ATTACHMENT 23

TECHNICAL SPECIFICATIONS

TORFP# F50B9400014

1. Summary

This task order is for the purchase and turnkey installation of one (1) 330-foot self-supporting tower, one (1) 12x38 ft. concrete foundation, one (1) 12x38x10-foot equipment shelter with a 75kW backup generator and one (1) 1000 gallon propane tank w/concrete foundation for the State of Maryland at the following location:

HARRY NICE BRIDGE COMMUNICATIONS TOWER

Harry W. Nice Memorial Bridge Toll Facility.

Newburg, MD. 20664

Grid Coordinates: Latitude: N38-21-49.95, Longitude: W76-58-35.40

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**

Attachments referenced are as follows:

- **Attachment 24-Foundation Inspection**
- **Attachment 25-Tower Loading Plan**
- **Attachment 26- Typical Equipment Shelter with Generator**
- **Attachment 28- Tower Layout**
- **Attachment 30-Soil Boring Report Geo Tech**
- **Attachment 31- Closeout Process**
- **Attachment 33-Construction Drawings**

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

The TO Contractor shall:

i. Provide location 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.

ii. Follow the approved sequence of construction as shown in the Attachment 33. Any deviations must be approved by the County or MDE, as required.

iii. May use subcontractors who have experience in civil/site work, Erosion and Sediment Control (E&S) implementation, Storm Water Management (SWM) and Storm Drain (SD) construction, etc. in the context of State Highway Administration (SHA) projects and meeting MD Dept. of the Environment (MDE) requirements.

iv. TO Contractors without green and yellow cards must use approved subcontractors to install and maintain soil and erosion controls who do have these certificates.

v. 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.

vi. 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.

vii. Survey and mark the Limits of Disturbance (LOD) in accordance with the attached construction drawings.

viii. Furnish and install sediment and erosion control systems 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 MDE policy. Details are provided in Attachment #33 Construction Drawings. Deviations from the drawings require County or MDE approval as appropriate.

ix. Have a watertight container 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 (i.e., concrete delivery tickets, stone delivery tickets, MDI, etc.). 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 will 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 are 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.

x. Furnish and install a stabilized construction entrance and site access road 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 construction drawings

xi. All concrete supplied shall originate from a State certified/SHA approved plant. Supplied concrete shall meet SHA, tower designer specifications and comply with Section 902 of the Grey Book.

xii. TO Contractors shall use a SHA approved concrete mix that complies with the design specifications of tower and shelter foundation.

xiii. Construct the tower foundation per tower manufacturer's specifications.

xiv. Construct one (1) 12x38ft poured concrete slab equipment shelter foundation. The foundation design shall be approved by the shelter manufacturer. At a minimum its footers will extend at least 6 IN below the local frost line. The supply and installation of the equipment shelter foundation shall include: the construction of the concrete foundation shall contain an integrated continuous stoop for the doors, and be designed to support a 12x38x10ft concrete equipment shelter (height is inside dimension).

xv. Construct one (1) 4x20ft. Concrete foundation for one (1) 1,000 gallon LP fuel tank. The foundation will be constructed on compacted dirt and no less than 3 IN of #57 stone. The foundation will be at least six inches above final grade and be reinforced with rebar or 6x6 metal mesh.

xvi. Install tower and shelter ground rings per the latest version of Motorola R56 installation standards. This will include at least two test wells. Test wells shall not interfere with vehicular traffic. Locations will be verified by the Project Manager

xvii. 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.

xviii. Install an eight (8) ft. high-galvanized chain link fence with two (2) feet of barbed wire on top, with a twelve (12) ft. wide, double leaf vehicle gate; and one (1) five (5) foot man gate around the site (includes tower, equipment shelter and additional shelter foundation) as shown on Attachment #33- Construction Drawings. The fence materials will 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 will be UV rated and black or grey in color. If the copper is not tinned, anti-oxidation compound will 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

i. The tower shall be a solid steel leg constructed, self-supporting, 330-ft tower. 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.

ii. Exact placement of the tower and shelter shall be coordinated by the TO Contractor with the State Project Manager.

iii. The tower shall be required to meet or exceed the latest EIA 222-H standards for this type of tower. It will be designed to carry the number and type of antennas as per attached 330-ft State Tower loading plan (see Attachment 25). 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 will be designed with the following 222-H design criteria:

Three second wind gust:	**120 MPH**
Three second wind gust concurrent with radial ice:	**40 MPH**
Concurrent radial ice:	**½ IN**

Structure classification:	**III**
Exposure category:	**C**
Topographic category:	**1**
Crest Height:	**N/A**

iv. 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.

v. Spacing between tower legs shall not exceed 31 ft. If using a pad and pier foundation, keep the pad to no more than 45x45ft.

vi. Proper and thorough grounding and bonding methods in accordance with currently published Motorola R56 standards shall be employed to provide maximum lightning protection.

vii. 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 Maryland State Department of Information Technology (DoIT). The TO Contractor shall furnish a statement that the engineered tower foundations and the calculated ground loadings meet the manufacturer's recommended requirements.

viii. Step bolts on one leg, safety climb and grounding bars are to be furnished and installed by the TO Contractor as part of the tower. Safety climb stand offs will be of sufficient length to ensure the safety climb does not rub on the flanges. Step bolt mounts will be permanently attached to the side of the climbing leg instead of the face/apex of the climbing leg. Tower ground bus bars will 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 will be a minimum of ¼"x4"x24", (minimum 33 hole pairs) copper bars. One tower bus bar will be provided for each shelter installed.

ix. The tower will 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 will be designed in accordance with Attachment 28. The "State" cable ladders will 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. If the cable ladders are required to meet, a single ladder will extend to the top of the tower. The single cable ladder will accommodate at least fifteen (15) ¾ IN snap-ins and be at least three (3) FT wide. The project manager will determine where the two cable ladders meet and transition to the single cable ladder. The cable ladders will be mounted on the same face and the outside edge of the tower. The ladders will each originate on opposite outer edges of the face of the tower. They will originate approximately

one foot from the leg of the tower and will remain one foot from the edge of the tower. One foot edge spacing will be maintained to the point where both cable ladders meet. From that point, a single cable ladder will extend, centered on the face, to the top of the tower. Cable ladders will not be positioned back to back. The "Cellular" cable ladder will be designed in accordance with the Tower layout (Attachment #28). The cellular cable ladder will 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 will extend the full height of the tower. The feed lines will be arranged in accordance with Attachment 25. Feed Lines heights will terminate at its corresponding antenna on Attachment 25. The tower will be designed in compliance with the state loading plan, the above configuration and all other applicable sections of this task order.

x. All leg and leg flange PL material is ASTM A-572 grade 50 (Fy >= 50 ksi). All other material is ASTM A36 (Fy >= 36 ksi).

xi. Anchor bolts will comply with ASTM A449 and be any number or size determined by the tower designer to comply with the requested load requirements.

xii. Tower foundation concrete strength will be at least 4000 PSI or the tower foundation designer's recommendation; whichever is greater. Concrete testing will be conducted in accordance with DoIT's concrete inspection policy memorandum (see Attachment 24). Test cylinders will be crushed and results provided to the State Project Manager prior to stacking the tower. Tower erection will 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.

xiii. Non-chloride, non-corrosive concrete set accelerate may be utilized in compliance with ASTM-C-494 type C and ACI-318.

xiv. Water reducing admixture may be utilized in compliance with ASTM-C-494.

xv. All admixtures should be dispensed into fresh concrete and sufficiently mixed. All admixtures must be added separately.

xvi. Minimum concrete cover of 3" on all steel.

xvii. Crown top of piers for drainage and chamfer all exposed concrete edges 1".

xviii. Compact backfill in 9" lifts. Remove all forms prior to backfill.

xix. The TO Contractor shall purchase and install tower lighting equipment on the 330 ft. tower (Total finished height of the tower including all appurtenances will be 348 ft.) as per FAA Advisory Circular AC70/7460-1-G or latest revision according to the following specifications:

a. The TO Contractor shall use tower lighting manufacturer trained and certified personnel to install tower lighting equipment on the 330 ft. tower.

b. The side markers shall be installed using stainless steel hose clamps, not plastic cable ties.

c. 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 and FAA-AC 150/5345-43E.

d. The TO Contractor shall install a medium intensity, dual strobe Type E-1 LED system that provides a white flashing LED for day operation and a red flashing LED (with IR LED) for night operation as per FAA requirements. The L-810 side markers will 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 will be centrally mounted and not anchored to just one tower leg. It will 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.

e. The lighting rod will extend at least four (4) Ft. above the top of the beacon. No part of the lightning rod or mount that obstructs the beacon will be larger than 7/8" in diameter.

f. The tower lighting system shall be supplied with remote and onsite diagnostics capabilities including software and direct connect cable.

g. TO Contractor will supply temporary power to the lighting controller until permanent power is supplied. This will 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.

h. The supplied tower lighting system shall include 5-year parts warranty.

i. The lighting controller will be bonded to the internal halo inside the generator room.

C. Equipment Shelter Specifications

12x38 ft. Shelter with 75 Kw Generator:

i. 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.

ii. 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.

iii. 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.

iv. Furnish a compatible Appleton plug such as AP20044CD with 50 Ft of conductors terminated in a pig tail. The plug will be designed to interface a portable generator with the Appleton receptacle mounted on the building. The plug will be weatherproof and the conductors will be adequately insulated and weatherproofed. They should be sized to safely connect a 50 kW emergency generator and mitigate any voltage drop. The cable assembly will 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 will be bonded per the latest version of R56. Shelters without generators will have the cable installed/stored just inside the door in accordance with the shelter layout drawings.

v. Two 16-port cable entry points complete with weatherproof caps shall be provided for antenna cable entry. One entry point will be located on the long side of the Equipment Shelter and the second entry point will be located on the end wall of the Equipment Shelter between the air conditioner units. These locations are shown in 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 SO 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.

vi. Cable ladders (24 inches wide) shall be mounted from the ceiling using all-thread and "cherry" insulators eight feet above the finished floor, measured from the floor to the bottom of the cable ladder, as shown in Attachment 26.

vii. 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 will include a humidity control feature. The outside portions of the units will be weather/rodent and tamper proof.

viii. All shelters 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 will 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.

ix. 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.

x. 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.

xi. Concrete Construction – The wall outer finish will be natural stone aggregate finish with an aesthetically pleasing earth tone.

xii. The shelter foundation shall be comprised of a concrete pad with steel reinforcement. The top of the finished foundation shall be 6 inches above finished grade. The foundation shall level the 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.

xiii. The minimum live floor loading design will be 300lbs. per square foot (PSF).

