circuits supplying power to equipment racks # 3-16 in the shelter shall extend downward six (6) feet from boxes mounted at 22" intervals on the ceiling as shown in the supplied TORFP Attachment #26 - Typical Equipment Shelter with Generator.
18. Wiring for these drops shall be housed in "Sealtite" flexible conduit and each drop shall be terminated in a quad receptacle box. Each quad box shall contain two circuits and each circuit shall have its own dedicated 15 or 20-amp circuit breaker. These drops shall be planned to fall immediately adjacent to the edge of the cable tray. The exact location for each drop must be confirmed with the State Project Manager before the shelter is fabricated. The circuit breakers for the 240 VAC quad boxes supplying power to equipment racks # 1-3 shall be located in the main load center. Racks #1-3 shall be supplied with one junction box each containing one 240 Volt 20 amp circuit. The junction box shall be fastened to the wall in accordance with the shelter drawings and supplied photos. All circuits shall have a dedicated neutral installed in accordance with the latest Motorola R56 standard. The junction boxes shall be mounted in line vertically.
19. **All low voltage wiring (e.g., alarm, control) shall be routed in separate conduits in accordance with the national electrical code.**
20. Power to the shelter shall be fed through a properly sized 240-Volt, fused single-phase disconnect switch mounted on the exterior wall of the shelter. (See Attachment #26 - Typical Equipment Shelter With Generator.).
21. Shelter shall be provided with 400-amp, 20-position (minimum) main load center, equipped with a minimum of twenty (20) 20-amp breakers. Breakers shall be "high magnetic" or high inrush current type (Square D, HM or equivalent). This box shall

- be installed at one end of the equipment area within five (5) feet of the primary cable entry port. In addition to the 400-ampere main load center, a minimum 20-position quad box load center shall be installed, fed from the main load center; the quad box load center shall be located on the generator room wall and shall supply power to quad boxes above rack positions 3-16. Load centers, circuit breakers and quad boxes shall be properly marked.
22. An interior system ground (halo) with a single #2 AWG stranded wire shall be provided with proper connections to the shelter and, in turn, to the tower ground system. The halo shall have a 6-inch break roughly opposite the Master Ground Bar. The #2 AWG ground wire for each row of racks shall be suspended on independent ground lead stand offs as outlined in the typical shelter drawing. They shall be positioned to ensure the #2 AWG lead is isolated from the main cable racks. No electrical conduit is allowed to bridge the 6" gap in the halo ground. The internal ground system shall be mounted on the wall using 2-inch (2") standoff insulators, connected to two (2) minimum 1/4" x 5" x 24", (33 hole pairs) minimum copper master ground bus bars that are installed directly under each cable entry port. The ground bus system shall be a Harger EPK16MOT bus bar system or an approved substitute. The copper ground bars on the back interior wall of the shelter shall be connected to the corresponding exterior ground bar with stainless steel insulated feed through. The external ground bar shall be connected through a minimum of three (3) 2-inch copper straps to the external building ground ring and tower grounding system. All exterior connections shall be exothermically welded to ensure proper connection. Electrical ground shall be bonded to the RF ground.
23. TO Contractor shall purchase and install the following lightning protection devices in the equipment shelter:
- i. An IEEE Type 1 SAD/MOV protection device shall be part of the integrated load center and approved for use in the latest version of R56.
 - ii. An IEEE Type 2 MOV protection device shall be installed at the main power input inside the shelter, by means of a 60-Ampere (per "leg") breaker or fused disconnect, across the utility lugs of the transfer switch. The device shall be installed inside of the equipment shelter and approved for use in the latest version of R56 such as Transtector IMAX series. Its installation shall comply with the latest version of R56 and maintain the device's UL1449 (latest edition) listing.
 - iii. An IEEE Type 3 SAD protection device shall be installed across the 120V/20A circuit for the lighting controller. This device must be installed in such a manner that its replacement shall not cause an outage to the tower lighting system. The device shall be installed in the generator room near the lighting controller and approved for use in the latest version of R56.
 - iv. All surge suppression devices shall have the ability to create a dry contact alarm (contact closure upon alarm). This alarm shall be integrated with the shelter

alarm wiring. The dry contact alarms shall be enabled from the factory.

24. The Air conditioning units shall be connected to the internal (halo) grounding system **only**, not to the external equipment shelter grounding system.
25. 48-inch, two or four-tube, energy efficient fluorescent fixtures shall provide sufficient lighting (minimum 50 foot candles) for the shelter in accordance with Attachment #26. The lights shall be controlled by a wall switch / timer internal to the shelter, and located next to the entry door. An exterior entry light shall be installed outside the main doorway of the structure. This light shall be controlled by a motion sensor wired through a wall switch inside the shelter.
26. The shelter shall be pre-wired, with the following functions, to a common point in the radio compartment and terminated with a split 66 Block. The 66 Block shall be mounted in the upper right-hand side of the punch block board. All alarms shall be punched down on the left-hand side of the punch block using solid wire. The 66 block will not be enclosed in any box or enclosure. All functions/alarms shall be programmed to be normally open. Upon an alarm they will close. The alarms shall be programmed as follows:
 - a. High Temperature Alarm – Adjustable for over-temperature alert (may be integrated with HVAC system).
 - b. Low Temperature Alarm – Adjustable for under-temperature alert (may be integrated with HVAC system).
 - c. HVAC Failure Alarm- derived from the HVAC controller
 - d. Generator Running Alarm – Closure when generator is running.
 - e. Remote Generator Start – No transfer to load (a dry contact closure will remote start the generator but will not transfer to the load if commercial power is good)
 - f. Generator transfer to Load (a dry contact closure will initiate a transfer to load. If the generator is off, it will start the generator)
 - g. Low Oil Pressure Alarm
 - h. Low Coolant Alarm
 - i. Generator Overcrank Alarm
 - j. High Coolant Temperature alarm
 - k. Transfer Panel Switched- indicates that the transfer panel has switched to backup power
 - l. Equipment Room Door Alarm
 - m. Generator Room Door Alarm
 - n. Equipment Room Smoke Alarm
 - o. Equipment Room Heat Detector Alarm
 - p. Generator Room Smoke Alarm
 - q. Generator Room Heat Detector Alarm
 - r. Type I Surge Suppressor Alarm
 - s. Type II Surge Suppressor Alarm
 - t. Type III Lighting Controller Surge Suppressor Alarm
 - u. Strobe White Alarm (per strobe controller)

- v. Strobe Red Alarm (per strobe controller)
 - w. Marker Alarm (per strobe controller)
 - x. Spare
 - y. Spare
27. On this double room shelter, there shall be a partition wall separating the emergency generator from the room containing the RF equipment. This partition wall shall have a one (1) hour fire rating (from the inside out and outside in). The floor under this section shall be reinforced to handle additional loading. Two gravity intake louvers and one exhaust fan with gravity louvers shall be installed. All louvers and openings shall be wire covered for security and prevention of entry by rodents. A separate outside door shall be installed on this room and shall be identical to the equipment room door. (See Attachment #26 - Typical Equipment Shelter With Generator.)
28. The lighting for this room shall be controlled by a separate wall switch / timer internal to the room and located next to the entry door.
29. The TO Contractor shall supply with each equipment shelter a 75 Kilowatt, liquid propane vapor fueled, 1800-RPM generator, 60 Hz, 120/240 volt, single phase with a 400-amp Automatic Transfer Switch (ATS).
30. Installation shall include all materials, parts, labor, etc. to provide a fully functional generator back-up system. Included in the installed price is the transfer switch and all associated wiring as well as generator alarm programming in accordance with state requirements. Block heaters with necessary wiring shall be included. Fuel tank hookup, fuel tank, fuel tank pad and fuel supply piping to the shelter shall be provided by the site work TO Contractor. Fuel supply piping shall be non-metallic to comply with R56 single point grounding requirements. The fuel tank shall be connected to the tower ground ring.
31. Fuel strainers on the propane fuel systems shall be installed for proper drainage to prevent moisture buildup in the line. Proper sized flex fuel lines shall be installed on all generators and the fuel line so as to not impede the proper flow of fuel and shall not be sharply bent, or crimped. The flex jumper shall be placed to ensure minimal engine vibration is transferred to the fuel solenoid assemblies to prevent rupture. The fuel line from the secondary regulator to the manifold shall not be less than 1” to minimize fuel pressure drop from no load to full load. The metal fuel line inside the room shall be bonded to the internal halo where it enters the room. This can be done with a c-clamp style device at the fuel line. Proper venting of the fuel system shall be installed to ensure no buildup of pressure and safe venting will occur. Fuel lines run in conduit or sleeves shall be sealed from moisture. All exhaust piping that can come in contact with personnel shall have a heat shield installed. Proper battery chargers shall be installed for the appropriate system, either 12 VDC or 24 VDC, 110 VAC. Note: two (2) 12 VDC battery chargers is not acceptable on 24-volt systems.
32. The TO Contractor shall perform on-site startup of the generator under full load,

- using a load bank. The original of the startup form shall be completed and submitted prior to submission of an invoice for work performed. The State Project Manager or his designee shall be notified in advance to attend the event at his discretion. The load bank test shall be at least one hour and conducted under full load. The startup shall also include the programming of all generator related alarms/function.
33. All alarm outputs from the generator shall be extended to the radio compartment via a data cable and terminated in a remote annunciator panel which provides both visual and audible alarm indications for each circuit monitored. The annunciator panel shall also provide either normally open or normally closed dry contacts which can be field selectable as needed to provide the proper inputs to the existing "66 block" for the dissemination of alarm information to the system. The annunciator panel shall be located directly below the existing "66 block" in the radio compartment.
 34. All wiring for the generator shall be routed overhead. It is unacceptable to cross the floor with conduits.
 35. An external minimum of ¼" x 4" x 24", (36 hole pairs) copper ground bar shall be installed on the outside of the shelter directly under the main cable entry port and attached with three (3), solid tinned copper, 2-inch ground straps, to the single ground point directly below the main cable entry port. Refer to Harger EPK16MOT.
 36. The shelter shall be designed and installed per the latest version of Motorola R56 to include eye wash station, first aid kit, chemical and CO2 type fire extinguishers mounted on the partition wall in the radio compartment.
 37. The shelter shall include one broom and dust pan (mounted to the wall), one six foot step ladder, one 30 gallon (plastic) garbage can and one box of 30 gallon garbage can liners.
 38. An external ground ring shall be provided around the shelter foundation. Above grade ground tails shall be provided. The buried external ground ring shall be in direct contact with the earth at a depth of 30 inches below the earth's surface with ground rods driven into the earth at intervals not to exceed twice the ground rod length. In the event 10-foot ground rods cannot be driven shorter rods are acceptable if driven at the proper intervals. The external ground ring shall be placed 3 feet outside the shelter foundation in order to be outside the drip line of the shelter.
 39. All grounds shall be bonded together. This includes the generator, the shelter, the fuel tank, the fencing, and equipment shelter grounding systems, the ice bridge and the tower. The ground test reading shall not normally exceed 5 OHMS. The State shall test all grounds using a fall-of-potential method test to determine compliance. In the event 5 OHMS cannot be reached by reasonable means and through no fault of the TO Contractor, the State will determine the course of action to be taken by the TO Contractor at an additional cost to the State. Grounds shall test fewer than 10 OHMS for the site to be acceptable for reasons of personal safety.

D. Specifications for Installation

1. Purchase and delivery of one (1) fully functional, 430 ft. above ground level, three (3) legged, solid legged, heavy duty, self-supporting, two-way microwave radio tower.
2. Installation of the tower shall include placing a foundation which is certified, signed and stamped by a Maryland registered Professional Engineer (certification must be provided with the response to the bid) that it is designed in accordance with the tower manufacturer's recommendations based upon the soil borings provided by the State (see TORFP Attachment #30 – Radio Tower Geotechnical Report).
3. The TO Contractor will furnish and install two (2), "State" cable ladders on one face of the tower. The supplied cable ladders will be installed in accordance with the state loading plan (Attachment #25), Tower layout (Attachment #28) and all other applicable sections of this task order.
4. The tower shall be erected to a height of 430 ft. (AGL) above ground in such a manner as to assure straightness and plumb.
5. Install tower lighting flash and SO cable on outside of cable ladder rail. The flash and SO cable shall be routed along the cable ladder rail in a manner to prevent damage over sharp edges, inadvertent climbing, etc; and attached per manufactures specifications
6. Purchase and installation of one (1) 12x38x10 ft. concrete equipment shelter (height is inside dimension) with a 75kW vapor propane generator. The equipment shelter shall rest flush on the poured concrete foundation without showing any gaps between Equipment Shelter and pad and leveled to within ½ degree. Typical Equipment Shelter drawings are supplied with this Task Order (Attachment #26) and should be used for pricing purposes.
7. An approved/certified shelter manufacturer representative shall be on site for all shelter deliveries to supervise the setting of the shelter. This individual shall correct any foundation gaps or any deficiencies found due to shipment. This individual shall also supervise the installation of any field installable items (e.g. hoods, light fixtures).
8. Provision and installation of a liquid cooled, 1800 RPM, 75 kW propane vapor fueled generator complete with a 400-Amp automatic transfer switch capable of zero cross-over (in-phase switching) and time-delay neutral switching to eliminate service interruptions of the electronic equipment and the tower lighting system. The transfer switch shall also have a programmable exercise timer. Time delay neutral shall be programmable from at least 0-3 seconds. The exercise timer shall will allow preprogramming of time and date of weekly generator runs. The transfer switch shall allow the weekly generator runs to be conducted with or without load.

9. Purchase and installation of one (1) new 1,000 gallon LP fuel tank with hookup to the generator and shall include first LP fill-up. Underground fuel supply piping shall be “plastic” high-performance polyethylene piping or equivalent. The above ground piping **shall** be UV rated rubber jacketed corrugated metallic piping. The fuel tank shall be connected to the tower ground ring. NOTE: a valid bill of sale must be provided with the tank.
10. Generator start-up and test under full load (using load bank) after permanent power is connected to the equipment shelter must be coordinated with the State Project Manager. The test using the load bank will be one hour. The startup shall include generator alarm/function programming.
11. Purchase and install one (1) extruded metal, 24-inch wide, no cantilever ice-bridge with a four tier “tee” or “tree” trapeze cable management systems to facilitate easy installation and removal of cables, such as Andrew WB-T24-4 or suitable equivalent. Ice bridge posts shall be no less than 3” in diameter, spaced no more than 6’ apart. Posts will be buried 36” encased in concrete. The ice bridge shall be routed in accordance with Attachment #33 and electrically insulated from the tower. The trapeze sections shall be no more than four (4) feet apart. The ice bridge shall be bonded to the external ground bus bar.
12. Purchase and installation, per local utility standard, of an electrical backboard of steel post and unistrut construction to include CT cabinet if required, wire trough, main disconnect, at least one (1) electric company approved meter socket with room to accommodate a minimum of three (3) additional meters.
13. Purchase and installation of two (2) 4-inch conduits, from the power company supplied pad mounted transformer, to the TO Contractor supplied electrical backboard, and from the backboard into the disconnect switch, located on the equipment shelter back wall.
14. Purchase and connection of electrical wiring, per local electrical code, from the TO Contractor installed backboard into the equipment shelter’s 400-amp fused disconnect and from there to the equipment shelter’s 400 amp load center. Electrical work shall be completed by a State of Maryland certified electrician.
15. Purchase and installation of one 12x12x12 communications pull box mounted on the back wall of the shelter. One (1) 4” conduit for future fiber connection to the site shall extend from this pull box to a location beyond the compound limits to a point to be determined by the state project manager. The pull box shall accommodate at least three (3) 4IN, schedule 40 conduits. This box shall be weather proof and constructed of plastic or other non- conductive materials. Locator tape shall be installed in all communications and electric trenches one (1) ft. above new conduits.