xiv. The minimum roof loading design will be 100lbs. per square foot (PSF).

xv. The minimum wall loading design will be 34 lbs. per square foot (PSF).

xvi. The minimum wind loading design will be 50 lbs. per square foot (PSF).

xvii. Two reinforced steel finished doors shall be located on the shelter, per the attached drawings. The doors will 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 will 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 will 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 will be bonded to its frame with welding cable of an appropriate gauge in accordance with the latest version of R56. Braided cable will not be used.

xviii. The equipment shelter floor shall be covered with 1/8", 12" x 12" vinyl tile, and light in color (beige, tan or white). The walls will be trimmed with a 4-inches high and 1/8 inch thick rubber base trim against the floor.

xix. The walls will be covered with a minimum of white wood-grained paneling or white vinyl over ½ inch plywood. The equipment shelter shall have a ¾" X 4ft X 8ft plywood telephone mounting board installed as per attached shelter layout drawing TORFP Attachment 26.

xx. 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 will 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 will be installed on the exterior of the shelter. These outlets are to 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.

xxi. Wiring for these drops shall be housed in "Seal-tite" 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 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 will be fastened to the wall in accordance with the shelter drawings and supplied photos. All circuits will have a dedicated neutral installed in accordance with the latest Motorola R56 standard. The junction boxes will be mounted in line vertically.

xxii. All low voltage wiring, i.e. alarm, control, etc., shall be routed in separate conduits in accordance with the national electrical code.

xxiii. 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.).

xxiv. Shelter is to 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.

xxv. An interior system ground (halo) with a single #2 AWG stranded wire will be provided with proper connections to the shelter and, in turn, to the tower ground system. The halo will have a 6-inch break roughly opposite the Master Ground Bar. The #2 AWG ground wire for each row of racks will be suspended on independent ground lead stand offs as outlined in the typical shelter drawing. They will 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 will be mounted on the wall using 2-inch (2") standoff insulators, connected to two (2) minimum ¼" 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 will be connected to the corresponding exterior ground bar with stainless steel insulated feed through. The external ground bar will 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 will be bonded to the RF ground.

xxvi. Purchase and installation of the following lightning protection devices in the equipment shelter:

a. An Institute of Electrical and Electronics Engineers (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.

b. An IEEE Type 2 MOV protection device will 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 will be installed inside of the equipment shelter and approved for use in the latest version of R56 such as Transtector IMAX series. The installation will comply with the latest version of R56 and maintain the device's UL1449 (latest edition) listing.

c. An IEEE Type 3 SAD protection device will be installed across the 120V/20A circuit for the lighting controller. This device must be installed in

such a manner that its replacement will not cause an outage to the tower lighting system. The device will be installed in the generator room near the lighting controller and approved for use in the latest version of R56.

d. All surge suppression devices will have the ability to create a dry contact alarm (contact closure upon alarm). This alarm will be integrated with the shelter alarm wiring. The dry contact alarms will be enabled from the factory.

xxvii. The Air conditioning units shall be connected to the internal (halo) grounding system **only,** not to the external equipment shelter grounding system.

xxviii. 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.

xxix. 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.

xxx. All functions/alarms will be programmed to be normally open. Upon alarm they will close.

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

xxxi. 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 will 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.

xxxii. 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.

xxxiii. 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).

xxxiv. 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 are to be included. Fuel tank hookup, fuel tank, fuel tank pad and fuel supply piping to the shelter is to 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.

xxxv. Fuel strainers on the propane fuel systems must be installed for proper drainage to prevent moisture buildup in the line. Proper sized flex fuel lines need to be installed on all generators and the fuel line so as to not impede the proper flow of fuel and must not be sharply bent, or crimped. The flex jumper must 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 will 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 must be installed to ensure no buildup of pressure and safe venting will occur. Fuel lines run in conduit or sleeves must be sealed from moisture. All exhaust piping that can come in contact with personnel will have a heat shield installed. Proper battery chargers must 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.

xxxvi. The TO Contractor must perform on-site startup of the generator under full load, using a load bank. The original of the startup form must be completed and submitted prior to submission of an invoice for work performed. The State Project Manager or his designee must be notified in advance to attend the event at their discretion. The load bank test will be at least one hour and conducted under full load. The startup will also include the programming of all generator related alarms/function.

xxxvii. All alarm outputs from the generator are to 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 will 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 will be located directly below the existing "66 block" in the radio compartment.

xxxviii. All wiring for the generator must be routed overhead. It is unacceptable to cross the floor with conduits.

xxxix. An external minimum of ¼" x 4" x 24", (36 hole pairs) copper ground bar is to 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)

xl. 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.

xli. 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.

xlii. An external ground ring shall be provided around the shelter foundation. Above grade ground tails will be provided for the shelter foundation. 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 is to be placed 3 feet outside the shelter foundation in order to be outside the drip line of the shelter.

xliii. All grounds must be bonded together. This includes the generator, the shelter, the fuel tank, the fencing, and equipment shelter grounding system, the ice bridge and the tower. The ground test reading must 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 must test fewer than 10 OHMS for the site to be acceptable for reasons of personal safety.

D. Specifications for Installation

i. Purchase and delivery of one (1) fully functional, 330 ft. above ground level, three (3) legged, solid legged, heavy duty, and self-supporting, two-way microwave radio tower.

ii. 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.

iii. The TO Contractor will furnish and install one (1), "State" cable ladder on one face of the tower. The supplied cable ladder 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.

iv. The tower shall be erected to a height of 330 ft. (AGL) and above ground in such a manner as to assure straightness and plumb.

v. Install tower lighting flash and SO cable on outside of cable ladder rail. The flash and SO cable should be routed along the cable ladder rail in a manner to

prevent damage over sharp edges, inadvertent climbing, etc. and attached per manufacturer's specifications.

vi. Purchase and installation of one (1) 12x38x10 ft. concrete equipment shelter (height is inside dimension) with a 75kW generator. The equipment shelter must rest flush on the poured concrete slab foundation without showing any gaps between the 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 purpose.

vii. An approved/certified shelter manufacturer representative will be on site for the shelter delivery to supervise the setting of the shelter. This individual will correct any foundation gaps or any deficiencies found due to shipment. This individual will also supervise the installation of any field installable items (e.g. hoods, light fixtures, etc.).

viii. 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 will also have a programmable exercise timer. Time delay neutral will be programmable from at least 0-3 seconds. The exercise timer will allow preprogramming of time and date of weekly generator runs. The transfer switch will allow the weekly generator runs to be conducted with or without load.

ix. 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 must be UV rated rubber jacketed corrugated metallic piping. The fuel tank shall be connected to the tower ground ring.

x. 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 will include generator alarm/function programming.

xi. Purchase and install one (1) extruded metal, 24-inch wide, no cantilever ice-bridge with a four tier "tee" or "tree" trapeze cable management system to facilitate easy installation and removal of cables, such as Andrew WB-T24-4 or suitable equivalent. The ice bridge posts will be no less than 3" in diameter, and spaced no more than 6' apart. Posts will be buried 36" encased in concrete. The ice bridge will be electrically insulated from the tower. The trapeze sections will be no more than four (4) feet apart. The ice bridge will be bonded to the external ground bus bar.

xii. Purchase and installation, per local utility standard, of an electrical backboard of steel post and uni-strut construction to include CT cabinet if required, wire trough, main disconnect, at least one (1) electric company approved meter socket with room to accommodate an additional meter, if necessary.

xiii. Purchase and installation of two (2) 4-inch conduits, approximately 60 ft. in length from the existing power company supplied pad mounted transformer, to the TO Contractor supplied electrical backboard, and from the backboard into the disconnect switch, located on the back of the equipment shelter.

xiv. Purchase and connection of electrical wiring, per local electrical code, from the TO Contractor installed backboard to the fused disconnect on the back of the shelter and from fused disconnect located on the back of the shelter into the equipment shelter's 400-amp load center. Electrical work must be completed by a State of Maryland certified electrician.

xv. Purchase and installation of two (2) 4-inch conduits, one (1) for electrical service and one (1) for communication cabling The communication conduit will originate at a minimum of 12x12x12 IN or larger communications cable pull box on the exterior of the shelter with generator. The pull box will accommodate at least three (3) 4IN, schedule 40 conduits. This box will be weather proof and constructed of plastic or other non-conductive materials. The location of the pull box will be determined by the State Project Manager. The 4" communications conduit will extend from the communications cable pull box located on the exterior of equipment shelter with the generator to a location approximately 150ft. beyond the compound limits to a point where the conduit is to be stubbed up near an existing fiber-optic man-hole for future connection. The electrical conduit will extend from the existing pad-mount transformer across the existing access road to the point of connection to the source of primary (13kv.) power located as shown on attachment #33- construction drawings. Locator tape will be installed in all telco and electric trenches one (1) ft. above new conduits.

xvi. Supplied materials, including, but not limited to, equipment shelters and tower, LP tank, etc. shall be new, unused and shall meet the latest design and fabrication standards of the Electronics Industry Association (EIA). A VALID BILL OF SALE FOR THE FUEL TANK MUST BE PROVIDED UPON INSTALLATION.

xvii. All supplied materials shall be purchased, not leased.

xviii. Supply 6" dia. bollards as needed in order to protect the pad-mount transformer from possible damage caused by vehicles.

xix. The TO Contractor will provide placards affixed to every equipment and generator room door stating there is Electro Magnetic Energy dangers. These signs will comply with the latest version of Motorola's R56. The TO Contractor will provide placards affixed to every vehicle and man gate indicating the site is alarmed and under 24 hour surveillance. The signs will 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 will 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 project manager. All signs will be metal, fade and weather proof. They will be permanently affixed to their

respective gate or door. ASR signs will be provided with the delivery of the tower.

E. Inspection Schedule/Requirements

i. Sediment and Erosion Controls – A preconstruction meeting will be conducted if applicable with the required inspectors at least 7 days prior to any disturbance. Controls will 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.

ii. Compaction tests – Construction inspectors will inspect each lift required for site grading, access road work and fill (to include the tower foundation). Noncompliance may require the removal of fill and/or halting work.

iii. Storm Water Management – If necessary, the TO Contractor will provide evidence of the installation of any required Storm Water Management materials and techniques. This is outlined in Attachment 33 and will be done at the TO contractor's expense.

iv. Cylinder break reports – The tower and shelter foundations will 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 will require tests. This will be coordinated through a private party at the TO Contractor's expense.

v. Electrical inspection – Final wiring will be inspected prior to energizing the site. An approved third party inspection agency can be utilized if recognized by the local utility. This will be supplied by the TO Contractor.

vi. Tower Inspection – The tower's structural integrity, galvanizing condition and assembly will be inspected by a third party inspector furnished by DoIT.

vii. R56 Inspection – the site, tower and shelter will be subject to a R56 inspection. Discrepancies will be corrected at the TO Contractor's expense. The inspector will be furnished by DoIT.

viii. 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.