16. Supplied materials, including, but not limited to the equipment shelter, tower, LP tank, etc. shall all be new, unused and shall meet the latest design and fabrication standards of the Electronics Industry Association (EIA).
17. All supplied materials shall be purchased, not leased. A bill of sale shall be provided for the purchase of the propane tank upon completion of the site.
18. Supply bollards as needed in accordance with the attached construction drawings.
19. The TO Contractor shall provide placards affixed to every equipment and generator shelter door stating there is Electro Magnetic Energy dangers. These signs shall comply with the latest version of Motorola's R56. The TO Contractor shall provide placards affixed to every vehicle and man gate indicating the site is alarmed and under 24 hour surveillance. The signs shall say: "Private property – No trespassing. This site is monitored by remote surveillance equipment. Equipment and entrances are alarmed and will notify local police of any intrusion." The TO Contractor shall provide placards to the fence along the entrance to the site with the FCC ASR number. The sign will comply with FCC guidelines. The ASR number will be provided by the State Project Manager. All signs shall be metal, fade and weather proof. They shall be permanently affixed to their respective gate or door. ASR signs shall be provided with the delivery of the tower.

3. Inspection schedule/requirements

- a. Sediment and Erosion Controls – A preconstruction meeting will be conducted, if applicable, with the required inspectors at least seven (7) days prior to any disturbance. Controls shall be randomly inspected by the appropriate inspectors having jurisdiction (County or State), but emphasis is placed after rain events. Corrections/repairs must be made within time limits specified by County or State requirements.
- b. Compaction tests – Construction inspectors shall inspect each lift required for site grading, retaining wall footers, road work and fill (to include the tower foundation). Non compliance may require the removal of fill and/or halting work.
- c. Storm Water Management – To Contractor shall provide evidence of the installation of Storm Water Management materials and techniques. This is outlined in Attachment #33 – Construction Drawings and shall be done at the TO contractor's expense.
- d. Cylinder break reports – The tower and shelter foundations shall require PE certified crush reports at a minimum of 28 days. Tower erection or shelter installation may not occur until compressive strength is tested and verified in compliance with manufacturer and task order specification. Concrete used for the wall foundation shall require tests. This will be coordinated through a private party at the TO Contractor's expense.
- e. Electrical inspection – Final wiring shall be inspected prior to energizing the site. An approved third party inspection agency can be utilized if recognized by the local utility. This shall be supplied by the TO Contractor.
- f. Tower Inspection – The tower's structural integrity, galvanizing condition and assembly shall be inspected by a third party inspector furnished by DoIT.

- g. R56 Inspection – the site, tower and shelter will be subject to a R56 inspection. Discrepancies shall be corrected at the TO Contractor’s expense. The inspector will be furnished by DoIT.
- h. Punch-list – A final inspection will be conducted by DoIT personnel to ensure all items in the Task Order are completed to the satisfaction of the State.

4. Commencement of Work

Work in response to this Task Order shall be initiated only upon issuance of a fully executed Notice to Proceed, authorized by the TO Procurement Officer

5. Approvals

Prior to ordering the following drawings/designs shall be approved by the State Project Manager:

- a. -Tower profile (Final drawings will have PE stamp)
- b. -Tower foundation design (Final drawings will have PE stamp)
- c. -Shelter drawings (Final drawings will have PE stamp)
- d. -Foundation design (Final drawings will have PE stamp)
- e. -Shop drawings for LP tank foundation
- f. -Shop drawings for fence

6. Final Acceptance Sign-off

The TO Contractor shall provide all items as outlined in the DoIT’s close out policy (Attachment #31). The following is required to be demonstrated to the State Project Manager upon project completion:

- a. The lighting system has operated without fault for thirty (30) days.
- b. The State receives a satisfactory inspection report from an independent tower vendor, funded by the State to perform a tower inspection, and all deficient items identified in the inspection report have been corrected to the State’s satisfaction. The inspector will mark all deficiencies with blue, permanent paint pens. All corrections will be marked with yellow, permanent paint pens. The correction shall be initialed and dated by the crew. Photos shall be taken showing the correction to include the initials as proof that the correction was made. The State reserves the right to perform additional tower inspections to verify that deficient items have been corrected. Should the State require two (2) or more tower inspections to verify correction of deficient items, all costs of the additional inspections, beyond the second inspection, shall be deducted from the TO Contractor’s final payment.
- c. All other deficiencies noted by the State have been corrected to the State’s satisfaction.
- d. All construction materials, equipment, excess tools and other materials shall be removed from the site. The shelter interior (equipment and generator room) shall be swept and all protective paper removed from the floors. The site shall be neat and organized.
- e. If applicable, final acceptance by MDE that all work has been completed in accordance with the MDE permit.



ATTACHMENT 24 – FOUNDATION INSPECTION SCOPE OF WORK

SUMMARY: Tower construction vendors will incorporate the following series of tests and inspections to ensure proper quality/strength of all concrete poured and the proper foundation installation on all CATS II, FA13 jobs. These inspections will also incorporate verification of foundation dimensions, rebar dimensions, rebar layout and soil compaction. Test results will be supplied, reviewed and approved by DoIT prior to any structures being set on foundations, tower erection or backfilling operations. Field testing will be conducted by an independent, third party.

DETAILS: Each concrete batch (6-9 cubic yards) will have a corresponding batch report provided by the supplier. These will be included in the close out documentation. Batches will be uniquely identified on the batch report. The vendor will use MD SHA approved concrete mixes for all FA13 projects. Mix tables and more information on concrete specifications can be found in section 900.10.03 in the MD SHA grey book.

These mandatory tests/inspections must take place for the tower and shelter foundations:

1. Construction inspectors will verify the excavated foundation dimensions are correct.
2. The compaction of the tower foundation excavated materials will be tested in accordance with AASHTO T99 (Standard Proctor Test). Compaction results will be in accordance with the tower foundation designer's specification or the geotechnical report provided, whichever is greater. Excavated fill will only be used to backfill the foundation if they pass the compaction test.
3. The bearing pressure of the tower foundation sub grade will be tested. Bearing results will be in accordance with the tower foundation designer's specifications or the geotechnical report provided, whichever is greater. In the event, the vendor cannot meet the required bearing pressure they will solicit advice from the tower manufacturer and geotechnical engineer to achieve the desired results.
4. Construction inspectors will verify the proper rebar size, dimension, grade, configuration, layout, fastener/wire ties and other provisions as specified by the foundation designer are correct prior to any concrete pours.
5. Ambient air temperature and general weather conditions will be recorded and noted by the inspector. Readings will be taken at the time of delivery.
6. Concrete slump will be tested for each continuously poured section of caisson or every fifty (50) cubic yards of concrete on a pad and pier foundation. The slump will be tested in accordance with ASSHTO T119 testing standard. The slump will meet the tower foundation designer's specification. If none are noted, then the Slump will be measured in accordance with SHA Grey Book Specification 902.10.03, Chart A. Results will be recorded and supplied prior to acceptance of the given foundation. Work may be halted if the slump is not deemed acceptable.
7. Concrete temperature will be measured for each continuously poured section of a caisson or every fifty (50) cubic yards of concrete on a pad and pier foundation. Temperatures will be tested in accordance with ASSHTO T309 testing standard. Temperature will be in accordance with the foundation designer's specification. If no specifications are supplied then the temperature will be

measured in accordance with SHA Grey Book Specification 902.10.03, Chart A. Results will be recorded and supplied prior to acceptance of the given foundation.

8. Air entrainment will be tested and documented in accordance with ASSHTO T152 or T196. The results will be documented for each continuously poured caisson or 50 cubic yards for a pad and pier foundation. Air content will be within the foundation designer's specification or no more than 5-8%.
9. Compressive strength will be measured at 7 days after pour and 28 days after pour. Compressive strength tests will be tested in accordance with ASSHTO T23 testing standard. A minimum of one (1) set of four (4) cylinders will be taken for each continuously poured section of caisson or every fifty (50) cubic yards of concrete on a pad and pier foundation. Compressive strength will be a minimum of the tower foundation's specification or 4000 psi at 28 days, whichever is greater. At least one cylinder per set will be broken at 7 days and one at 28 days. If all 7 day sets have reached the required compressive strength then back fill operations and/or tower erection can commence. 14 day tests can be conducted if the 7 day tests are not within specification to expedite construction. 28 day tests will be conducted even if 7 day tests are deemed acceptable. Written results must be provided to the state project manager prior to tower erection. Shelter foundations will be at least 3000 psi or the shelter foundation designer's requirements, whichever is greater, at 28 days. Shelter foundations will require one (1) set of four (4) cylinders for both shelter foundations. Test cylinders will be cured on site. As weather conditions dictate, the vendor will provide a cure box to adequately insulate the test cylinders as they cure.

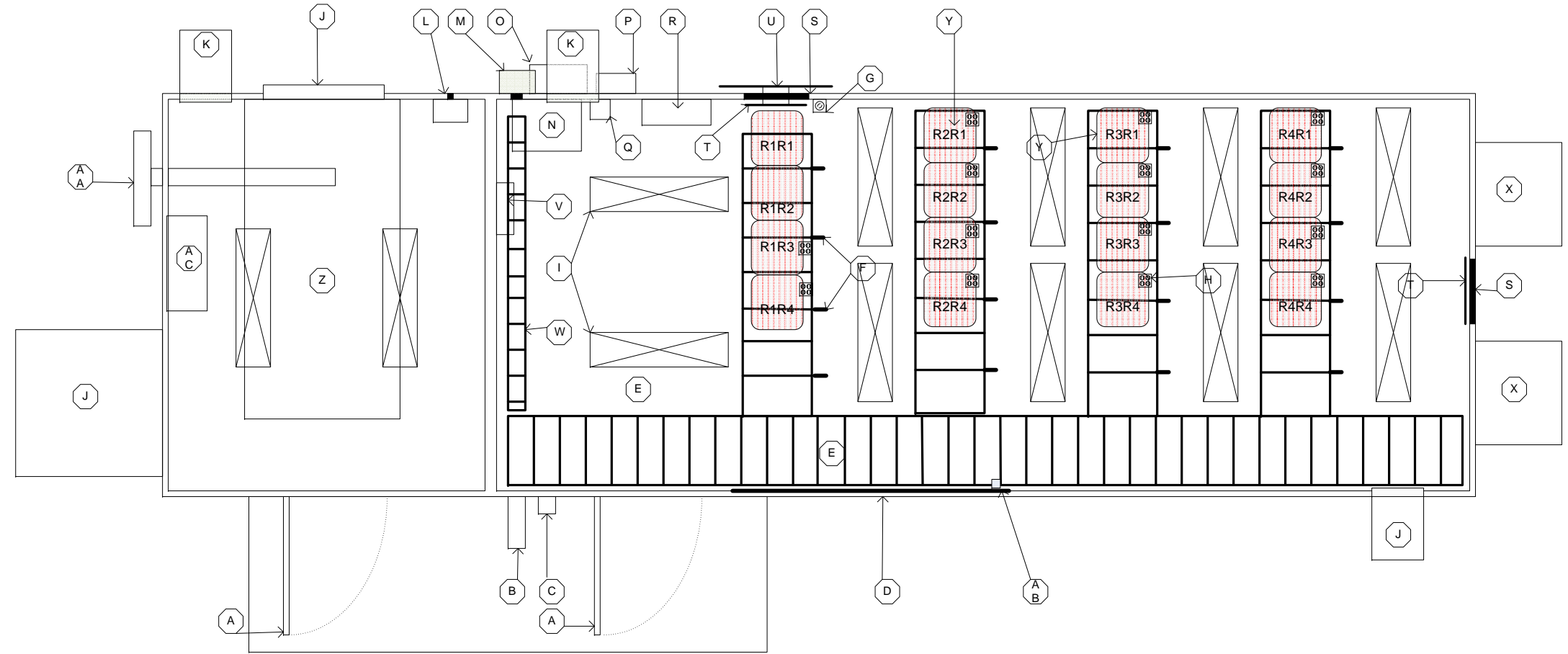
The inspector will provide photographs if necessary. If specifications are not met then the inspector has the authority to stop work until specifications are met.

Tower Loading for 430' Self Supporting Tower

ITEM	MOUNTING LOCATION AGL(ft)	ANT. MODEL	AZIMUTH	FREQ.	LINE SIZE	SUPPLY W/ TOWER
1	430	BMR-12	0°	800 MHZ	1 5/8"	N
2	430	BMR-12	120°	800 MHZ	1 5/8"	N
3	430	BMR-12	240°	800 MHZ	1 5/8"	N
4	400	BMR-12	0°	800 MHZ	1 5/8"	N
5	400	BMR-12	120°	800 MHZ	1 5/8"	N
6	400	BMR-12	240°	800 MHZ	1 5/8"	N
7	380	BMR-12	0°	800 MHZ	1 5/8"	N
8	380	BMR-12	120°	800 MHZ	1 5/8"	N
9	380	BMR-12	240°	800 MHZ	1 5/8"	N
10	360	BMR-12	0°	800 MHZ	1 5/8"	N
11	360	BMR-12	120°	800 MHZ	1 5/8"	N
12	360	BMR-12	240°	800 MHZ	1 5/8"	N
13	340	BMR-12	0°	800 MHZ	1 5/8"	N
14	340	BMR-12	120°	800 MHZ	1 5/8"	N
15	340	BMR-12	240°	800 MHZ	1 5/8"	N
16	320	DB 420-D	0°	450 MHZ Dual fed antenna	2 X 7/8"	N
17	320	DB 420-D	120°	450 MHZ Dual fed antenna	2 X 7/8"	N
18	320	DB 420-D	240°	450 MHZ Dual fed	2 X 7/8"	N
19	300	DB 224	0°	138-174 MHZ	7/8"	N
20	300	DB 224	120°	138-174 MHZ	7/8"	N

21	300	DB 224	240°	138-174 MHZ	7/8"	N
22	280	(9) DAPA 59210 Panel Antenna Array	360°	1710- 1990 MHZ	24 X 1 5/8"	N
23	260	(9) DB858HV90E- SX Panel Antenna Array	360°	806-896 MHZ	9 X 1 5/8"	N
24	240	8' HP Solid Dish	0°	6.000 GHz	EW63	N
25	240	8' HP Solid Dish	120°	6.000 GHz	EW63	N
26	240	8' HP Solid Dish	240°	6.000 GHz	EW63	N
27	220	(9) DAPA 59210 Panel Antenna Array	360°	1710- 1990 MHZ	12 X 1 5/8"	N
28	200	(9) DB858HV90E- SX Panel Antenna Array	360°	806-896 MHZ	9 X 1 5/8"	N
29	180	8' HP Solid Dish	0°	6.000 GHz	EW63	N
30	180	8' HP Solid Dish	120°	6.000 GHz	EW63	N
31	180	8' HP Solid Dish	240°	6.000 GHz	EW63	N
32	170	(9) DB858HV90E- SX Panel Antenna Array	360°	806-896 MHZ	9 X 1 5/8"	N
33	150	(9) DAPA 59210 Panel Antenna Array	360°	1710- 1990 MHZ	24 X 1 5/8"	N

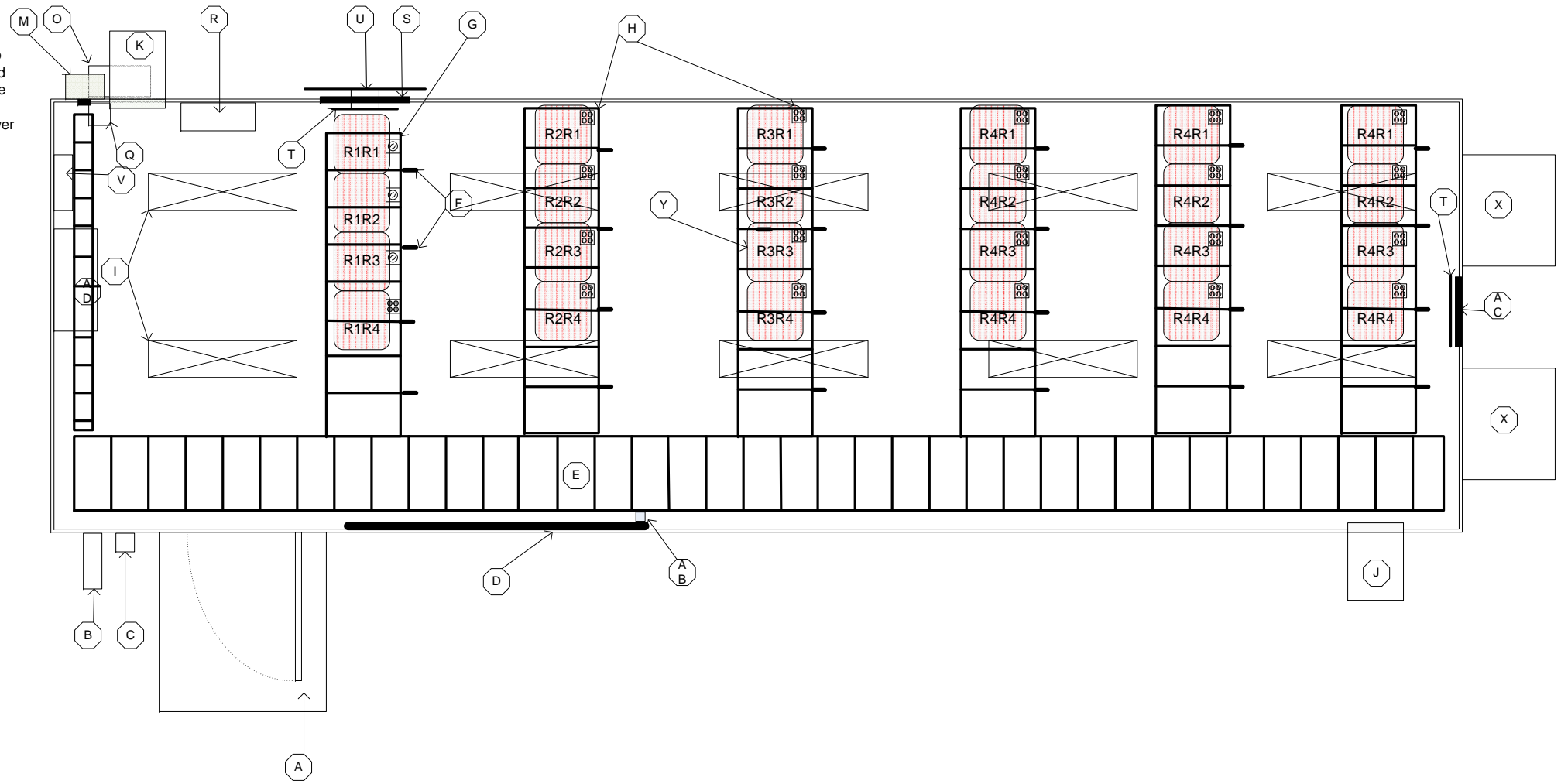
State of Maryland		Typical 12x38 Ft Shelter (with generator) Layout	
DATE ORIGINAL 9/8/08	SCALE 1/4" : 1"	JOB NO.	DRAWN
LATEST REVISION C		CHECKED	
REVISIONS			
NO.	DATE	DESCRIPTION	DRAWN
B	10/08	Added alarms	
C	06/09	Changed location of 240VAC outlets	
D	03/11	Revised lighting plan	
Drawn by: William Drew, PMP William.Drew@dot.state.md.us 410-767-2366 -Dimensions are approximate. -Final layout/design is subject to the State's approval.			



A Door	J Intake hood	S 16 Port cable entry port	A Alarm 66 Block (no enclosure)
B Appleton Plug	K Temp activated fans	T Internal ground bus bar	B Appleton cable/hose bib
C Exterior Light	L Light controller and penetration for SO cables	U External ground bus bar	C
D 4x8 Telco board	M Pull box and 4IN penetration for telco	V Subfeed	D
E 24" cable ladders	N Auto transfer switch	W Teleco cable ladder	E
F Stand offs for #2 ground lead (3) vertically mounted 240v outlets (twist lock type)	O Main service disconnect	X HVAC	F
G 120V Quad box outlet	P Building subfeed disconnect	Y Rack footprint	G
H	Q Type2 MOV	Z Generator	H
I 48IN lights	R Integrated load center	A Generator exhaust	I
		A	J

LATEST REVISION		DATE ORIGINAL		TITLE	
JOB NO.		SCALE			
CHECKED		NO.		REVISIONS	
		DATE			
DRAWN		DESCRIPTION			

If there are two shelters ordered do not penetrate 12x38 without generator for tower light cables



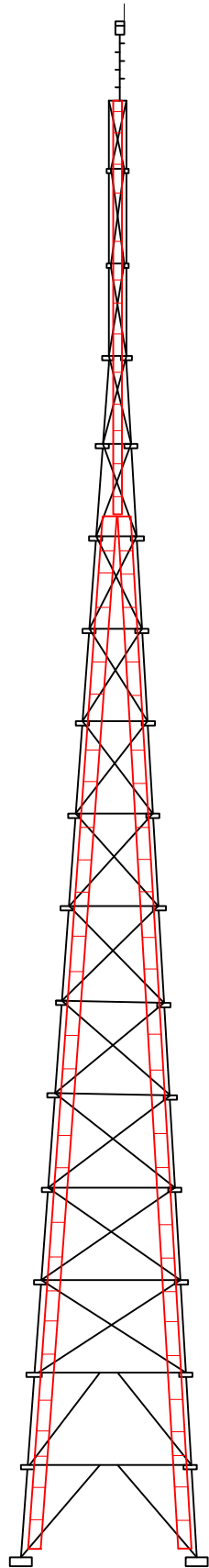
A	Door
B	Appleton Plug
C	Exterior Light
D	4x8 Telco board
E	24" cable ladders
F	Stand offs for #2 ground lead
G	240v outlets (twist lock type)
H	120V Quad box outlet
I	48IN lights

J	Intake hood
K	Temp activated fans
L	Light controller and penetration for SO cables
M	Pull box and 4IN penetration for telco
N	Auto transfer switch
O	Main service disconnect
P	Building subfeed disconnect
Q	Type2 MOV
R	Integrated load center

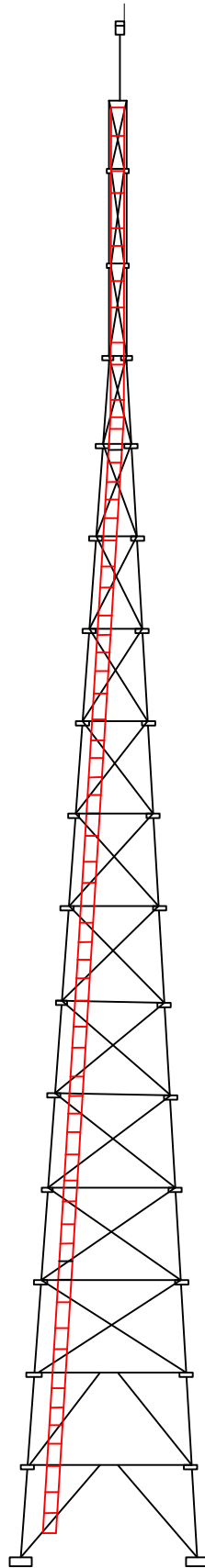
S	24 Port cable entry port
T	Internal ground bus bar
U	External ground bus bar
V	Subfeed
W	Teleco cable ladder
X	HVAC
Y	Rack footprint
Z	Generator
AA	Generator exhaust

AB	Alarm 66 Block (no enclosure)
AC	16 Port cable entry port
AD	Appleton cable/hose bib
AE	
AF	
AG	
AH	
AI	
AJ	

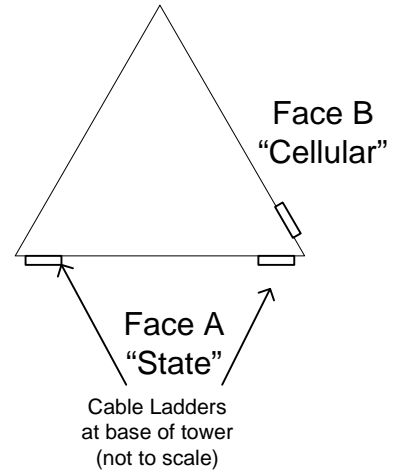
<p style="text-align: center;">Typical State tower layout</p>		<p style="text-align: center;">Drawn by: Sean Javins sean.javins@doit.state.md.us</p>	
		<p>SIZE</p> <p>FSCM NO</p>	<p>DWG NO</p>
<p>SCALE</p> <p>1in = 40ft. 0in.</p>	<p>SHEET</p> <p>1 OF 3</p>	<p>REV</p> <p>A</p>	



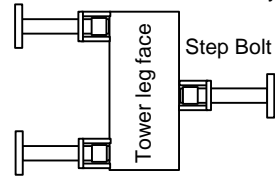
Face A
"State"



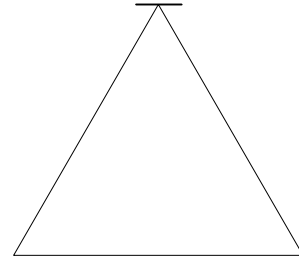
Face B
"Cellular"



Step Bolt Detail
Not to scale. Provide similar layout.



Tower Leg Face



**MARYLAND STATE HIGHWAY ADMINISTRATION
FOUNDATIONS BORING LOG**

Sheet 1 of 3
Boring _____ of 4

Contract No. CA101A51 Project Description North Calvert Cliffs Communication Tower

Boring No. B-2 Station _____ Coordinates 281704 1464812

Boring By Freestate

Driller R. Stidham

Surface Elevation 114.5 Date Started 11/14/16

Rig Type CME-55

Date Completed 11/14/16

Rig No. 08

Drive Hammer AUTO 140 LB.

Casing Auger Size 3.25 IN.

Size of Core _____ IN.

Size of Bit OD _____ IN.

Core Barrel Type _____

Auger Depth 83.5

WATER TABLE

Depth Below Surface		Time (hours)	Date
Depth	Elev.		

Boring and Sampling Conforms to AASHTO:

DEPTH IN FEET	ELEV. IN FEET	MATERIAL DESCRIPTION	SPOON			RECOVERY	REMARKS	DEPTH	CASING BLOWS / FOOT
			SAMPLE NO.	BLOWS	DEPTH				
0.3	114.25	HMA = 3"							
19.5	95.00	Damp, med dense, orangeish brown, fine to coarse SAND, trace to little to no clay, trace gravel	1	8-8 12	0.5- 2.0	88.7		1	
			2	4-7 7	2.5- 4.0	66.7		2	
			3	4-8 10	5.0- 6.5	88.7		3	
			4	3-6 6	7.5- 9.0	83.3		4	
			5	4-8 10	10.0- 11.5	94.7		5	
			6	7-10 12	12.5- 14.0	100.0		6	
			7	4-8 9	15.0- 16.5	100.0		7	
19.5	95.00	Damp, med dense, orangeish brown, clayey SAND	8	8-7 7	18.5- 20.0	100.0	8		
23.5	91.00		Damp, med stiff, light brown to dark gray, CLAY, trace sand	9	2-3 4	23.5- 25.0	100.0	9	
33.5	81.00	Damp to wet, very dense to med dense, orangeish brown, fine SAND		10	2-3 4	28.5- 30.0	100.0	10	
				11	11-24 28	33.5- 35.0	88.7	11	

MARYLAND STATE HIGHWAY ADMINISTRATION FOUNDATIONS BORING LOG

Sheet 3 of 3
Boring of 4

Contract No. CA101A51 Project Description North Calvert Cliffs Communication Tower

Boring No. B-3 Station Coordinates 281739 1464816

DEPTH IN FEET	ELEV. IN FEET	MATERIAL DESCRIPTION	SPOON			RECOVERY	REMARKS	DEPTH	CASING BLOWS / FOOT
			SAMPLE NO.	BLOWS	DEPTH				
84.3	29.17	Damp, very dense, dark greenish gray, silty SAND, trace shell fragments, contains cemented sands <i>(Continued)</i>	21	13-50/4"	83.5-	100.0	Boring backfilled at completion due to being drilled on last day on site	82	
					84.3			83	
							84		
							85		
							86		
							87		
							88		
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							126		



ATTACHMENT 31

State Of Maryland Dept. of Information Technology Communication Tower Closeout Acceptance Standards

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1. Intent

- 1.11 Tower Foundation
- 1.12 Concrete Placement
- 1.13 Concrete Testing
- 1.14 Electrical Conduit Placement
- 1.15 Tower Erection and Installation
- 1.16 Shelter Placement
- 1.17 Fence Installation
- 1.18 Tower Lighting
- 1.19 Generator Start up
- 1.20 Liquid Propane Information
- 1.21 Generator Start Up
- 1.22 Site As - Built Drawings
- 1.23 MD Dept of the Environment Permit and Receipt
- 1.24 Photo Documentation

2. Closeout Book Set Up

- 1. Site Name and Notes
- 2. Manufacturer Warranties
- 3. Site Ground Resistance Reports
- 4. Concrete Test Reports
- 5. Site Photos
- 6. Tower and Foundation Drawings
- 7. Shelter Drawings
- 8. Site As-Built Drawings
- 9. MDE Permit / Completion Receipt
- 10. Equipment Spec Sheets
- 11. Contract Task Orders (include any addendums)
- 12. Contract Purchase Order
- 13. Liquid propane information

3 Site Binder

- 1. Site ground test.
- 2. Concrete reports.
- 3. Manufacturer warranties for shelter, generator, lighting controller, HVAC, Transfer Switch, etc.
- 4. Generator start up documents.
- 5. Photos of underground work.

1. Intent

The intent of this document is to provide designated personnel with set guidelines, including specified performance metrics, for verifying completeness of construction of communication towers, shelters, and ancillary equipment. Successful completion of the tests and mandatory document submissions set forth in this document will guarantee functional acceptance of a quality facility.

1.11 Tower Foundation

Tower foundation closeout documentation will include:

a. The reinforcement bar steel manufacturer will furnish certification of grade steel report. The certification shall include actual mill test results including the chemical and physical properties of the finished metal products.