3. 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 State Program Manager.

4. Approvals

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

- **Tower profile (Final drawings will have PE stamp)**
- **Tower foundation design (Final drawings will have PE stamp)**
- **Shelter drawings (Final drawings will have PE stamp)**
- **Foundation design (Final drawings will have PE stamp)**
- **Shop drawings for LP tank foundation**
- **Shop drawings for fence**

5. Final Acceptance Sign-off

The TO Contractor will 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:

i. The lighting system has operated without fault for thirty (30) days.

ii. 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 will be initialed and dated by the crew. Photos will 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.

iii. All other deficiencies noted by the State have been corrected to the State's satisfaction.

iv. All construction materials, equipment, excess tools and other materials will be removed from the site. The shelter interior (equipment and generator room) will be swept and all protective paper removed from the floors. The site should be neat and organized.

v. 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.

ATTACHMENT
Typical 330' State Tower Loading Plan

Antenna#	Mounting Location (Measured down from top)	Mounting Location (AGL)	Antenna Model	Azimuth	Frequency	Line Size	To be supplied with tower
1	Top	330	BMR-12	0°	800 MHZ	1 5/8"	N
2	Top	330	BMR-12	120°	800 MHZ	1 5/8"	N
3	Top	330	BMR-12	240°	800 MHZ	1 5/8"	N
4	Top Less 20'	310	BMR-12	0°	800 MHZ	1 5/8"	N
5	Top Less 20'	310	BMR-12	120°	800 MHZ	1 5/8"	N
6	Top Less 20'	310	BMR-12	240°	800 MHZ	1 5/8"	N
7	Top Less 40'	290	BMR-12	0°	800 MHZ	1 5/8"	N
8	Top Less 40'	290	BMR-12	120°	800 MHZ	1 5/8"	N
9	Top Less 40'	290	BMR-12	240°	800 MHZ	1 5/8"	N
10	Top Less 60'	270	DB 420-D	0°	450 MHZ Dual fed antenna	(2) Ea. 7/8"	N
11	Top Less 60'	270	DB 420-D	120°	450 MHZ Dual fed antenna	2 X 7/8"	N
12	Top Less 60'	270	DB 420-D	240°	450 MHZ Dual fed antenna	2 X 7/8"	N
13	Top Less 80'	250	DB 224	0°	138-174 MHZ	7/8"	N
14	Top Less 80'	250	DB 224	120°	138-174 MHZ	7/8"	N
15	Top Less 80'	250	DB 224	240°	138-174 MHZ	7/8"	N

16	Top Less 100’	230 feet	(6) DAPA 59210 Panel Antenna	360°	1710-1990 MHZ	6 X 1 5/8"	N
17	Top Less 120’	210 feet	(6) DB858HV90E-SX Panel Antenna Array	360°	806-896 MHZ	12 X 1 5/8"	N
18	Top Less 140’	190 feet	8' HP Solid Dish	0°	6.000 GHz	EW63	N
19	Top Less 140’	190 feet	8' HP Solid Dish	120°	6.000 GHz	EW63	N
20	Top Less 140’	190 feet	8' HP Solid Dish	240°	6.000 GHz	EW63	N
21	Top Less 160’	170 feet	(6) DAPA 59210 Panel Antenna Array	360°	1710-1990 MHZ	6 X 1 5/8"	N
22	Top Less 180’	150 feet	(6) DB858HV90E-SX Panel Antenna Array	360°	806-896 MHZ	12 X 1 5/8"	N
23	Top Less 200’	130 feet	8' HP Solid Dish	0°	6.000 GHz	EW63	N
24	Top Less 200’	130 feet	8' HP Solid Dish	120°	6.000 GHz	EW63	N
25	Top Less 200’	130 feet	8' HP Solid Dish	240°	6.000 GHz	EW63	N
26	Top Less 220’	110 feet	(6) DB858HV90E-SX Panel Antenna Array	360°	806-896 MHZ	12 X 1 5/8"	N
27	Top Less 240’	90 feet	(6) DAPA 59210 Panel Antenna Array	360°	1710-1990 MHZ	6 X 1 5/8"	N

State of Maryland

Typical 12x38 Ft Shelter (with generator) Layout

DATE ORIGINAL: 9/8/08

SCALE: ¼" : 1"

LATEST REVISION: C

JOB NO.:

REVISIONS

NO.	DATE	DESCRIPTION
B	10/08	Added alarms
C	06/09	Changed location of 240VAC outlets/ added r1r3 120VAC
D	03/11	Revised lighting plan

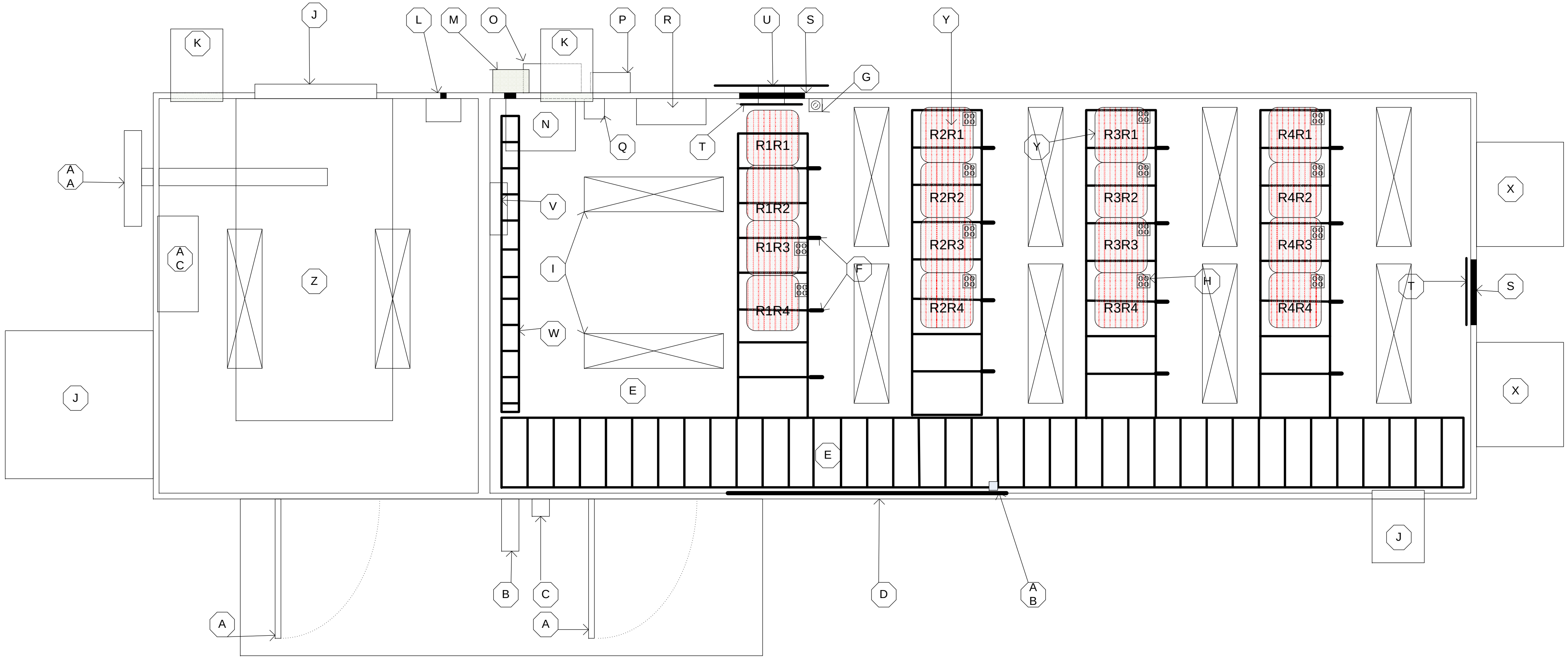
CHECKED:

DRAWN:

Drawn by: William Drew, PMP
William.Drew@doit.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	AB	Alarm 66 Block (no enclosure)
B	Appleton Plug	K	Temp activated fans	T	Internal ground bus bar	AC	Appleton cable/hose bib
C	Exterior Light	L	Light controller and penetration for SO cables	U	External ground bus bar	AD	
D	4x8 Telco board	M	Pull box and 4IN penetration for telco	V	Subfeed	AE	
E	24" cable ladders	N	Auto transfer switch	W	Teleco cable ladder	AF	
F	Stand offs for #2 ground lead	O	Main service disconnect	X	HVAC	AG	
G	(3) vertically mounted 240v outlets (twist lock type)	P	Building subfeed disconnect	Y	Rack footprint	AH	
H	120V Quad box outlet	Q	Type2 MOV	Z	Generator	AI	
I	48IN lights	R	Integrated load center	AA	Generator exhaust	AJ	