1.12 Concrete Placement

a. Concrete placement shall comply with current ASTM and/or AASHTO specifications.

b. Concrete delivery tickets will include the following

- Concrete producers name, including address and phone number.
- Date and time batched concrete departed the mix facility.
- Concrete mixture (i.e. 4000 psi mix, % of air, slump, etc).
- Time batched concrete arrived and site location.
- Verified time of discharged concrete.

1. 13 Concrete Testing

3rd party independent inspection and certification report to include the following (provided at the vendor's expense):

- The sealed report will include a written report of inspection of the reinforcement bar in accordance with the approved tower foundation design.
- Certified concrete test cylinders break test report.
- The report will include results of slump, air entrainment, weather conditions at the time of pour, the use of any admixtures per latest DoIT concrete inspection policy.

1.14 Electrical Conduit/Equipment Installation

Electrical conduit, wiring and materials will be installed in accordance with National NEC codes and standard, local jurisdictional requirements, local utility requirements, and latest version on Motorola's R56. Documentation required for electrical installation is:

- a. Photo documentation of underground conduit depicting depth of trench.
- b. Photo documentation of underground utility marking tape.
- c. Electrician's current Maryland License.

1.15 Tower Erection and Installation

The tower installation will be in accordance with ASTM specifications. Closeout documentation will include:

- a. A copy of the erection manual specification contained with the tower.
- b. A copy of the lighting installation manual.
- c. Copies of the safety climb installation manual.
- d. Compliance letter from the installer certifying the tower has been installed in accordance with the manufactures specifications.
- e. Provide photo documentation of any repairs or corrections made as a result of the State supplied tower inspection report.

1.16 Ground System/Underground Details

- a. Provide photo documentation of ground ring depth, welded and mechanical ground connections.

1.17 Shelter Placement

Provide copy of shelter documents enclosed with the shelter.
Provide shelter set photos.

1.18 Tower Lighting

Provide a copy of the tower light manual and diagnostic materials. Document that the tower light has been functional for at least 30 days and at the time of acceptance.

- a. Provide proof of warranty through the manufacturer or CATS II vendor.

1.19 Site grounding

Provide evidence of site grounding compliance through a three point – fall of potential test and resistance test of at least 10 equipment grounds with a clamp on test meter. These tests will be conducted at the vendors expense.

- a. Clamp on test will demonstrate less than 5 ohms of resistance for each ground tested.
- b. Report will describe the ground lead tested, relative location within the site and the ground reading.
- c. Fall of potential test will describe type of equipment used, soil type, equipment calibration date and test results.
- d. All will be conducted by personnel trained on the equipment.

1.20 Liquid Propane Information

Provide evidence to support buried installation. The tank shall be new and unused.

- a. Provide an invoice that demonstrates the installation of non metallic fuel line.
- b. Provide photos of underground installation.
- c. Provide certified documentation that high performance polyethylene “plastic” fuel line or similar substitute was installed.
- d. Provide a bill of sale demonstrating the tank’s ownership by the State of Maryland.

1.21 Generator Start up

Provide factory certified inspection/start up documents. The initial setup and testing of the generator will be conducted by a factory certified representative. The required documentation under this section includes:

- a. Record serial numbers, models, nomenclature, etc of the generator and automatic transfer switch.
- b. Record and document all services performed to check the integrity of the delivered generator, alarm configuration, components and automatic transfer switch.
- c. Record and document the generator’s performance during the required one (1) hour load bank test (under full load).
 - a. This will include indicators such as voltage output, frequency output, oil/water pressure, load, etc.
- d. Provide a copy of the generator and transfer switch warranty.

1.22 Site As Built Drawings

Provide three hard copies of site as built drawings. Provide one soft copy of the as built drawings.

In the event construction drawings are provided by the State the vendor will red line any changes and provide measurements/locations highlighting the actual location.

If no construction drawings are provided, then the vendor will create a set of as built drawings that show the location of the following items: Tower, shelters, LP tank/pad, electrical conduit, transformer, electric backboard, fence, ice bridges, etc. The drawings will be to scale.

1.23 MD Dept of the Environment Permit and Receipt

Provide a copy of the MDE permit. Provide a copy of the receipt provided by MDE to demonstrate completion of the E&S/SWM portion of the project.

1.24 Photo Documentation

Exhibit A Photo Documentation Log

Format

All photographs must be submitted printed in color and contained within the photo tab of the closeout binder.

Pre Construction

1. Access road.
2. Utility path.
3. Utility Pole at primary power location, including pole number.
4. Proposed compound location 4 photos. North, East, West South.
5. Tower Location.
6. Shelter Pad location.

Construction

Tower Foundation

1. Tower foundation excavation and shoring.
2. Placement of rebar.
3. Placement of anchor bolts.
4. Tower foundation concrete placement.
5. Finished concrete.
6. Backfill and compaction of foundation.

Shelter Foundation

1. Shelter foundation excavation, forms and shoring.
2. Placement of rebar.
3. Foundation concrete placement.
4. Stoop forms, rebar and reinforcement.
5. Finished concrete.

Utilities

1. Power routing from primary pole location to tower site.
2. Telco routing from pole to demark.
3. Underground conduit depth.
4. Power and Telco conduit bends.

Fuel Tank

1. Installation of pad, including rebar, concrete, etc.

2. Underground fuel supply line trench, trench depth, and connections.
3. Photo evidence of installation of non-metallic fuel line.

Tower Installation

1. Erection process.
2. Installation of lighting system.
3. Lighting cable routing (to include strain relief).

Antenna System

1. Antenna and Microwave mounts.
2. Antenna and Microwave model and serial number.
3. Digital photo verifying mounts are plumb and level.
4. Photo verifying mounts are secured to tower (including stiff arms).
5. Photos of coax grounding and ground kits.

Facility Grounding

1. Grounding trench including verification of trench depth.
2. #2 solid to ground rod (minimum of 5 photos).
3. Underground exothermic welds (minimum of 5 photos)
4. Ice bridge grounding.
5. Entry port grounding.
6. Coax grounding (tower and port).
7. Fence grounding including grounding "buttons".
8. Fence Gate grounding.
9. Shelter grounding exterior / interior.

Post Construction

1. Tower profile. North, East, South West.
2. Compound and Tower with Shelter, North, East, South West.
3. Antenna System, including mount antennas coax, ice bridge entry port.
4. Generator including serial number model number.
5. Primary utility backboard, including meter and meter number.
6. Generator fuel tank location and connections.
7. Shelter bolted down.
8. Shelter door grounds.
9. Tower grounded.
10. Fire Extinguisher.

2. Closeout Book Set Up

Closeout binder will be submitted in one (1) hard copy and one (1) CD version with all photos in jpeg format

1. Site Name and Notes

Provide title sheet to include:

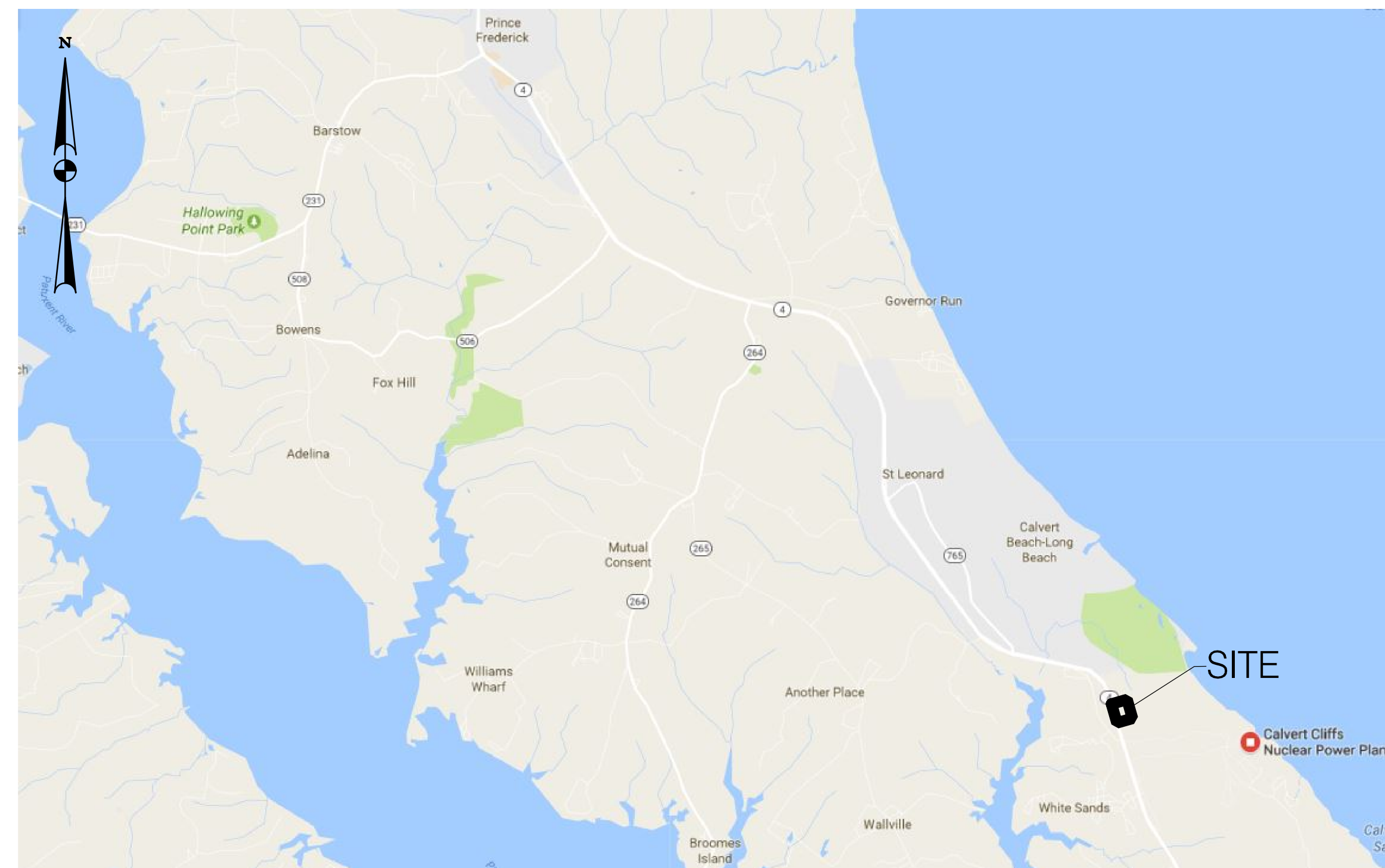
- Site name.
- Project number.

- Proper physical address.
 - Company name
2. Manufacture Warranties
 - Include all manufactures warranties.
 3. Site Ground Resistance Reports
 - Provide post ground test.
 4. Concrete Test Reports
 - Provide certified test reports.
 - Concrete delivery tickets for all concrete placed at site location - **Mandatory submission.**
 5. Site Photos
 - As required by Exhibit A.
 6. Tower and Foundation Drawings
 - **Mandatory Submission** (Provide 2 copies).
 7. Shelter Drawings
 - Mandatory Submission (Provide 2 copies).
 8. Site As-Builts
 - Provide as required.
 9. MDE Permit / Completion Receipt
 - **Mandatory submission.**
 10. Equipment Spec Sheets
 - Provide as required.
 11. Contract Task Orders
 - **Mandatory submission.**
 - 12 Contract Purchase Order
 - **Mandatory submission.**
 13. Liquid Propane Information
 - A bill of sale demonstrating the tank's ownership by the State of Maryland - **Mandatory submission.**
 14. Generator Startup
 - Documented record of all services performed and generator performance during load bank testing- **Mandatory submission.**
 15. Electricians current Maryland License
 - **Mandatory submission.**