TITLE

LATEST REVISION | DATE ORIGINAL

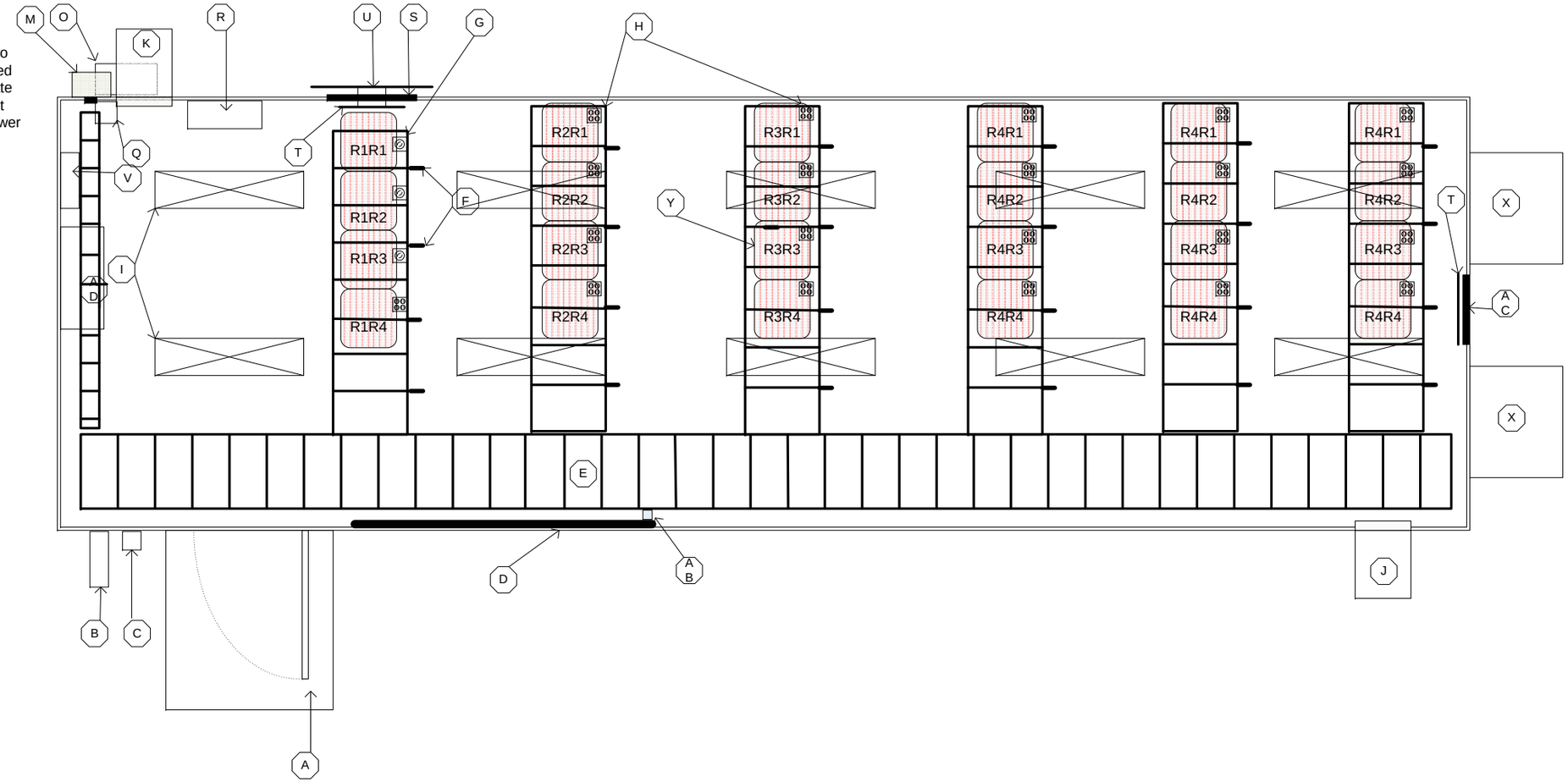
JOB NO. | SCALE

CHECKED | DRAWN

REVISIONS

NO.	DATE	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

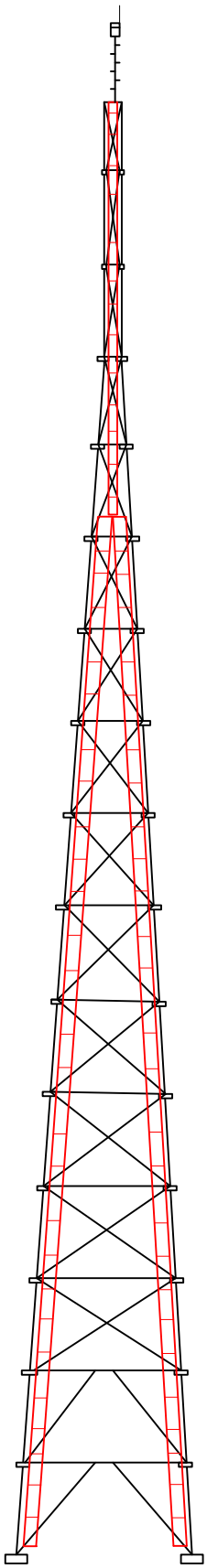
AB	Alarm 66 Block (no enclosure)
AC	16 Port cable entry port
AD	Appleton cable/hose bib
AE	
AF	
AG	
AH	
AI	
AJ	

Typical State tower layout

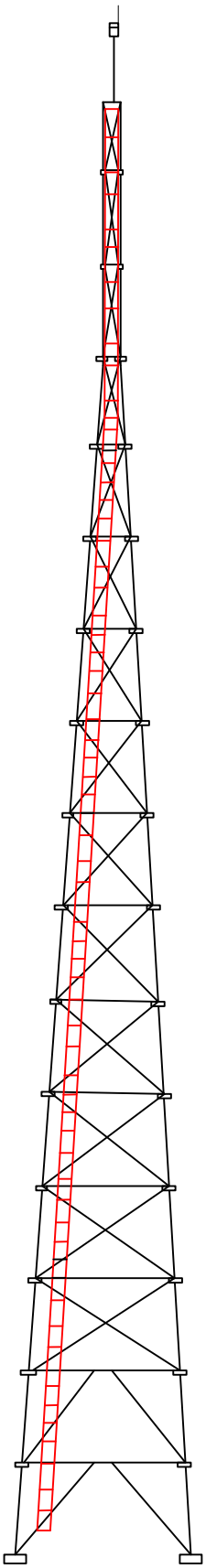
Drawn by: Sean Javins
sean.javins@doit.state.md.us

SIZE	FSCM NO	DWG NO	REV
			A

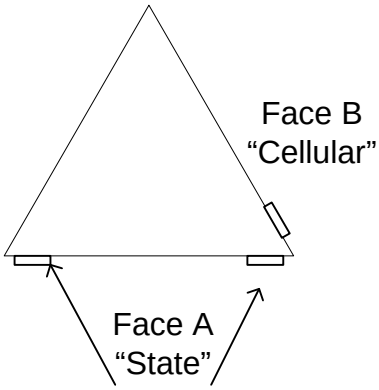
SCALE	SHEET
1in = 40ft. 0in.	1 OF 3



Face A
“State”

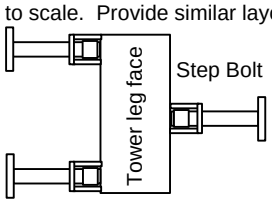


Face B
“Cellular”

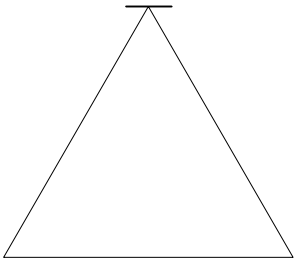


Cable Ladders
at base of tower
(not to scale)

Step Bolt Detail
Not to scale. Provide similar layout.



Tower Leg Face



HARRY W. NICE BRIDGE IMPROVEMENT PROJECT

JMT | PARSONS BRINCKERHOFF

A Joint Venture

GEOTECHNCAL ENGINEERING REPORT **November 30, 2016**

NICE BRIDGE COMMUNICATION TOWER AT HARRY W. NICE MEMORIAL BRIDGE TOLL FACILITY

Newburg, Charles County, Maryland

JMT Project No. 12-1012-001

Submitted to:
Maryland Transportation Authority

72 Loveton Circle | Sparks, MD 21152 | Telephone (410) 329-3100 | Fax (410) 472-2200

HARRY W. NICE BRIDGE IMPROVEMENT PROJECT

JMT | PARSONS BRINCKERHOFF

A Joint Venture

Nice Bridge Communications Tower
Geotechnical Engineering Report

Date: November 30, 2016

Reason: **Geotechnical Engineering Report for**
Nice Bridge Communications Tower
Harry W. Nice Memorial Bridge Toll Facility
Newburg, Charles County, Maryland

Johnson, Mirmiran & Thompson and Parsons Brinckerhoff Joint Venture (JMT|PB JV) has been prepared this report to provide recommended geotechnical design parameters for design of the foundations for the Nice Bridge Communications Tower and associated shelter building. The project site is located on the Harry W. Nice Memorial Bridge Toll Facility Campus in Newburg, Charles County, Maryland. This tower foundation report includes comprehensive recommendations regarding the soil profile, geotechnical parameters for axial and lateral design of deep foundations for the tower, and bearing pressures for the 12-foot by 38-foot shelter building. The foundation recommendations included herein are based on Johnson, Mirmiran and Thompson's (JMT) geotechnical engineering analysis of the subsurface conditions indicated by Test Borings CT-1, CT-2, CT-3, and CT-4 performed by E2CR, Inc. The proposed construction, results of the subsurface investigation and recommendations for design of the tower and shelter foundations are discussed below:

Proposed Construction

The Nice Bridge Communications Tower is planned to consist of a 3-legged, 330-foot tall radio tower to be constructed on the site of an existing helipad at the Harry W. Nice Memorial Bridge Toll Facility Campus. The legs will be approximately 30 feet apart at the base, in a triangular pattern. A 12-foot by 38-foot two-room shelter will also be constructed on the helipad, a minimum of 10 feet west of the tower footprint. The groundline at the existing helipad is at approximately EL 23.0, and no cut or fill is expected for the proposed construction. It is understood that the legs of the tower is anticipated to be supported on drilled shafts, while the shelter is anticipated to be supported by a 16-inch wide, 3-foot deep perimeter wall foundation.

Plan Sheet 6036-T-1 titled "Elevation View and Member Information" included herein as an attachment was provided to the JMT|PB JV, indicated maximum individual leg loads (factored) and maximum total foundation load (factored). The maximum individual leg loads (factored) were used to provide a general assessment of the foundations.

Geologic Conditions

The following sections present the regional geology, physiography, topography and drainage, site geology, and groundwater conditions in the area of the tower.

Regional Geology

The project is located in the Atlantic Coastal Plain and more specifically the Mid-Atlantic Coastal Plain which starts at the North Carolina and South Carolina border and extends north to the New York border with New Jersey. The Mid-Atlantic Coastal Plain is bound by the Fall Zone to the west and the Atlantic Ocean to the east. Stratigraphic units exposed in the Chesapeake Bay area consist of Mesozoic and Cenozoic Coastal Plain beds that have been deposited in the tectonic downwarp known as the Salisbury embayment. The basement formations underlying the embayment include Precambrian and Palaeozoic age crystalline rocks.

The entire Coastal Plain and Salisbury embayment has undergone a complex history of structural movement and global sea-level fluctuations. The lithology, thickness and dip of the various formations deposited in the Salisbury embayment are structurally controlled by the regional tectonism which tilts the entire Atlantic continental margin in a seaward direction. Local structural influences include down dropped grabens, related to early Mesozoic rifting, that occur along northeast trending lineaments.

Known faults in the project vicinity include the Stafford fault system, which strikes N 35º E for a distance of 72 km along the west bank of the Potomac River in northeastern Virginia, the Skinkers Neck (VA) and Brandywine (MD) fault system, roughly parallel and 10 to 20 km southeast of the Stafford fault system, and the Port Royal fault zone, which is an additional 7 to 14 km to the southeast (USGS Open-File Report 2005-1336). The latter Port Royal fault zone extends from central Caroline County, Virginia, northeastward through the town of Port Royal on the Rappahannock River and Mathias Point Neck on the right bank of the Potomac River at the bend just north of the project. Vertical displacement on the top of the Aquia Formation and Marlboro Clay is reportedly as much as 33 feet along the Port Royal fault zone (USGS Geologic Map of the Fredericksburg 30’ x 60’ Quadrangle, Virginia and Maryland). All of the faults referenced above fall within a USGS Fault Class C, meaning there is insufficient evidence to demonstrate (1) the existence of tectonic faulting or (2) Quaternary slip or deformation associated with the feature (USGS Open-File Report 2005-1336).

Sediments of the Coastal Plain thicken from a feather edge at the Fall Zone on the western limits, overlapping the Piedmont and thickening seaward along the coastline to 10’s of thousands of feet under the continental shelf. Sediment age ranges from the Jurassic to Holocene and consist mostly of sand, silt, clay, and minor amounts of gravel. Lower Tertiary deposits consist of glauconitic silty sands containing varying amounts of marine shells and are principally marine shelf deposits. The Upper Tertiary beds consist of diatomaceous silts and silty and shelly sands. Sands and gravels of fluvial and deltaic origin cap most of the higher interfluves in the Salisbury embayment and are of the Miocene, Pliocene and/or Pleistocene epochs.

Physiography

The project is located within the Atlantic Coastal Plain Province. This plain is seaward sloping and extends from Cape Cod to the southern tip of Florida, bound by the Piedmont to the west and the Atlantic Ocean to the east. This province was sculpted by during the last few million years by repeated sea level fluctuation cycles of the Pleistocene glaciation. Streams that drain the Coastal Plain are estuaries in river valleys that have been drowned

during the Holocene sea level rise and are subject to tidal fluctuations. The Potomac River, on which the project is located, is tidal up to the Fall Zone.

Locally, the project area is within the Embayed Section and more specifically the Western Shore Lowlands on the Maryland side of the Potomac River. These lowlands are comprised of a series of low fluvial and estuarine terraces, beaches and drowned river mouths and locally subdivided into the Potomac Estuary and Lowland District. The Virginia side of the Potomac is described as the inner Coastal Plain and characterized by broad uplands, gently dissected by streams with locally, short, quite rugged terrain. The project area is subdivided into the Northern Neck, a region bound by the Potomac and Rappahannock Rivers.

Topography and Drainage

Ground surface elevations in the Nice Bridge project area are very low, ranging from near Elevation 10 feet along the Potomac River to as high as 50 feet on bridge approach embankments for US 301. The terrain is typically flat to rolling with locally steep slopes near streams, creeks and manmade embankments. Slopes range from flat to as steep as 45 degrees in stream cuts.

The Clifton Creek and Pasquahanza Creek subwatersheds bound the project on the Maryland side of the Potomac River while the Virginia side of the project is within the Gambo Creek subwatershed. All three subwatersheds drain into the Potomac River. The majority of the project is located within the Potomac River, which has tidal fluctuations ranging between 0.1 to 1.7 feet below and above the mean water level.

Site Geology

Calvert Formation

Beneath the existing fill, middle and lower Miocene Age Calvert Formation were encountered to depth of 32. feet in Borings CT-1, CT-2 and CT-3 and to the termination depth of Boring CT-4. The Calvert Formation consists of two to seven sequences fining upward, each of which includes a light to dark olive gray clayey and silty fine to very fine basal sand. The formation sequences are sparsely to abundantly shelly, grading upward to sandy, diatomaceous clay-silt and diatomite.

Nanjemoy Formation (Lower Eocene)

Beneath the Miocene Age Calvert Formation, the Nanjemoy formation was encountered to the termination depth of Borings CT-1, CT-2 and CT-3. The Nanjemoy Formation is of the lower Eocene and consists of dark olive-gray, greenish-gray, and olive black glauconitic quartz sand, fine to coarse grained, very clayey and silty. It is intensely burrowed, sparsely to abundantly shelly and interbedded with sandy clay-silt. Sand in the upper part of the unit is less clayey, very micaceous, and contains scattered fine quartz pebbles.

Subsurface Conditions

The subsurface conditions were evaluated by drilling a total of four (4) test borings designated CT-1, CT-2, CT-3, and CT-4 to depths ranging from 25 to 75 feet below the existing ground surface at the location of the test borings in accordance with AASHTO T-206 and T-306 procedures. A ground surface elevation of EL 23.0 was estimated at

all four boring locations. All borings were performed in the paved helipad area, encountering between 7.2 inches and 14.4 inches of asphalt. Material labeled as possible fill was noted on the Boring Logs for CT-1, CT-2, CT-3, and CT-4 to a depth of 3.5, 4.0, 3.8, and 3.0 feet, respectively. Below the surficial soils, the borings revealed the following materials:

Boring CT-1: The material encountered in this boring generally consisted of Silty SAND, Clayey SAND, SAND, and Sandy Lean CLAY in the upper 32.5 feet (Calvert Formation). The N-values for the granular materials in the Calvert Formation ranged from 5 blows per foot (bpf) to 26 bpf, indicating relative densities ranging from loose to medium dense. The N-value for the fine-grained material was 10 bpf, indicating a consistency of stiff. From a depth of 32.5 feet to the termination depth of the boring (Nanjemoy Formation), the material encountered generally consisted of Silty SAND, Clayey SAND, and Sandy SILT. The N-values for the granular materials in the Nanjemoy Formation ranged from 12 bpf to 50 blows per 6 inches of penetration, indicating relative densities ranging from medium dense to very dense. The N-values for the fine-grained material ranged from 27 bpf to 38 bpf, indicating consistencies ranging from very stiff to hard.

Boring CT-2: The material encountered in this boring generally consisted of Silty SAND, Clayey SAND, and Lean CLAY in the upper 32.5 feet (Calvert Formation). The N-values for the granular materials in the Calvert Formation ranged from 5 bpf to 20 bpf, indicating relative densities ranging from loose to medium dense. The N-value for the fine-grained material was 10 bpf, indicating a consistency of stiff. From a depth of 32.5 feet to the termination depth of the boring (Nanjemoy Formation), the material encountered generally consisted of Clayey SAND. The N-values for the granular materials in the Nanjemoy Formation ranged from 11 bpf to 42 bpf, indicating relative densities ranging from medium dense to dense.

Boring CT-3: The material encountered in this boring generally consisted of Silty SAND, Clayey SAND, and Lean CLAY in the upper 32.5 feet (Calvert Formation). The N-values for the granular materials in the Calvert Formation ranged from 2 bpf to 22 bpf, indicating relative densities ranging from very loose to medium dense. The N-value for the fine-grained material was 17 bpf, indicating a consistency of very stiff. From a depth of 32.5 feet to the termination depth of the boring (Nanjemoy Formation), the material encountered generally consisted of Silty SAND, and Clayey SAND. The N-values for the granular materials in the Nanjemoy Formation ranged from 13 bpf to 42 bpf, indicating relative densities ranging from medium dense to dense.

Boring CT-4: The material encountered in this boring generally consisted of Silty SAND, Clayey SAND, and Sandy Lean CLAY, down to the termination depth of the boring at 25 feet (Calvert Formation). The N-values for the granular materials in the Calvert Formation ranged from 7 bpf to 34 bpf, indicating relative densities ranging from loose to dense. The N-value for the fine-grained material was 17 bpf, indicating a consistency of very stiff.

Laboratory Testing

The laboratory testing program included visual classifications of all soil samples by an experienced engineering geologist. The classifications were based on texture and plasticity in accordance with the Unified Soil Classification System (USCS). The USCS group symbol for each soil type is indicated in parentheses following the soil descriptions on the boring logs. The various soil types were grouped into the major zones (strata) noted on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate. In-situ, these transitions will likely be gradual.

Selected samples were tested for their natural water content, Atterberg limits, and percentage fines and corrosion series testing. All tests were conducted in accordance with ASTM procedures. The results of the natural water content, Atterberg limits, and percentage fines are attached herewith in Enclosure (4). Corrosion Series test results are pending and will be provided once they are received form our sub-consultant.

Groundwater Conditions

Groundwater was measured during drilling, at completion and up to 24 hours after completion of the borings. The borings were backfilled upon completion and after 24 hour water levels were measured. Table 1 presents the groundwater measurements obtained in the borings:

Table 1: Summary of Groundwater Observations

Boring ID	Existing Ground Surface Elevation (feet)	Groundwater Encountered (1)		Short-Term Groundwater (2)		Cave-In (2)	
		Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)	Depth (feet)	Elevation (feet)
CT-1	23.0	10.5	12.5	---	---	N/A	N/A
CT-2	23.0	11.5	11.5	---	---	11.8	11.2
CT-3	23.0	12.0	11.0	---	---	11.5	11.5
CT-4	23.0	11.5	11.9	---	---	N/A	N/A

(1) Measured at completion of borings prior to auger removal
(2) Measured up to 72 hours after completion of the boring

The recorded water levels, or absence of water, reflect the conditions at the time of this exploration only. Fluctuations in the location of hydrostatic groundwater level and perched water levels can occur as a result of seasonal variations in evaporation, precipitation, surface water run-off, leaking utilities and other factors.

Soil Parameters Recommended for Use for Design

The three tower legs will each be supported by single drilled shafts, while the two-room shelter will be supported by a perimeter wall foundation. An LRFD Strength Limit State design shall be utilized in the capacity design of the shafts and foundation, while a Service Limit State design should be utilized for the deflection analyses of the shafts. The strength limit and service limit loading on the tower leg shafts should be provided by a structural engineer. As the shafts will be primarily constructed in sand, the Resistance Factors for downward side resistance and tip resistance should be 0.55 and 0.50 respectively. The Uplift Resistance Factor for the shaft is 0.45. The Bearing Resistance Factor for the perimeter wall foundation which will be bearing on the lean clay and clayey sand is 0.45.

In order to approximate the necessary strength and other soil parameters required to properly design the shafts and perimeter wall, classification, moisture content, and corrosion testing was performed on representative samples from each of the four borings. The completed boring logs for CT-1, CT-2, CT-3, and CT-4 are enclosed, including the results of all laboratory testing.

The following Table 2 presents a summary of the soil types and strengths estimated for use in the drilled shaft and bearing resistance designs. The soil parameters have been broken down into geologic formation, soil type, and SPT blow count values to provide clarity as to the application of the various parameters.