STATE OF MARYLAND

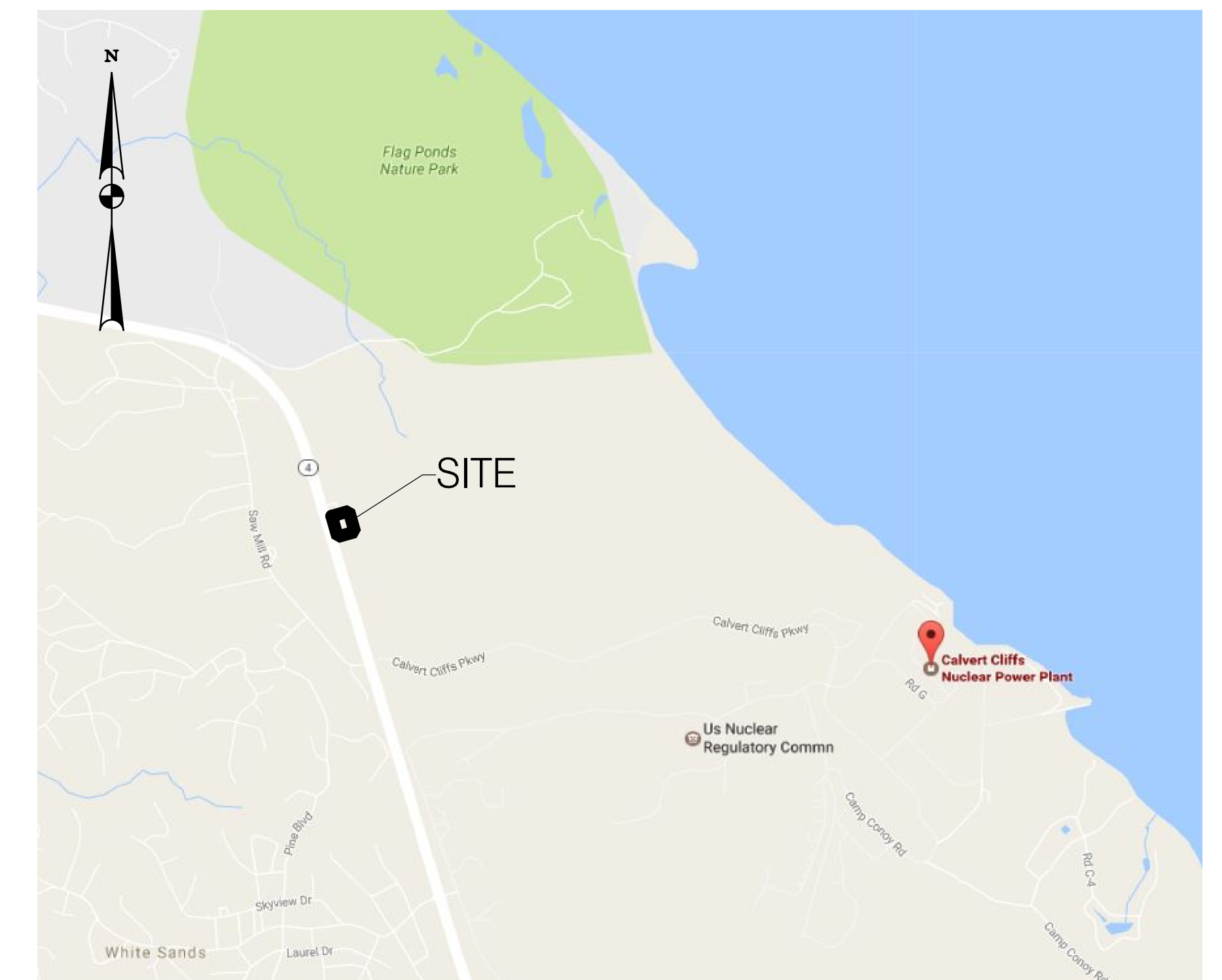
DEPARTMENT OF INFORMATION TECHNOLOGY
WIRELESS DIVISION

SITE DEVELOPMENT ENGINEERING LUSBY COMMUNICATIONS TOWER INSTALLATION



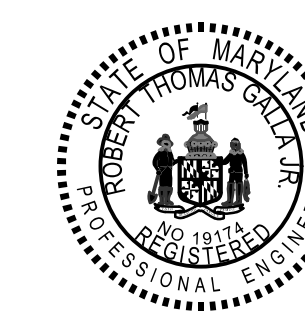
LOCATION MAP
SCALE: 1" = 1 MILE
SOURCE: GOOGLE MAPS

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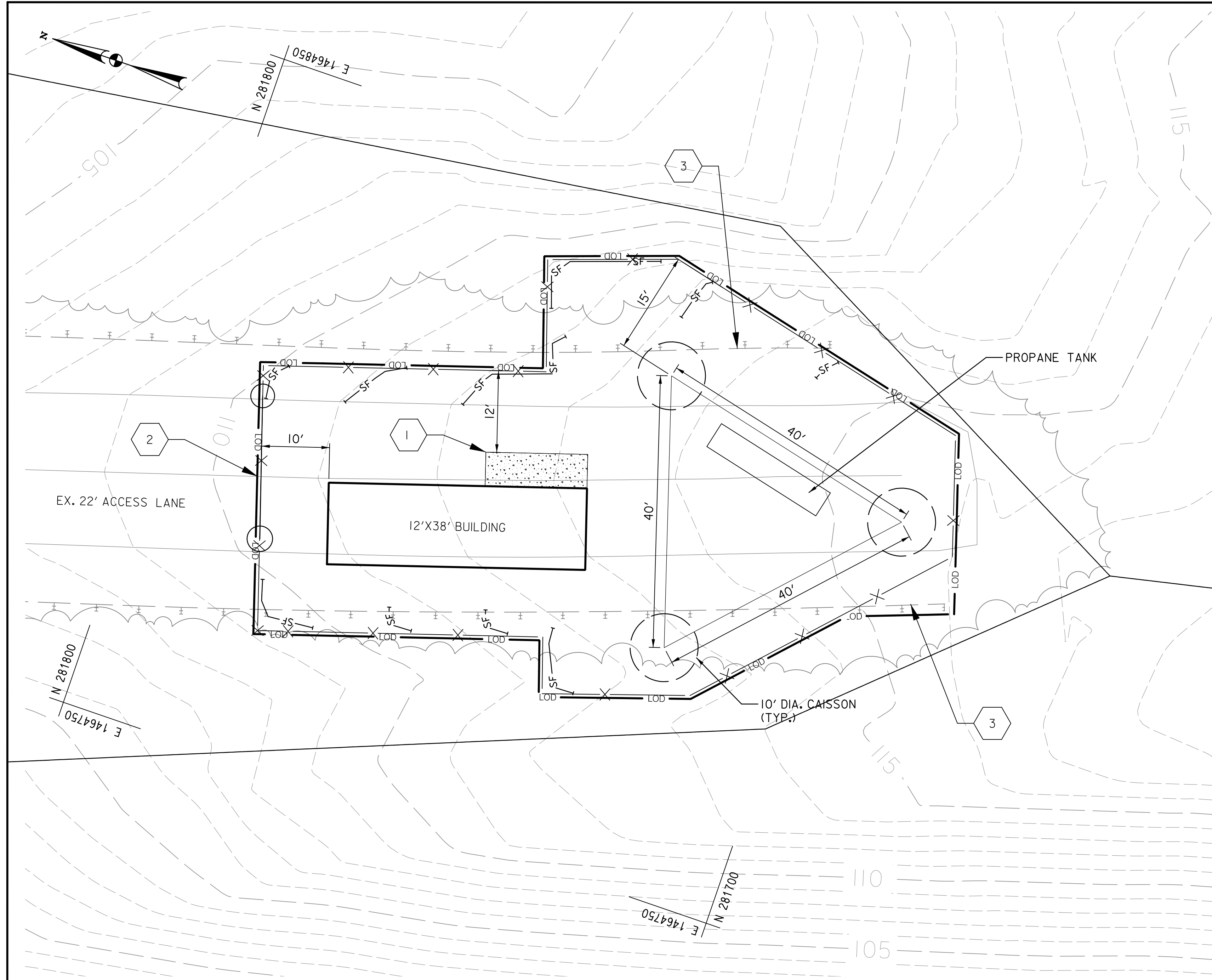


VICINITY MAP
SCALE: 1" = 1,000'
SOURCE: GOOGLE MAPS

DECEMBER 20, 2016



I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 10174. EXPIRATION DATE: 6/20/2017.



GENERAL NOTES

- HORIZONTAL DATUM: NAD 8391
VERTICAL DATUM: NAVD 88
- THE TOPOGRAPHIC INFORMATION SHOWN ON THIS DRAWING IS BASED ON A FIELD SURVEY COMPLETED BY AECOM DATED DECEMBER 2016. PROPERTY BOUNDARY SURVEY PENDING. PROPERTY BOUNDARY SHOWN IS APPROXIMATE.
- ANY DAMAGE TO ADJACENT ROADS, UTILITIES, FENCE LINES, ETC. DURING CONSTRUCTION SHALL BE REPLACED IN KIND OR REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE STATE.
- MATERIALS SALVAGED DURING CONSTRUCTION SHALL BECOME THE CONTRACTOR'S PROPERTY UNLESS OTHERWISE NOTED ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF SALVAGED MATERIALS.
- CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE AT ALL TIMES.
- THE LOCATIONS OF UNDERGROUND AND AERIAL UTILITIES SHOWN ON THE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR SHALL ADHERE TO THE MARYLAND HIGH VOLTAGE LINE ACT AND COORDINATE WITH UTILITY COMPANIES FOR ANY OR ALL RELOCATIONS THAT MAY BE REQUIRED.
- CALL "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO BEGINNING EXCAVATION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. FOR AREAS AND/OR UTILITIES WHICH "MISS UTILITY" WILL NOT LOCATE, THE CONTRACTOR SHALL UTILIZE THE SERVICES OF A PRIVATE UTILITY LOCATOR TO IDENTIFY THE LOCATION OF SUBSURFACE UTILITIES WITHIN THE LIMITS OF WORK.
- THE CONTRACTOR MUST PROTECT IN PLACE ALL ACTIVE UNDERGROUND UTILITIES UNLESS OTHER TREATMENT IS IDENTIFIED. REPAIRS TO UTILITIES OR PROPERTY DAMAGE AS A RESULT OF THE CONTRACTOR'S NEGLIGENCE OR METHOD OF OPERATION MUST BE MADE AT THE CONTRACTOR'S EXPENSE BEFORE PROCEEDING WITH CONSTRUCTION.
- CONCRETE FOUNDATION DIMENSION MAY VARY FROM ACTUAL SHELTER DIMENSION. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY SHELTER DIMENSION AND CONSTRUCT FOUNDATION TO MATCH ACTUAL SHELTER DIMENSIONS.
- AFTER NEW FENCE AND GATES ARE INSTALLED, COORDINATE WITH THE PROJECT MANAGER TO MAINTAIN THE COMPOUND LOCKED AT ALL TIMES.
- SUBSURFACE CONDITIONS MAY VARY ON SITE. INFORMATION ON SUBSURFACE CONDITIONS, LOCATIONS OF TEST BORINGS, AND BORING LOGS ARE CONTAINED IN THE GEOTECHNICAL EVALUATION REPORT. THE CONTRACTOR SHALL PLAN WORK ACCORDINGLY.
- AS DESIGNED, THERE IS NO FOREST CLEARING ASSOCIATED WITH THIS PROJECT.
- AS DESIGNED, THERE IS NO STREAM OR WETLAND DISTURBANCE ASSOCIATED WITH THIS PROJECT.

CONSTRUCTION NOTES

- 5'W x 15'L CONCRETE PAD CENTERED ON BUILDING DOORS. PAD TO BE MONOLITHIC AND POURED AS PART OF BUILDING FOUNDATION.
- 20' DOUBLE LEAF GATE. PROVIDE LATCHES OF FENCE EXTERIOR TO HOLD GATE IN OPEN POSITION. (SEE SHEET 3 OF 5 FOR DETAIL.)
- EXISTING GUARD RAIL WITHIN LIMIT OF DISTURBANCE TO BE REMOVED AND DISPOSED OF OFFSITE BY CONTRACTOR.

LEGEND

- X—X FENCE
- SF— SILT FENCE
- LOD— LIMIT OF DISTURBANCE
- ▭ BUILDING
- ▨ CONCRETE
- - - - - PROPERTY LINE

NOTE TO CONTRACTOR

- EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.
- NO AREAS SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS THE RUNOFF IS DIRECTED TO AN MDE-APPROVED SEDIMENT CONTROL DEVICE.
- EXCESS CUT MATERIAL SHALL BE HAULED OFFSITE IMMEDIATELY.

SEQUENCE OF CONSTRUCTION FOR SITE WORK

- NOTIFY THE MDE INSPECTOR WITHIN SEVEN (7) WORKING DAYS BY WRITING AND/OR TELEPHONE AT (410)-537-3510 TO ARRANGE FOR A PRE-CONSTRUCTION MEETING PRIOR TO BEGINNING CONSTRUCTION.
- INSTALL PERIMETER SILT FENCE EROSION AND SEDIMENT CONTROL MEASURES.
- CONTRACTOR SHALL ACCESS SITE EXCLUSIVELY FROM EXISTING ACCESS LANE. A STABILIZED CONSTRUCTION ENTRANCE MAY BE INSTALLED ALONG THE EXISTING 22' ACCESS LANE WITHIN THE LIMIT OF DISTURBANCE AT THE DISCRETION OF THE CONTRACTOR AND MDE INSPECTOR.
- CONSTRUCT COMMUNICATIONS TOWER AND ASSOCIATED INFRASTRUCTURE. INSTALL PERIMETER CHAINLINK FENCE.
- STABILIZE DISTURBED AREAS AS PER THE VEGETATION STANDARDS. WITH APPROVAL OF THE MDE INSPECTOR, REMOVE ALL EROSION AND SEDIMENT CONTROL MEASURES, STABILIZE AREAS DISTURBED BY THIS REMOVAL.



PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19174, EXPIRATION DATE: 6/20/2017.



USING AGENCY APPROVAL

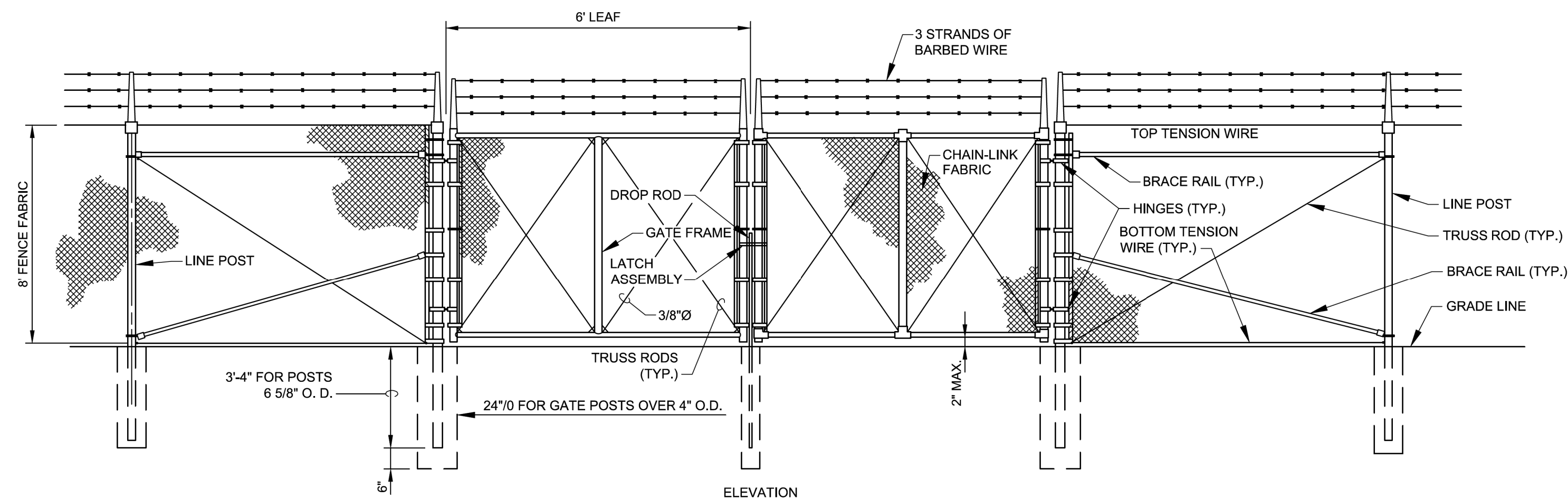
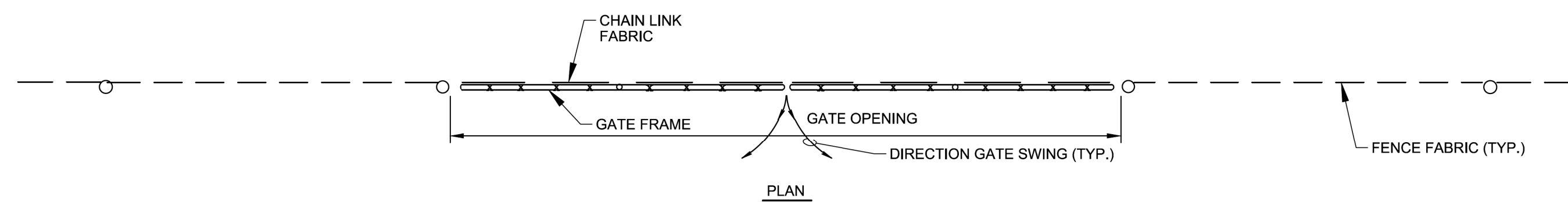
MARK	DATE	DESCRIPTION