Table 2: Summary of General Soil Parameters

Geologic Formation	Soil Type	Blow Count 'N'	Unit Weight (pcf)	Buoyant Unit Weight (pcf)	Cohesion (ksf)	Friction Angle (degrees)
Calvert Formation	Fine-Grained (Sandy, Lean CLAY)	≤ 10	120	60	2.0	---
		> 10	130	70	3.0	---
	Granular (Silty SAND, Clayey SAND, SAND)	≤ 10	110 to 120	50 to 60	---	28 to 32
		> 10	120 to 130	60 to 70	---	33 to 38
Nanjemoy Formation	Fine-Grained (Sandy SILT)	≤ 10	120	60	2.0	---
		> 10	130	70	6.0	---
	Granular (Silty SAND, Clayey SAND)	≤ 10	110 to 120	50 to 60	---	28 to 32
		> 10	120 to 130	60 to 70	---	33 to 38

In addition to supporting the vertical downward loading of the tower, the drilled shaft foundations will also be resisting lateral forces, overturning moments, and uplift loads. While the downward vertical loading will be resisted by the skin friction developed along the perimeter of the shaft and bearing resistance on the tip of the shaft, uplift will only be resisted by the skin friction along the shaft perimeter. Lateral loading and overturning moments will need to be designed for to ensure shear and moment developed in the shaft are within the structural capacity of the shaft concrete and steel, and the lateral deflection of the shaft is less than 1inch. The estimated parameters to be utilized in the lateral load analyses of the drilled shafts are shown in Table 3 below.

Table 3: Summary of Soil Parameters for Drilled Shaft Design

Geologic Formation	Soil Type	Blow Count 'N'	Soil Modulus 'k' (pci)		Strain @ 50% of Maximum Stress
			Above Water Table	Below Water Table	
Calvert Formation	Fine-Grained (Sandy, Lean CLAY)	≤ 10	250	250	0.01
		> 10	500	500	0.007
	Granular (Silty SAND, Clayey SAND, SAND)	≤ 5	25	20	---
		>5 and ≤ 10	90	60	---
		> 10	225	125	---
Nanjemoy Formation	Fine-Grained (Sandy SILT)	≤ 10	250	250	0.01
		> 10	500	500	0.007
	Granular (Silty SAND, Clayey SAND)	≤ 10	90	60	---
		> 10	225	125	---

Geotechnical Recommendations

The available data was analyzed with reference to the tower and associated sheler building and the existing subsurface conditions at the site, and is discussed below.

Tower Foundation

The proposed tower will be a steel frame having a total height of 330 feet and supported by three legs spaced at about 30 feet. The magnitude and nature of the loads imposed by the proposed tower on the proposed foundation were provided on Plan Sheet 6036-T-1 (enclosed) and indicated individual tower leg loads to be on the order of 150, 1552, and 1377 kips, in shear, compression and tension, respectively. It is understood actual foundation loads will vary and that design of foundation will be performed by others. In order to facilitate this design, some assumptions were made to provide recommendations for foundations and design parameters for support of the tower.

Due to the magnitude of the loads and soil data disclosed by the results of the test borings and laboratory tests, it is recommended that the tower be supported on a deep foundation system. Deep foundation types considered for support of the tower structure include straight shaft drilled piers and driven steel H-piles, steel Pipe piles, pre-cast concrete piles and auger-cast piles. Based on our past experience with the deep foundation alternatives in this site's geology, straight drilled shafts are recommended for support of each leg of the proposed tower. The shafts will derive their compressive capacity by a combination of skin friction and end bearing. Tension capacity will be derived form a combination of skin friction and weight of the foundation element can also be used to resist the uplift forces. Groundwater levels and soil parameters included in Tables 1 and 2, and the appropriate load and resistance factors, should be used to determine the diameter/size and length of drilled shaft needed to resist the compression and tension loading.

Lateral loads on the shafts will be resisted by the passive resistance of the shaft against the soil, the structural rigidity and the depth of embedment of the shaft into the soil. The lateral deflection of the top of the shaft under the subjected load can be analyzed using the computer program such as "L-Pile". The result of the computer program will be used to design the pile diameter/size and the required embedment depth into soil. Groundwater levels, and soil design parameters included in Tables 1, 2, and 3, and the appropriate load and resistance factors, should be used in the evaluation of the lateral capacity of the shafts.

Based upon the individual tower leg loading indicated on Plan Sheet 6036-T-1 (enclosed) and estimated soil strength and lateral load parameters, it is estimated that a drilled shaft constructed for each tower leg, with a estimated diameter of 9 feet and estimated length of 75 feet, should provide the necessary vertical, uplift, and lateral support. Final design of the tower foundation should be performed by a professional engineer licensed in the State of Maryland.

Shelter Foundation

The proposed shelter will be a 12-foot by 38-foot two-room shelter building is to be constructed a minimum of 10 feet west of the tower footprint. Spread footing founded on the stiff clay and/or medium dense sands of the Calvert Formation soils are recommended for support of the shelter building. Spread footings should be designed for a net allowable maximum bearing pressure of 2,500 psf. The bearing stratum should be inspected and tested for the allowable bearing capacity prior to placement of concrete. In addition, the footings should have a minimum width of 18-inches and be founded at a minimum depth of 2.5 foot below exterior finish grade for frost protection. The total and differential settlements of the foundation are anticipated to be on the order of 1 inch and ½ inch respectively.

Groundwater

Groundwater was encountered in the boring at depth of 10.5 to 12 feet and is therefore not anticipated in the shallow depths of excavations for the shelter perimeter wall. Based on the expected depth of the drilled shafts, groundwater will be encountered in the excavation for the drilled shafts. Groundwater can typically be sealed out by the use of steel casing. If groundwater cannot be sealed out, placing pumps at the bottom of the drilled shafts should be suitable to dewater the excavation.

The excavations for the foundation for the radio tower and shelter should be kept dry at all time and surficial rainwater should be prevented from entering the excavation. The site should be graded to prevent ponding of water in the excavation. Exposed subgrade that gets loosened due to ponded water should be undercut to stable ground. The undercut areas should be backfilled with lean concrete.

Support of Excavation

The excavation for the perimeter wall may extend to a depth greater than 4 feet. All excavations deeper than 4 feet should be sloped at a temporary slope of 1.5H:1V or be supported by an earth retaining system. The design and method of the temporary earth retaining system should be left to the Contractor

Means of Excavation

Shelter Perimeter Wall

The Boring CT-4 generally indicated stiff lean clay and dense silty sand within the anticipated depth of foundation excavation for the proposed shelter. It is anticipated that the excavations for the foundation can generally be accomplished with standard excavation equipment.

Drilled Shaft

Materials to be drilled consist of some clayey soils, but predominately silty and clayey sand. Some cemented sand was indicated at a depth of 40 feet in Boring CT-3. Prior to placing any foundation concrete, the bearing materials must be tested to verify adequate design bearing capacity, and the steel reinforcement must be observed to verify that the bars are properly sized and positioned in accordance with the foundation plans and specifications.

Temporary steel liner may be necessary during drilling, in order to prevent sloughing of the sides of the upper soils. Considering the type of soils and groundwater conditions, it is recommended that the slurry method in accordance with MSHA standards be used to construct the drilled shafts Concrete should be placed by the tremie method in accordance with SHA standards.

Closing

This report has been prepared to aid in the evaluation of this site and to assist with the foundation design for the proposed Nice Bridge Communications Tower and shelter in Newburg, Charles County, Maryland. The report scope is limited to recommendations pertaining to this specific project and the location described. The project description represents our current understanding of the significant aspects of the proposed improvements relevant to the geotechnical considerations.

The analysis and recommendations submitted in this report are based upon the data obtained from the test borings performed at the locations indicated on the boring location plan. This report does not reflect any variations which may occur between the borings. The nature and extent of the variations between borings may not become evident until the course of construction. It is therefore essential that on-site observation of fill, footing, subgrades, testing of compacted fill and backfill and other geotechnical related construction be performed during construction to ascertain if re-evaluation of the recommendations in this report must be made.

Plans and specifications should be established to account for possible additional costs that may be required for construction or foundations and/or excavation as recommended in this report. Additional costs may be incurred for various reasons, including extra foundation depth, possible footing redesign, unsuitable fill material, disturbance of subgrades, etc.

If you have any questions or need further information, please do not hesitate to contact Mike Leffler at 410-316-2462 or mleffler@jmt.com.

Very truly yours,
JOHNSON, MIRMIRAN & THOMPSON, INC

Steven Sommers, P.E.
Senior Geotechnical Engineer

Michael E. Leffler, P.E.
Vice President

Enclosures
(1) Boring Location Plan
(2) USCS Description
(3) Boring Logs for CT-1, CT-2, CT-3, and CT-4
(4) Laboratory Test Results
(5) Tower Plan Sheet 6036-T-1

RUBELING & ASSOCIATES
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
ARCHITECTURE & ENGINEERING
A JOINT VENTURE

MARYLAND TRANSPORTATION AUTHORITY
Engineering Division

ADDENDUMS & REVISIONS			
NO.	DESCRIPTION	BY	DATE

GOVERNOR HARRY W. NICE MEMORIAL BRIDGE

RADIO TOWER SITE PLAN
NEWBURG, MARYLAND TO DAHLGREN, VIRGINIA

CONTRACT NO. NB-2849-000-006
DRAWING NO.

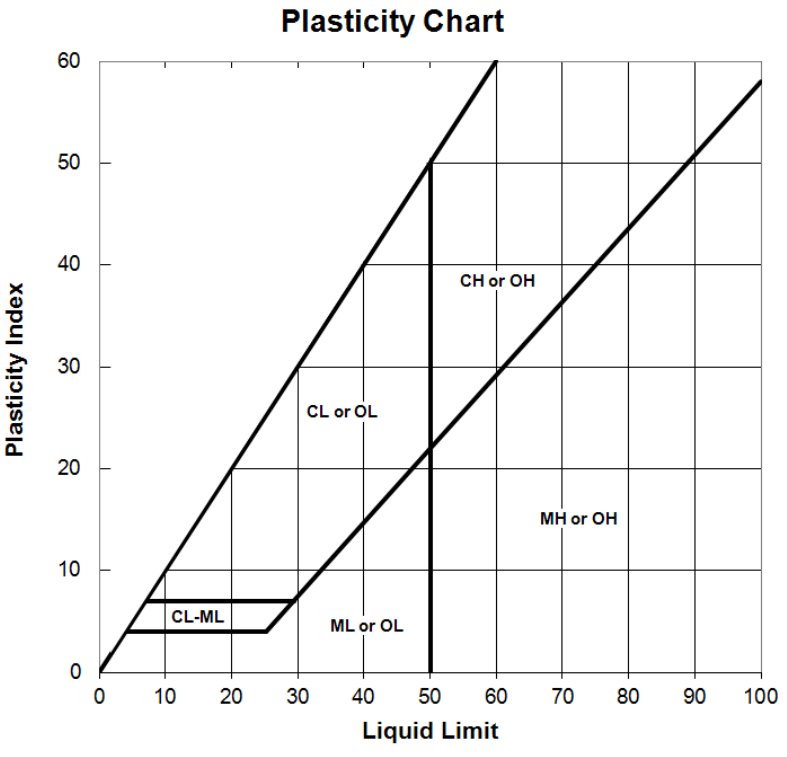
DESIGNED BY JMT	DRAWN BY JMT	CHECKED BY JMT	SHEET NO.
CONST. REVIEW BY	DATE JULY ,2016	SCALE AS SHOWN	OF XX

Q:\SMD\140790_000_Nice_Bridge.GEC\CADD\pHD_US301_HeliPad - Tower.dgn

Thursday, July 07, 2016 AT 04:26 PM

Unified Soil Classification System (ASTM D-2487)

Major Divisions			Group Symbols	Typical Names	Laboratory Classification Criteria		
Coarse-Grained Soils Grained Soils More Than 50 % Retain	Gravels (More Than 50 % of Coarse Fraction Retained on the No. 4 Sieve)	Clean Gravels (Trace to No Fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Trace To No Fines	Determine percentages of sands and gravel from grain size curve. Depending on percentage of fines (Fraction smaller than No. 200 sieve), coarse-grained soils are classified as follows: Less than 5 percent: GW, GP, SW, SP More Than 12 percent; GM, GC, SM, SC 5 to 12 Percent: Borderline cases requiring dual symbols	$C_U = D_{60}/D_{10}$ Greater Than or Equal to 4 $C_c = (D_{30})^2/(D_{10} \times D_{60})$ Between 1 and 3	
			GP	Poorly Graded Gravels, Gravel-Sand Mixtures, Trace To No Fines		Not Meeting Requirements of GW for C_U and C_c	
		Gravels with Fines (Appreciable amount of Fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures		Atterberg Limits Below "A" line or PI Less Than 4	Above "A" Line with PI Between 4 and 7 are Borderline cases Requiring use of Dual Symbol
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures		Atterberg Limits Below "A" line or PI Greater Than 7	
	Sands (More Than 50 % of Coarse Fraction Passing the No. 4 Sieve)	Clean Sands (Trace to No Fines)	SW	Well Graded Sands, Gravelly sands, Trace to no Fines		$C_U = D_{60}/D_{10}$ Greater Than or Equal 6 $C_c = (D_{30})^2/(D_{10} \times D_{60})$ Between 1 and 3	
			SP	Poorly Graded Sands, Gravelly sands, Trace to no Fines		Not Meeting Requirements of SW for C_U and C_c	
		Sands with Fines (Appreciable amount of Fines)	SM	Silty Sands, Sand-silt Mixtures		Atterberg Limits Below "A" line or PI Less Than 4	Above "A" Line with PI Between 4 and 7 are Borderline cases Requiring use of Dual Symbol
			SC	Silty Sands, Sand-silt Mixtures		Atterberg Limits Below "A" line or PI Greater Than 7	
Fine-Grained Soils (More Than 50 % Passing the No. 200 Sieve)	Silts and Clay Mixtures (Liquid Limit Less Than 50)		ML	Inorganic Silts, Gravelly Silts, Sandy Silts,			
			CL	Inorganic Clays of low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays and Lean Clays			
			OL	Organic Silts and Silty Clays			
	Silts and Clay Mixtures (Liquid Limit Greater Than 50)		MH	Inorganic Clayey Silts, Gravelly Clayey Silts, Sandy Clayey Silts, Elastic Silts			
			CH	Inorganic Clays of high Plasticity, Fat Clays			
			OH	Organic Clays of medium to high Plasticity, organic Clayey Silts			
	Highly Organic Soils		Pt	Peat and Highly Organic Soils			



E2CR, INC.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Nice Bridge GEC				15530-04	**CT-1**
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Newberg, MD	10-21-16	10-25-16			23.0
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	13.0'	N/A			N/A
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
S. Lyons	140 lbs.	30 inches	SPT		75.0'
DRILL MAKE AND MODEL	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
CME-75		M. Patel			1 OF 2

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
0	23.0		Pavement						4" Asphalt 8" Base Offset Boring 5.0' northwest due to unknown utiltity Boring marked as CT-2 in the drawings Bulk Bag 3.0' 8.0'- sample wet at 10.5' had gravel layer from 12.5' to 13.0' Added mud from 15.0'
	22.0		Sitly Sand, trace Gravel, Moist, Medium Dense, Olive, Gray, Tan (SM) (Possible FILL)	S-1	24"	9-12-14-14	DS	22"	
	19.5		Sandy Lean CLAY, Moist, Stiff, Brown, Orange, Olive (CL) (Calvert)	S-2	24"	4-5-5-7	DS	19"	
5	17.5		Silty SAND, Moist to Wet, Medium Dense to Loose, Brown, Tan, Olive, Orange, Gray (SM) (Calvert)	S-3	24"	4-5-7-8	DS	20"	
				S-4	24"	4-4-4-5	DS	18"	
10				S-5	24"	3-3-2-3	DS	20"	
				S-6	24"	2-4-9-12	DS	18"	
				S-7	24"	5-5-6-6	DS	19"	
15									
				S-8	18"	2-2-3	DS	18"	
20									
	0.5		Silty SAND, Wet, Medium Dense, Gray (SM) (Calvert)						
	-1.5		Clayey SAND, Moist, Medium Dense, Gray (SC) (Calvert)	S-9	18"	7-6-5	DS	18"	
25	-4.5		Poorly Graded SAND with Silt, wet, Medium Dense, Green, Gray (SM) (Calvert)						
				S-10	18"	6-7-12	DS	18"	
30	-9.5		Clayey SAND, trace Organics, trace Mica, Moist, Medium Dense, Dark Green, Dark Brown (SC)						
				S-11	18"	3-5-7	DS	18"	
35									

E2CR, INC.

BORING LOG

BORING NO. **CT-1**

PROJECT: Nice Bridge GEC

PROJECT NO.: 15530-04

PAGE NO.: 2 OF 2

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
			(Nanjemoy)						
				S-12	18"	6-9-11	DS	18"	
40									
			Trace Shells from 43.0'	S-13	18"	7-11-13	DS	18"	
45									
	-24.5								
			Silty, Clayey SAND, trace Shells, trace Mica, Moist, Dense, Dark Green, Gray (SC-SM) (Nanjemoy)	S-14	18"	10-16-19	DS	18"	
50									
				S-15	12"	8-50/6"	DS	12"	S-15B Cemented Sand at 54.5' hit Cemented Sand layer 2' thick to 56.5'
55									
	-35.5								
			Clayey SAND, trace Shells, Moist, Dense, Dark Green, Black (SC) (Nanjemoy)	S-16	18"	10-8-9	DS	14"	
60									
	-39.5								
			Sandy SILT, trace Shells, Moist, Stiff to Hard, Gray, Green (SM) (Nanjemoy)	S-17	18"	7-11-16	DS	18"	Stop at 75.0' on 10-21-16
65									
				S-18	18"	11-17-21	DS	18"	Water at 12.6' in the augers at 8:45am on 10-25-16
70									
				S-19	18"	11-12-16	DS	18"	Boring grouted upon Comp.
75			Bottom of Boring @ 75.0'						

E2CR, INC.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Nice Bridge GEC				15530-04	**CT-2**
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Newberg, MD	10-20-16	10-21-16			23.0
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	13.0'	dry	dry		11.8'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
S. Lyons	140 lbs.	30 inches	SPT		75.0'
DRILL MAKE AND MODEL	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
CME-75		M. Patel			1 OF 2

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
0	23.0		Pavement						7" Asphalt
	22.4		Silty, Clayey Sand, Moist, Medium Dense, Olive Green, Tan, Brown (SC-SM) (Possible FILL)	S-1	24"	5-8-12-14	DS	19"	Boring marked as CT-1 in the drawings
	19.0			S-2	24"	7-5-5-7	DS	18"	
5	17.5		Lean CLAY, Moist, Stiff, Brown, Orange (CL) (Calvert)	S-3	24"	2-5-7-10	DS	21"	S-3 had layer of SM
	14.7		Clayey SAND, Moist, Medium Dense, Brown, Olive, Orange (SM) (Calvert)	S-4	24"	3-7-5-5	DS	17"	
10			Silty SAND, Moist to Wet, Medium Dense to Loose, Tan, Orange, Olive, Brown (SM) (Calvert)	S-5	24"	3-3-3-3	DS	18"	sample wet at 11.5'
				S-6	24"	2-2-4-11	DS	17"	had gravel layer from 12.5' to 13.3'
				S-7	24"	8-6-7-7	DS	16"	Added mud from 15.0'
15									
				S-8	18"	2-2-3	DS	18"	
20									
	0.5		Silty, Clayey SAND, Wet, Loose, Gray, Tan, Brown (SC) (Calvert)	S-9	18"	4-3-2	DS	18"	
25									
	-4.5		Silty SAND, Wet, Medium Dense, Gray, Green (SM) (Calvert)	S-10	18"	5-6-8	DS	18"	
30									
	-9.5		Clayey SAND, trace Mica, Moist, Medium Dense, Dark Green, Dark Brown (SC) (Nanjemoy)	S-11	18"	3-5-6	DS	18"	
35									

E2CR, INC.