CAD DWG FILE: HV MDSHA
DRAWN BY: VMB
CHECKED BY: ERE
PROJECT NO: 60527270
DATE: DECEMBER 2016

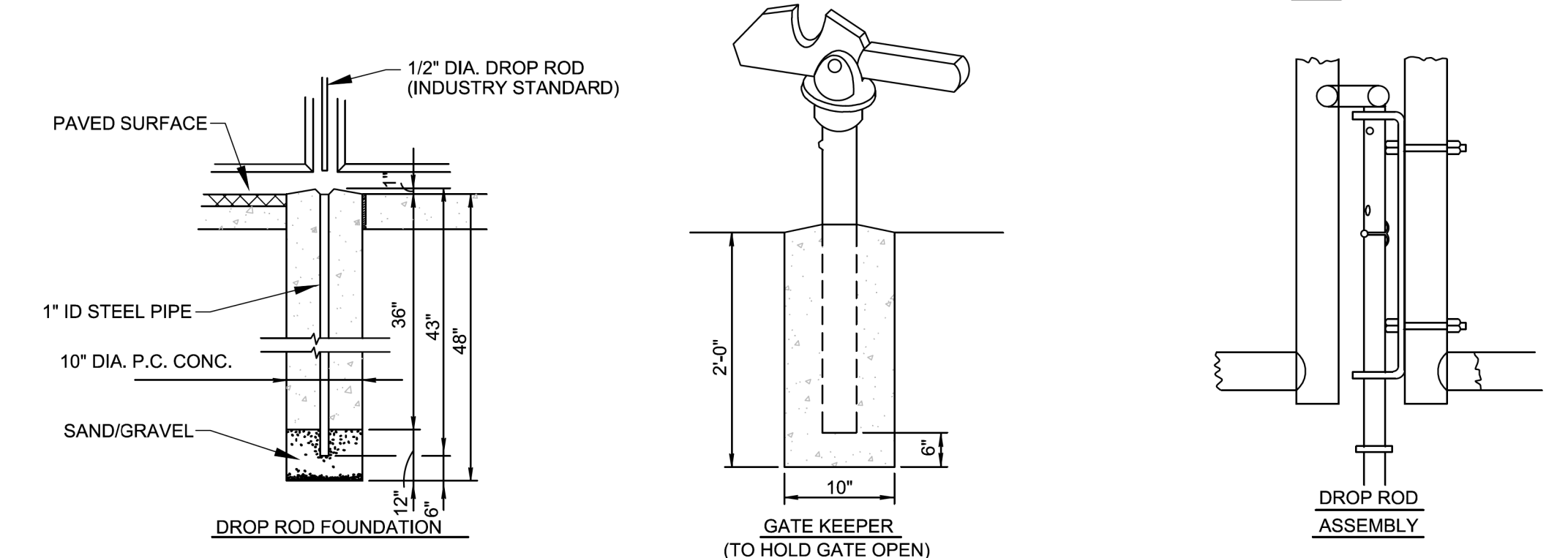
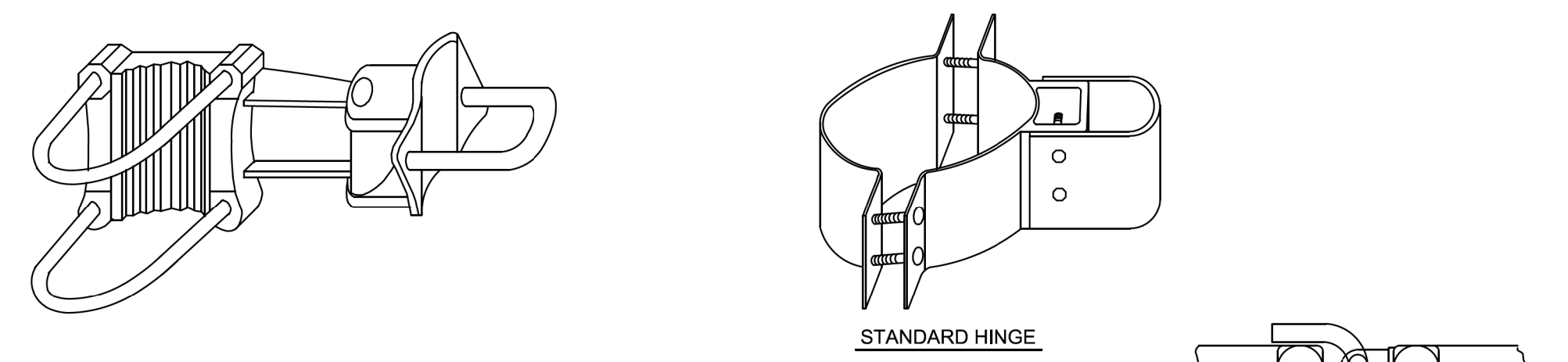
SITE PLAN AND EROSION AND SEDIMENT CONTROL PLAN

PROFESSIONAL CERTIFICATION

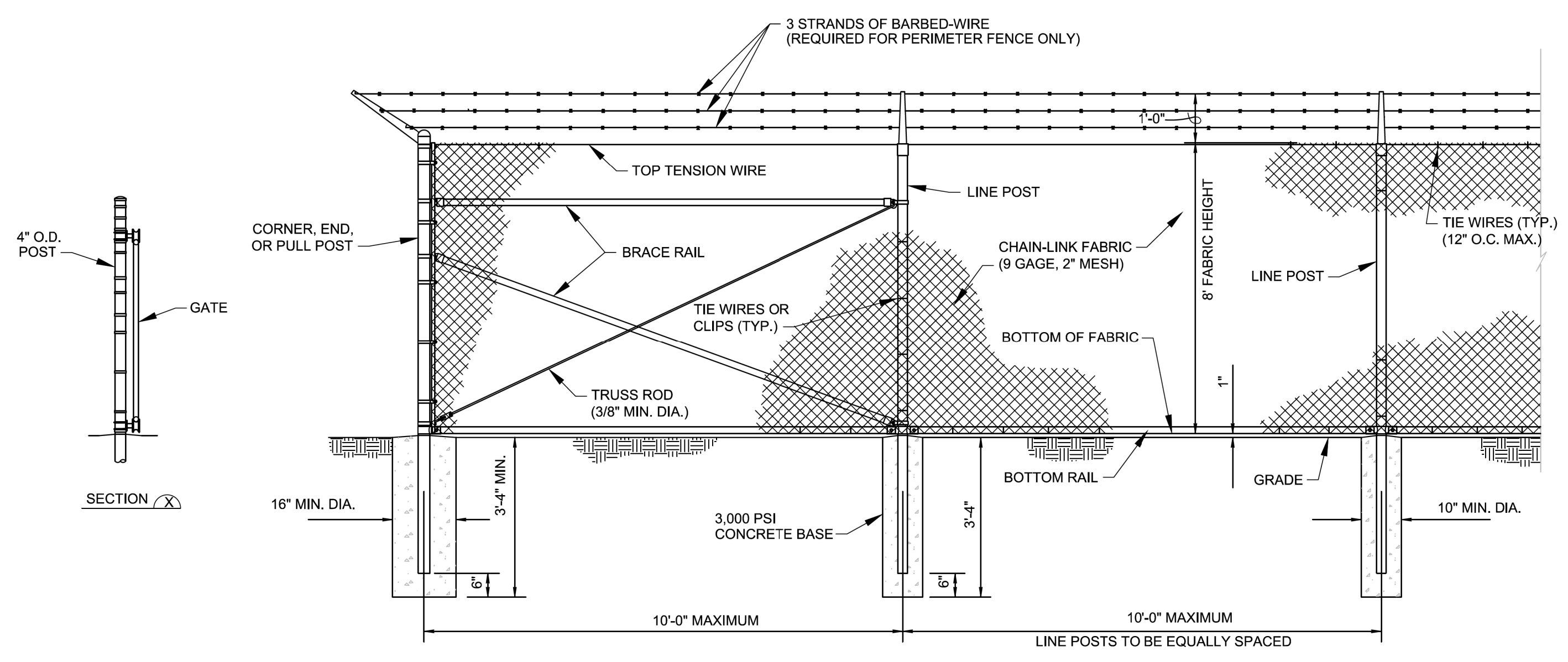
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DG DOUBLE SWING GATE
SCALE: NOT TO SCALE



SW SWING GATE DETAILS
SCALE: NOT TO SCALE



F CHAIN LINK FENCE
SCALE: NOT TO SCALE

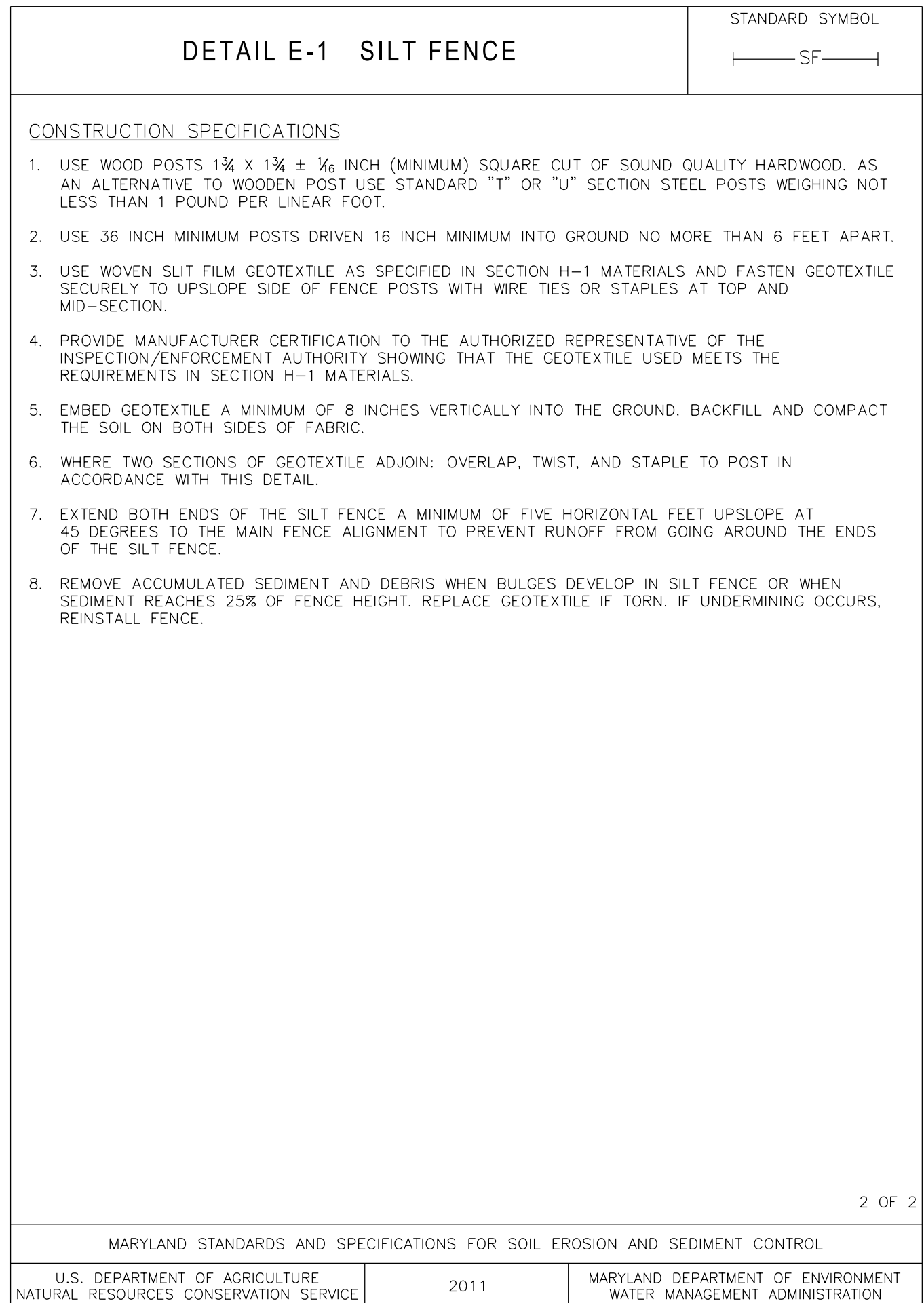
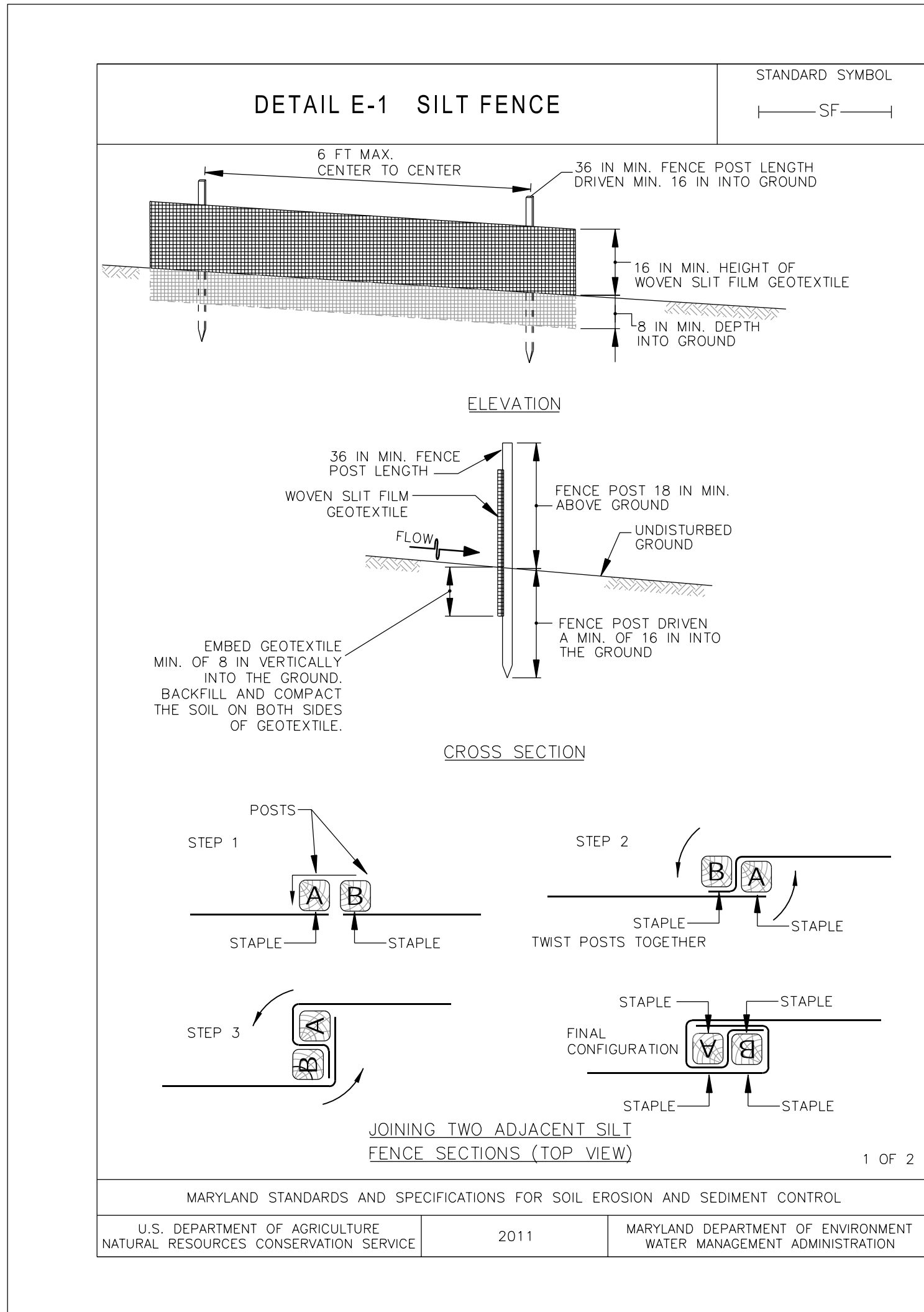
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MARK	DATE	DESCRIPTION

CAD DWG FILE: HV MDSA
DRAWN BY: VMB
CHECKED BY: ERE
PROJECT NO: 60527270
DATE: DECEMBER 2016

DETAILS

1. THE CONTRACTOR SHALL NOTIFY MDE AT 410-537-3510 SEVEN (7) DAYS BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY AND UNLESS WAIVED BY THE ADMINISTRATION, SHALL BE REQUIRED TO HOLD A PRE-CONSTRUCTION MEETING BETWEEN PROJECT REPRESENTATIVES AND A REPRESENTATIVE OF MDE.
2. THE CONTRACTOR MUST NOTIFY MDE IN WRITING AND BY TELEPHONE AT THE FOLLOWING POINTS:
 - A. THE REQUIRED PRE-CONSTRUCTION MEETING;
 - B. THE FOLLOWING INSTALLATION OF SEDIMENT CONTROL MEASURES;
 - C. DURING THE INSTALLATION OF SEDIMENT BASINS (TO BE CONVERTED INTO PERMANENT STORMWATER MANAGEMENT STRUCTURES) AT THE REQUIRED INSPECTION POINTS (SEE INSPECTION CHECKLIST ON PLAN), NOTIFICATION PRIOR TO COMMENCING CONSTRUCTION OF EACH STEP IS MANDATORY;
 - D. PRIOR TO REMOVAL OR MODIFICATION OF ANY SEDIMENT CONTROL STRUCTURE(S);
 - E. PRIOR TO REMOVAL OF ALL SEDIMENT CONTROL DEVICES;
 - F. PRIOR TO FINAL ACCEPTANCE.
3. THE CONTRACTOR SHALL CONSTRUCT ALL EROSION AND SEDIMENT CONTROL MEASURES PER THE APPROVED PLAN AND CONSTRUCTION SEQUENCE AND SHALL HAVE THEM INSPECTED AND APPROVED BY THE MDE INSPECTOR PRIOR TO BEGINNING ANY OTHER LAND DISTURBANCES. MINOR SEDIMENT CONTROL DEVICE LOCATION ADJUSTMENTS MAY BE MADE IN THE FIELD WITH THE APPROVAL OF THE WMA INSPECTOR. THE CONTRACTOR SHALL ENSURE THAT ALL RUNOFF FROM DISTURBED AREAS IS DIRECTED TO THE SEDIMENT CONTROL DEVICES AND SHALL NOT REMOVE ANY EROSION OR SEDIMENT CONTROL MEASURES WITHOUT PRIOR PERMISSION FROM WMA INSPECTOR AND AGENCY INSPECTOR. THE CONTRACTOR MUST OBTAIN PRIOR AGENCY AND WMA APPROVAL FOR CHANGES TO THE SEDIMENT CONTROL PLAN AND/OR SEQUENCE OF CONSTRUCTION.
4. THE CONTRACTOR SHALL PROTECT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS TO PREVENT THE DEPOSITION OF MATERIALS ONTO PUBLIC ROADS. ALL MATERIALS DEPOSITED ONTO PUBLIC ROADS SHALL BE REMOVED IMMEDIATELY.
5. THE CONTRACTOR SHALL INSPECT DAILY AND MAINTAIN CONTINUOUSLY IN AN EFFECTIVE OPERATING CONDITION ALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL SUCH TIMES AS THEY ARE REMOVED WITH PRIOR PERMISSION FROM WMA INSPECTOR AND AGENCY INSPECTOR.
6. ALL SEDIMENT BASINS, TRAP EMBANKMENTS AND SLOPES, PERIMETER DIKES, SWALES AND ALL DISTURBED SLOPES STEEPER OR EQUAL TO 3:1 SHALL BE STABILIZED WITH SOD OR SEED AND ANCHORED STRAW MULCH OR OTHER APPROVED STABILIZATION MEASURES AS SOON AS POSSIBLE BUT NO LATER THAN SEVEN (7) CALENDAR DAYS AFTER ESTABLISHMENT. ALL AREAS DISTURBED OUTSIDE OF THE PERIMETER SEDIMENT CONTROL SYSTEM MUST BE MINIMIZED. MAINTENANCE MUST BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION. (REQUIREMENT FOR STABILIZATION MAY BE REDUCED TO THREE (3) DAYS FOR SENSITIVE AREAS).
7. THE CONTRACTOR SHALL APPLY SOD OR SEED AND ANCHORED STRAW MULCH OR OTHER APPROVED STABILIZATION MEASURES TO ALL DISTURBED AREAS AND STOCKPILES WITHIN FOURTEEN (14) CALENDAR DAYS AFTER STRIPPING AND GRADING ACTIVITIES HAVE CEASED IN THE AREA. MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION. (REQUIREMENT MAY BE REDUCED TO SEVEN (7) DAYS FOR).
8. PRIOR TO REMOVAL OF SEDIMENT CONTROL MEASURES, THE CONTRACTOR SHALL STABILIZE AND HAVE ESTABLISHED PERMANENT STABILIZATION FOR ALL CONTRIBUTORY DISTURBED AREAS USING SOD OR AN APPROVED PERMANENT SEED MIXTURE WITH REQUIRED SOIL AMENDMENTS AND AN APPROVED ANCHORED MULCH. WOOD FIBER MULCH MAY ONLY BE USED IN SEEDING SEASON WHERE THE SLOPE DOES NOT EXCEED 10% AND GRADING HAS BEEN DONE TO PROMOTE SHEET FLOW DRAINAGE. AREAS BROUGHT TO FINISHED GRADE DURING THE SEEDING SEASON SHALL BE PERMANENTLY STABILIZED AS SOON AS POSSIBLE BUT NO LATER THAN FOURTEEN (14) CALENDAR DAYS AFTER ESTABLISHMENT. WHEN PROPERTY IS BROUGHT TO FINISHED GRADE DURING THE MONTHS OF NOVEMBER THROUGH FEBRUARY AND PERMANENT STABILIZATION IS FOUND TO BE IMPRACTICAL, TEMPORARY SEED AND ANCHORED STRAW MULCH SHALL BE APPLIED TO DISTURBED AREAS. THE FINAL PERMANENT STABILIZATION OF SUCH PROPERTY SHALL BE APPLIED BY MARCH 15 OR EARLIER IF GROUND AND WEATHER CONDITIONS ALLOW.
9. THE SITE'S APPROVAL LETTER APPROVED EROSION AND SEDIMENT CONTROL PLANS, DAILY LOG BOOKS AND TEST REPORTS SHALL BE AVAILABLE AT THE SITE FOR INSPECTION BY DULY AUTHORIZED OFFICIALS OF WMA AND AGENCY RESPONSIBLE.
10. SURFACE DRAINAGE FLOWS OVER UNSTABILIZED CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER PREVENTING DRAINAGE FLOWS FROM TRAVELING THE SLOPES OR BY INSTALLING PROTECTIVE DEVICES TO LOWER THE WATER DOWNSLOPE WITHOUT CAUSING EROSION. DIKES SHALL BE INSTALLED AND MAINTAINED AT THE TOP OF A CUT OR FILL SLOPE UNTIL THE SLOPE AND DRAINAGE AREA TO IT ARE FULLY STABILIZED AT WHICH TIME THEY MUST BE REMOVED AND FINAL GRADING COMPLETED TO PROMOTE SHEET FLOW DRAINAGE. PROTECTIVE METHODS MUST BE PROVIDED AT POINTS OF CONCENTRATED FLOW WHERE EROSION IS LIKELY TO OCCUR.
11. PERMANENT SWALES OR OTHER POINTS OF CONCENTRATED WATER FLOW SHALL BE STABILIZED WITH SOD OR SEED WITH APPROVED EROSION CONTROL MATTING, RIPRAP, OR BY OTHER APPROVED STABILIZATION MEASURES.
12. TEMPORARY SEDIMENT CONTROL DEVICES MAY BE REMOVED, WITH PERMISSION OF WMA INSPECTOR AND AGENCY INSPECTORS, WITHIN THIRTY (30) CALENDAR DAYS FOLLOWING ESTABLISHMENT OF PERMANENT STABILIZATION IN ALL CONTRIBUTORY DRAINAGE AREAS. STORMWATER MANAGEMENT STRUCTURES USED TEMPORARILY FOR SEDIMENT CONTROL SHALL BE CONVERTED TO THE PERMANENT CONFIGURATION WITHIN THIS TIME PERIOD AS WELL.
13. NO PERMANENT CUT OR FILL SLOPE WITH A GRADIENT STEEPER THAN 3:1 WILL BE PERMITTED IN LAWN MAINTENANCE AREAS. A SLOPE GRADIENT OF UP TO 2:1 WILL BE PERMITTED IN NON-MAINTENANCE AREAS PROVIDED THAT THOSE AREAS ARE INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN WITH A LOW-MAINTENANCE GROUND COVER SPECIFIED FOR PERMANENT STABILIZATION SLOPE GRADIENT STEEPER THAN 2:1 WILL NOT BE PERMITTED WITH VEGETATIVE STABILIZATION.
14. FOR FINISHED GRADING THE CONTRACTOR SHALL PROVIDE ADEQUATE GRADIENTS TO PREVENT WATER FROM PONDING FOR MORE THAN TWENTY FOUR (24) HOURS AFTER THE END OF A RAINFALL EVENT. DRAINAGE COURSES AND SWALE FLOW AREAS MAY TAKE AS LONG AS FORTY-EIGHT (48) HOURS AFTER THE END OF A RAINFALL EVENT TO DRAIN. AREAS DESIGNATED TO HAVE STANDING WATER SHALL NOT BE REQUIRED TO MEET THIS REQUIREMENT.
15. SEDIMENT TRAPS OR BASINS ARE NOT PERMITTED WITHIN 20 FEET OF A FOUNDATION THAT EXISTS OR IS UNDER CONSTRUCTION. NO STRUCTURE MAY BE CONSTRUCTED WITHIN 20 FEET OF AN ACTIVE SEDIMENT TRAP OR BASIN.
16. THE WMA INSPECTOR HAS THE OPTION OF REQUIRING ADDITIONAL SAFETY OR SEDIMENT CONTROL MEASURES, IF DEEMED NECESSARY.
17. ALL TRAP DEPTH DIMENSIONS ARE RELATIVE TO THE OUTLET ELEVATION. ALL TRAPS MUST HAVE A STABLE OUTFALL. ALL TRAPS AND BASINS SHALL HAVE STABLE INFLOW POINTS.
18. VEGETATIVE STABILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. REFER TO APPROPRIATE SPECIFICATIONS FOR TEMPORARY SEEDING, PERMANENT SEEDING, MULCHING, SODDING AND GROUND COVERS.
19. SEDIMENT SHALL BE REMOVED AND THE TRAP OR BASIN RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE QUARTER OF THE TOTAL DEPTH OF THE TRAP OR BASIN. TOTAL DEPTH SHALL BE MEASURED FROM THE TRAP OR BASIN BOTTOM TO THE CREST OF THE OUTLET.
20. SEDIMENT REMOVED FROM TRAPS (AND BASINS) SHALL BE PLACED AND STABILIZED IN APPROVED AREAS, BUT NOT WITHIN A FLOODPLAIN, WETLAND OR TREE-SAVE AREA. WHEN PUMPING SEDIMENT LADEN WATER, THE DISCHARGE MUST BE DIRECTED TO A SEDIMENT TRAPPING DEVICE PRIOR TO RELEASE FROM THE SITE. A SUMP PIT MAY BE USED IF SEDIMENT TRAPS THEMSELVES ARE BEING PUMPED OUT.
21. ALL WATER REMOVED FROM EXCAVATED AREAS (E.G. UTILITY TRENCHES) SHALL BE PASSED THROUGH AN APPROVED DEWATERING PRACTICE OR PUMPED TO A SEDIMENT TRAP OR BASIN PRIOR TO DISCHARGE FROM THE SITE (I.E. VIA FUNCTIONAL STORM DRAIN SYSTEM OR TO STABLE GROUND SURFACE).
22. SEDIMENT CONTROL FOR UTILITY CONSTRUCTION FOR AREAS OUTSIDE OF DESIGNED CONTROLS OR AS DIRECTED BY ENGINEER OR WMA INSPECTOR:
 - A. CALL "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF WORK.
 - B. EXCAVATED TRENCH MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF THE TRENCH.
 - C. TRENCHES FOR UTILITY INSTALLATION SHALL BE BACKFILLED, COMPACTED AND STABILIZED AT THE END OF EACH WORKING DAY. NO MORE TRENCH SHALL BE OPENED THAN CAN BE COMPLETED THE SAME DAY, UNLESS:
 1. TEMPORARY SILT FENCE SHALL BE PLACED IMMEDIATELY DOWNSTREAM OF ANY DISTURBED AREA INTENDED TO REMAIN DISTURBED FOR MORE THAN ONE DAY.
 - D. WHERE DEEMED APPROPRIATE BY THE ENGINEER OR INSPECTOR, SEDIMENT BASINS AND TRAPS MAY NEED TO BE SURROUNDED WITH AN APPROVED SAFETY FENCE. THE FENCE MUST CONFORM TO LOCAL ORDINANCES AND REGULATIONS. THE DEVELOPER OR OWNER SHALL CHECK WITH LOCAL BUILDINGS OFFICIALS ON APPLICABLE SAFETY REQUIREMENTS. WHERE SAFETY FENCE IS DEEMED APPROPRIATE AND LOCAL ORDINANCES DO NOT SPECIFY FENCING SIZES AND TYPES, THE FOLLOWING SHALL BE USED AS A MINIMUM STANDARD: THE SAFETY FENCE MUST BE MADE OF WELDED WIRE AND AT LEAST 42 INCHES HIGH, HAVE POSTS SPACED NO FARTHER APART THAN 8 FEET, HAVE MESH OPENINGS NO GREATER THAN 2 INCHES IN WIDTH AND 4 INCHES IN HEIGHT WITH A MINIMUM OF 14 GAUGE WIRE. SAFETY FENCE MUST BE MAINTAINED AND IN GOOD CONDITION AT ALL TIME.
23. OFF-SITE SPOIL OR BORROW AREAS ON STATE OR FEDERAL PROPERTY MUST HAVE PRIOR APPROVAL BY WMA AND OTHER APPLICABLE STATE, FEDERAL AND LOCAL AGENCIES OTHERWISE APPROVAL MUST BE GRANTED BY THE LOCAL AUTHORITIES. ALL WASTE AND BORROW AREAS OFF-SITE MUST BE PROTECTED BY SEDIMENT CONTROL MEASURES AND STABILIZED.
24. SITES WHERE INFILTRATION DEVICES ARE USED FOR THE CONTROL OF STORMWATER, EXTREME CARE MUST BE TAKEN TO PREVENT RUNOFF FROM UNSTABILIZED AREAS FROM ENTERING THE STRUCTURE DURING CONSTRUCTION. SEDIMENT CONTROL DEVICES PLACED IN INFILTRATION AREAS MUST HAVE BOTTOM ELEVATIONS AT LEAST TWO (2) FEET HIGHER THAN THE FINISH GRADE BOTTOM ELEVATION OF THE INFILTRATION PRACTICE. WHEN CONVERTING A SEDIMENT TRAP TO AN INFILTRATION DEVICE, ALL ACCUMULATED SEDIMENT MUST BE REMOVED AND DISPOSED OF PRIOR TO FINAL GRADING OF INFILTRATION DEVICE.
25. OFF-SITE SPOIL OR BORROW AREAS ON STATE OR FEDERAL PROPERTY SHALL HAVE PRIOR APPROVAL BY MDE AND OTHER APPLICABLE STATE, FEDERAL AND LOCAL AGENCIES; OTHERWISE APPROVAL SHALL BE GRANTED BY THE LOCAL AUTHORITIES. ALL WASTE AND BORROW AREAS OFF-SITE SHALL BE PROTECTED BY SEDIMENT CONTROL MEASURES AND STABILIZED.
26. SITE INFORMATION:
 - A. AREA DISTURBED: 0.11 ACRES
 - B. TOTAL CUT: 700 CUBIC YARDS (+/-)
 - C. TOTAL FILL: 0 CUBIC YARDS
 - D. OFFSITE WASTE/ BORROW LOCATION: AT CONTRACTOR'S DISCRETION



STANDARD STABILIZATION NOTE

FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES AND ALL SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1) AND SEVEN (7) DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.

OWNER'S/DEVELOPER'S CERTIFICATION

I/WE HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT BEFORE BEGINNING THE PROJECT. I/WE HEREBY AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ONSITE EVALUATION BY APPROPRIATE INSPECTION AND ENFORCEMENT AUTHORITY OR THE STATE OF MARYLAND, DEPARTMENT OF THE ENVIRONMENT. I/WE HEREBY CERTIFY THAT STORMWATER MANAGEMENT FACILITIES WILL BE MAINTAINED IN ACCORDANCE WITH APPROVED PLANS.

DATE _____ OWNER/DEVELOPER SIGNATURE _____

RESPONSIBLE PERSONNEL CERTIFICATION NO. _____ PRINTED NAME AND TITLE _____

DESIGN CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUMES 1 & II INCLUDING SUPPLEMENTS, THE ENVIRONMENT ARTICLE SECTIONS 4-101 THROUGH 116 AND SECTIONS 4-201 AND 215, AND THE CODE OF MARYLAND REGULATIONS (COMAR) 26.17.01 AND COMAR 26.17.02 FOR EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT, RESPECTIVELY.

DATE 12/20/2016 DESIGNER'S SIGNATURE _____

MD REGISTRATION NO. 19174 PRINTED NAME ROBERT T. GALLA

(E.E., L.S., R.L.A., OR P.A. (CIRCLE ONE))



PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19174, EXPIRATION DATE: 6/20/2017.



USING AGENCY APPROVAL

MARK	DATE	DESCRIPTION

CAD DWG FILE: HV MDSHA

DRAWN BY: VMB

CHECKED BY: ERE

PROJECT NO: 60527270

DATE: DECEMBER 2016

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

STABILIZATION NOTES:

Section I – Vegetative Stabilization Methods and Materials

- A. Site Preparation
- I. Install erosion and sediment control structures (either temporary or permanent) such as diversions, grade stabilization structures, berms, waterways, or sediment control basins.
 - II. Perform all grading operations at right angles to the slope. Final grading and shaping is not usually necessary for temporary seeding.
 - III. Schedule required soil tests to determine soil amendment composition and application rates for sites having disturbed area over 5 acres.

- B. Soil Amendments (Fertilizer and Lime Specifications)
- I. Soil tests must be performed to determine the exact ratios and applications rates for both lime and fertilizer on sites having disturbed areas over 5 acres. Soil analysis may be performed by the University of Maryland or a recognized commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.
 - II. Fertilizers shall be uniform in composition, free flowing and suitable for accurate application by approved equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers shall all be delivered to the site fully labeled according to the applicable state fertilizer laws and shall bear the name, trade name or trademark and warrantee of the producer.
 - III. Lime materials shall be ground limestone (hydrated or burnt lime may be substituted) which contains at least 50% total oxides (calcium oxide plus magnesium oxide). Limestone shall be ground to such fineness that at least 50% will pass through a #100 mesh sieve and 98-100% will pass through #20 mesh sieve.
 - IV. Incorporate lime and fertilizer into the top 3-5" of soil by disking or other suitable means.

- C. Seedbed Preparation
- I. Temporary Seeding
 - a. Seedbed preparation shall consist of loosening soil to a depth of 3" to 5" by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened it should not be rolled or dragged smooth but left in the roughened condition. Sloped areas (greater than 3:1) should be tracked leaving the surface in an irregular condition with ridges running parallel to the contour of the slope.
 - b. Apply fertilizer and lime as prescribed on the plans.
 - c. Incorporate lime and fertilizer into the top 3" - 5" of soil by disking or other suitable means.

- II. Permanent Seeding
- a. Minimum soil conditions required for permanent vegetative establishment:
 1. Soil pH shall be between 6.0 and 7.0
 2. Soluble salts shall be less than 500 parts per million (ppm).
 3. The soil shall contain less than 40% clay but enough fine grained material (>30% silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception is if lovegrass or sericia lespedeza is to be planted, then a sandy soil (< 30% silt plus clay) would be acceptable.
 4. Soil shall contain 1.5% minimum organic matter by weight.
 5. Soil must contain sufficient pore space to permit adequate root penetration.
 6. If these conditions cannot be met by soils on site, adding topsoil is required in accordance with Section 21 Standard and Specification for Topsoil.
 - b. Areas previously graded in conformance with the drawings shall be maintained in a true and even grade, then scarified or otherwise loosened to a depth of 3 - 5" to permit bonding of the topsoil to the surface area and to create horizontal erosion check slots to prevent topsoil from sliding down a slope.
 - c. Apply soil amendments as per soil test or as included on the plans.
 - d. Mix soil amendments into the top 3 - 5" of topsoil by disking or other suitable means. Lawn areas should be raked to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Where site conditions will not permit normal seedbed preparation, loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface. Steep slopes (steeper than 3:1) should be tracked by a dozer leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. The top 1- 3" of soil should be loose and friable. Seedbed loosening may not be necessary on newly disturbed areas.

- D. Seed Specifications
- I. All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to re-testing by a recognized seed laboratory. All seed used shall have been tested within the 6 months immediately preceding the date of sowing such material on this job.

- NOTE: Seed tags shall be made available to the inspector to verify type and rate of seed used.
- II. Inoculant - The inoculant for treating legume seed in the seed mixtures shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species. Inoculants shall not be used later than the date indicated on the container. Add fresh inoculant as directed on package. Use four times the recommended rate when hydroseeding.
- NOTE: It is very important to keep inoculant as cool as possible until used. Temperatures above 75-80 F can weaken bacteria and make the inoculant less effective.

- E. Methods of Seeding
- I. **Hydroseeding:** Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer), broadcast or drop seeder, or a cultipacker seeder.
 - a. If fertilizer is being applied at the time of seeding, the application rates amounts will not exceed the following: nitrogen; maximum of 100lbs. Per acre total of soluble nitrogen; P205 (phosphorus): 200 lbs/ac; K20 (potassium): 200 lbs/ac.
 - b. Lime - use only ground agricultural limestone, (Up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
 - c. Seed and fertilizer shall be mixed on site and seeding shall be done immediately and without interruption.

- II. **Dry Seeding:** This included use of conventional drop broadcast spreaders.
 - a. Seed spread dry shall be incorporated into the subsoil at the rates prescribed on the Temporary or Permanent Seeding Summaries or Tables 25 or 26. The seeded area shall then be rolled with a weighted roller to provide good seed to soil contact.
 - b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.
- III. **Drill or Cultipacker Seeding:** Mechanized seeders that apply and cover seed with soil.
 - a. Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
 - b. Where practical, seed should be applied in two directions perpendicular to each other. Apply half the seeding rate in each direction.

- F. Mulch Specifications (In order of preference)
- I. Straw shall consist of thoroughly threshed wheat, rye or oat straw, reasonably bright in color, and shall not be musty, moldy, caked, decayed, or excessively dusty and shall be free of noxious weed seeds as specified in the Maryland Seed Law.
 - II. Wood Cellulose Fiber Mulch (WCFM)
 - a. WCFM shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state.
 - b. WCFM shall be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
 - c. WCFM, including dye, shall contain no germination or growth inhibiting factors.
 - d. WCFM materials shall be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material shall form a blotter-like ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
 - e. WCFM material shall contain no elements or compounds at concentration levels that will be phytotoxic.
 - f. WCFM must conform to the following physical requirements: fiber length to approximately 10 mm., diameter approximately 1 mm., ph range of 4.0 to 8.5, ash content of 1.6% maximum and water holding capacity of 90% minimum
- NOTE: Only sterile straw mulch should be used in areas where one species of grass is desired.

- G. Mulching Seeded Areas - Mulch shall be applied to all seeded areas immediately after seeding.
- I. If grading is completed outside of the seeding season, mulch alone shall be applied as prescribed in this section and maintained until the seeding season returns and seeding can be performed in accordance with these specifications.
 - II. When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre. Mulch shall be applied to a uniform loose depth of between 1" and 2". Mulch applied shall achieve a uniform distribution and depth so that the soil surface is not exposed. If a mulch anchoring tool is to be used, the rate should be increased to 2.5 tons/acre.
 - III. Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1,500 lbs. Per acres. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lbs. Of wood cellulose fiber per 100 gallons of water.

H. Securing Straw Mulch (Mulch Anchoring): Mulch anchoring shall be performed immediately following mulch application to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon size of area and erosion hazard:

- I. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of two (2) inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should be used on the contour if possible.
 - II. Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 pounds/acre. The wood cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
 - III. Application of liquid binders should be heavier at the edges where wind catches 1,500 lbs. Per acres. The wood cellulose fiber shall be mixed with water, and appear uniform after binder application. Synthetic binders - such as Acrylic DLR (Agra-Tack) DCA-70, Petrosel, Terra Tax II, Terra Tack AR or other approved equal may be used at rates recommended by the manufacturer to anchor mulch.
 - IV. Lightweight plastic netting may be stapled over the mulch according to manufacturer's recommendations. Netting is usually available in rolls 4' to 15' wide and 300 to 3000 feet long.
- I. Incremental Stabilization - Cut Slopes
- I. All cut slopes shall be dressed, prepared, seeded and mulched as the work progresses. Slopes shall be excavated and stabilized in equal increments not to exceed 15'.
 - a. Excavate and stabilize all temporary swales, side ditches, or berms that will be used to convey runoff from the excavation.
 - b. Perform phase 1 excavation, dress, and stabilize.
 - c. Perform phase 2 excavation, dress, and stabilize. Overseed phase 1 areas as necessary.
 - d. Perform final phase excavation, dress and stabilize. Overseed previously seeded areas as necessary.
- II. Construction sequence:

- a. Excavate and stabilize all temporary swales, side ditches, or berms that will be used to convey runoff from the excavation.
- b. Perform phase 1 excavation, dress, and stabilize.
- c. Perform phase 2 excavation, dress, and stabilize. Overseed phase 1 areas as necessary.
- d. Perform final phase excavation, dress and stabilize. Overseed previously seeded areas as necessary.

NOTE: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

- J. Incremental Stabilization of Embankment - Fill Slopes
- I. Embankments shall be constructed in lifts as prescribed on the plans.
 - II. Slopes shall be stabilized immediately when the vertical height of the multiple lifts reaches 15', or when the grading operation ceases as prescribed in the plans.
 - III. At the end of each day, temporary berms and pipe slope drains should be constructed along the top edge of the embankment to intercept surface runoff and convey it down the slope in a non-erosive manner to a sediment trapping device.

NOTE: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

Section II - Temporary Seeding
Vegetation - annual grass or grain used to provide cover on disturbed areas for up to 12 months. For longer duration of vegetative cover, Permanent Seeding is up to 12 months. For longer duration of vegetative cover, Permanent Seeding is required.

- A. Seed Mixtures - Temporary Seeding
- I. Select one or more of the species or mixtures listed in Table 26 for the appropriate Plant Hardiness Zone (from Figure 5) and enter them in the Temporary Seeding Summary below, along with application rates, seeding dates and seeding depths.
 - II. For sites having soil tests performed, the rates shown on this table shall be deleted and the rates recommended by the testing agency shall be written in. Soil tests are not required for Temporary Seeding.

Seed Mixture (For Hardiness Zone 7A) (From Table B.1)				Fertilizer Rate (10-10-10)	Lime Rate
Species	Application Rate (lb/ac)	Seeding Dates	Seeding Depths		
Annual Ryegrass	50	3/1 - 4/30 11/1	1/4-1/2 in.	600 lb/ac (15 lb/1000 sf)	2 tons/ac (100 lb/1000 sf)
Barley or Rye Plus Foxtail Millet	150	3/1 - 4/30 5/1 - 8/14 8/15 - 11/15	1 in.		

Section III: Permanent Seeding

Seeding grass and legumes to establish ground cover for a minimum period of one year on disturbed areas generally receiving low maintenance.

- A. Seed Mixtures - Permanent Seeding
- I. For sites having disturbed areas over 5 acres, the rates shown on this table shall be deleted and the rates recommended by the soil testing agency shall be written in.
 - II. For areas receiving low maintenance, apply ureaform fertilizer (46-0-0) at 3 1/2 lbs/1000 sq ft. (150 lbs/ac) in addition to the above soil amendments shown in the table below, to be performed at the time of seeding.

Seed Mixture (For Hardiness Zone 8b) (From Table B5)				Fertilizer Rate (10-20-20)			Lime Rate	
No.	Species	Application Rate (lb/ac)	Seeding Dates	Seeding Depths	N	P205		K20
5	Tall Fescue (85%) or, Perennial Ryegrass (50%) plus Crownvetch or Flatpea	110	3/1 - 5/15 8/15 - 10/15	1/4"	90 lb/ac (2 lb/1000 sf)	175 lb/ac (4 lb/1000 sf)	175 lb/ac (4 lb/1000 sf)	2 tons/ac (100 lb/1000 sf)
		20						
7	Tall Fescue (83%) Weeping Lovegrass (2%) Sericia Lespedeza (15%)	110	3/1 - 10/15	1/4"	90 lb/ac (2 lb/1000 sf)	175 lb/ac (4 lb/1000 sf)	175 lb/ac (4 lb/1000 sf)	2 tons/ac (100 lb/1000 sf)
		3						
		20						

Section IV - Sod: To provide cover on disturbed areas (2:1 grade or flatter).

- A. General specifications
- I. Class of turfgrass sod shall be Maryland or Virginia State Certified or Approved. Sod labels shall be made available to the job foreman and inspector.
 - II. Sod shall be machine cut at a uniform soil thickness of 3/4", plus or minus 1/4", at the time of cutting. Measurement for thickness shall exclude top growth and thatch. Individual pieces of sod shall be cut to the suppliers width and length. Maximum allowable deviation from standard widths and lengths shall be 5 percent. Broken pads and torn or uneven ends will not be acceptable.
 - III. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section.
 - IV. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be approved by an agronomist or soil scientist prior to installation.
- B. Sod Installation
- I. During periods of excessively high temperature or in areas having dry subsoil, the subsoil shall be lightly irrigated immediately prior to laying the sod.
 - II. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly wedged against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which cause air drying of the roots.
 - III. Wherever possible, sod shall be laid with the long edges parallel to the contour and with staggering joints. Sod shall be rolled and tamped, pegged or otherwise secured to prevent slippage on slopes and to ensure solid contact between sod roots and the underlying soil surface.
 - IV. Sod shall be watered immediately following rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. The operations of laying, tamping and irrigating for any piece of sod shall be completed within eight hours.

- C. Sod Maintenance
- I. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantities to maintain moist soil to a depth of 4". Watering should be done during the heat of the day to prevent wilting.
 - II. After the first week, sod watering is required as necessary to maintain adequate moisture content.
 - III. The first mowing of sod should not be attempted until the sod is firmly rooted. No more than 1/3 of the grass leaf shall be removed by the initial cutting or subsequent cuttings. Grass height shall be maintained between 2" and 3" unless otherwise specified.



7 SAINT PAUL STREET, 17th FLOOR
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4 N PARK DRIVE, SUITE #300 COCKEYSVILLE,
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PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19174, EXPIRATION DATE: 6/20/2017.



USING AGENCY APPROVAL

MARK	DATE	DESCRIPTION

CAD DWG FILE: HV MDSHA

DRAWN BY: VMB

CHECKED BY: ERE

PROJECT NO: 60527270

DATE: DECEMBER 2016

EROSION AND SEDIMENT CONTROL VEGETATIVE STABILIZATION NOTES