BORING LOG

BORING NO. **CT-2**

PROJECT: Nice Bridge GEC

PROJECT NO.: 15530-04

PAGE NO.: 2 OF 2

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
				S-12	18"	7-8-10	DS	18"	
40									
			Trace Shells from 43.0'	S-13	18"	6-8-11	DS	18"	
45									
	-24.5								
			Clayey SAND, trace Shells, trace Mica, Moist, Medium Dense to Dense, Dark Green, Gray (SC) (Nanjemoy)	S-14	18"	7-11-16	DS	18"	
50									
				S-15	18"	8-12-19	DS	18"	there was a 2" piece of gravel seem to be shale or cemented sand
55									
				S-16	18"	10-15-20	DS	18"	
60									
	-39.5								
			Clayey SAND, Moist, Medium Dense, Dark Green (SC) (Nanjemoy)	S-17	18"	9-15-22	DS	18"	
65									
				S-18	18"	15-19-23	DS	6"	had 1.5" piece of Shale at 69. 0'
70									
				S-19	18"	11-14-14	DS	15"	grouted boring on-10-21-16 with portland and soil cuttings
75			Bottom of Boring @ 75.0'						

E2CR, INC.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Nice Bridge GEC				15530-04	**CT-3**
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Newberg, MD	10-20-16	10-25-16			23.0
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	13.0'	dry	dry		11.5'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
S. Lyons	140 lbs.	30 inches	SPT		75.0'
DRILL MAKE AND MODEL	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
CME-75		M. Patel			1 OF 2

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
0	23.0		Pavement						9" Asphalt
	21.8								5" Base
			Silty SAND, trace Gravel, Moist, Medium Dense, Olive, Gray, Tan (SM) (Possible FILL)	S-1	24"	3-7-15-15	DS	17"	Bulk Bag 1.0'-4.0'
	19.2			S-2	24"	10-9-8-9	DS	18"	
5	17.5		Lean CLAY with Sand, Moist, Very Stiff, Tan, Olive (CL) (calvert)	S-3	24"	7-8-8-7	DS	20"	
			Clayey SAND, Moist, Medium Dense, Tan, Brown, Orange (SC) (Calvert)	S-4	24"	5-4-4-3	DS	21"	
	14.5								
10			Silty SAND, Moist to Wet, Loose, Tan, Brown, Orange, Olive (SM) (Calvert)	S-5	24"	1-2-3-2	DS	21"	
				S-6	24"	2-3-2-5	DS	17"	Sample wet at 12.0'
				S-7	24"	3-3-2-2	DS	18"	Gravel layer frim 12.8' to 13.3' added mud from 15.0'
15									
				S-8	18"	WOH/12"-2	DS	18"	Sample was saturated
20									
				S-9	18"	8-9-11	dsDS	18"	
25									
	-4.5								
			Silty SAND, Wet, Medium Dense, Green, Gray (SM) (Calvert)	S-10	18"	7-9-12	DS	18"	
30									
	-9.5								
			Clayey SAND, trace Mica, trace Organics, Moist, Dark Green, Dark Brown (SC) (Nanjemoy)	S-11	18"	4-5-8	DS	18"	
35									

E2CR, INC.

BORING LOG

BORING NO. **CT-3**

PROJECT: Nice Bridge GEC

PROJECT NO.: 15530-04

PAGE NO.: 2 OF 2

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
	-14.5								
40			Silty SAND, trace Cemented Sand Fragments, trace Shells, trace Mica, Moist, Dense, Dark Green, Gray (SM) (Nanjemoy) trace Shells from 38.5' Cemented Sand layer from 39.5' to 40.0'	S-12	12"	9-15	DS	12"	at 39.5' hit something hard so stopped the sample and it was cemented sand in tip of spoon
45				S-13	18"	8-14-17	DS	18"	
50				S-14	18"	9-16-22	DS	18"	
	-29.5								
55			Silty SAND, trace Mica, trace Shells, Moist, Dense, Dark Green, Gray (SM) (Nanjemoy)	S-15	18"	9-15-20	DS	18"	Stop at 60.0' on 10-20-16
60				S-16	18"	9-14-16	DS	18"	Water at 12.8' in the augers at 7:45am on 10-21-16
65				S-17	18"	9-15-19	DS	18"	pulled augers on 10-21-16
70				S-18	18"	11-19-23	DS	18"	Boring left open for water readings
75				S-19	18"	9-12-15	DS	18"	Boring backfilled with portland and soil cuttings on 10- 25-16
			Bottom of Boring @ 75.0'						

E2CR, INC.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Nice Bridge GEC				15530-04	**CT-4**
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Newberg, MD	10-25-16	10-25-16			23.0
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	13.0'	N/A	N/A		N/A
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
S. Lyons	140 lbs.	30 inches	SPT		25.0'
DRILL MAKE AND MODEL	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
CME-75		M. Patel			1 OF 1

DEPTH	STRATA ELE/ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE DATA: SAMPLE TYPE AND DIAMETER	SAMPLE DATA: SAMPLE RECOVERY	REMARKS:
0	23.0		Pavement						6" Asphalt 8" Base
	21.9		Silty SAND, Moist, Dense, Olive, Brown, Orange (SM) (Possible FILL)	S-1	24"	12-16-18-19	DS	20"	Offset 4.0' NE due to unknown utiltiy
	20.0		Sandy Lean CLAY, Moist, Sitff, Brown, Gray (CL) (Calvert)	S-2	24"	15-8-9-8	DS	16"	
5	17.5		Clayey SAND, Moist, Medium Dense, Tan, Brown, Orange (SC) (Calvert)	S-3	24"	8-7-6-5	DS	1"	2 attempts for S-3
				S-4	24"	4-5-5-4	DS	18"	
	13.5		Silty SAND, moist to wet, loose to medium dense, Olive, Brown, Tan (SM) (Calvert)	S-5	24"	2-4-3-4	DS	22"	
10				S-6	24"	3-2-5-14	DS	19"	S-6B had 4" of SM with Gravel
			Gravel layer from 12.8' to 13. 3'	S-7	24"	7-9-9-9	DS	14"	Sample wet from 11.5'
15									Added mud from 15.0'
				S-8	18"	4-5-5	DS	18"	Boring grouted upon comp.
20									
				S-9	18"	4-6-8	DS	18"	
25			Bottom of Boring @ 25.0'						
30									
35									

ENGINEERING · CONSULTATION · E2CR inc. CONSTRUCTION · REMEDIATION ·

MOISTURE CONTENT TEST

Project: Nice Bridge Com Tower

Project No.: 15530-04

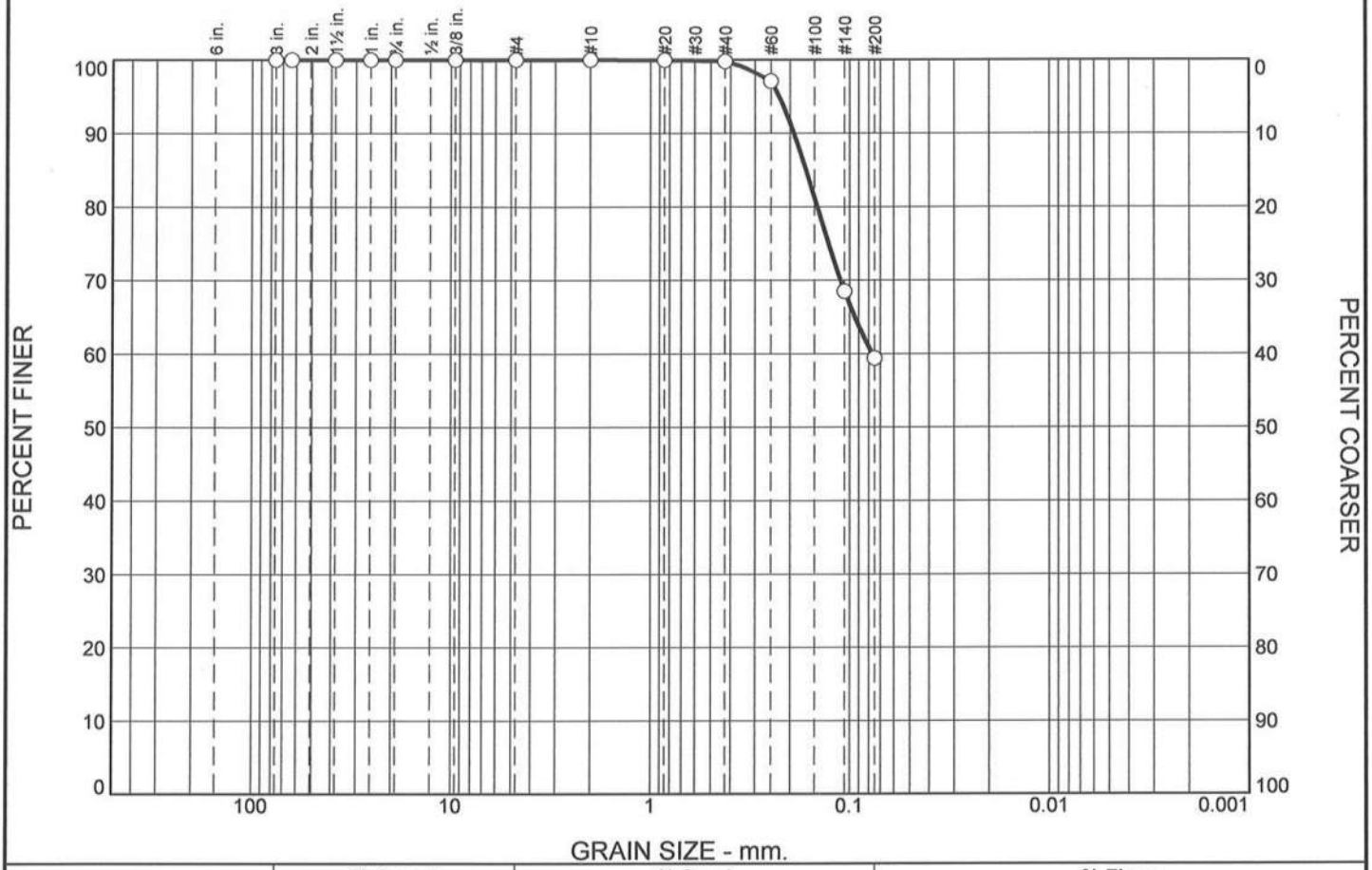
Date: 22-Nov-16

Boring No.	Sample No.	Depth	% Moisture	% Fines	Loss on ignition
CT-1	S-2	3.0'-5.0'	19.1%		
	S-5	9.0'-11.0'	26.3%		
	S-8	18.5'-20.0'	29.7%		
	S-10	28.5'-30.0'	23.2%		
	S-12	38.5'-40.0'	30.7%		
	S-16	58.5'-60.0'	39.8%		
	S-18	68.5'-70.0'	34.8%		
CT-2	S-5	9.0'-11.0'	25.9%		
	S-9	23.5'-25.0'	22.2%		
	S-15	53.5'-55.0'	33.9%		
	S-16	58.5'-60.0'	36.3%		
	S-18	68.5'-70.0'	35.2%		
CT-3	S-3	5.0'-7.0'	11.7%		
	S-8	18.5'-20.0'	28.9%		
	S-12	38.5'-40.0'	33.6%		
	S-13	43.5'-45.0'	28.3%		
	S-16	58.5'-60.0'	33.6%		
CT-4	S-1	1.0'-3.0'	12.0%		
	S-2	3.0'-5.0'	17.7%		
	S-5	9.0'-11.0'	22.3%		
	S-8	18.5'-20.0'	28.5%		

Comments:

Technician: GW **Checked by:**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	40.4	59.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.8		
#60	97.1		
#140	68.5		
#200	59.4		

* (no specification provided)

Material Description

Gray, Brown, Sandy Lean CLAY

Atterberg Limits

PL= 18 LL= 35 PI= 17

Coefficients

D_{90}= 0.1912 D_{85}= 0.1661 D_{60}= 0.0769
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(7)

Remarks

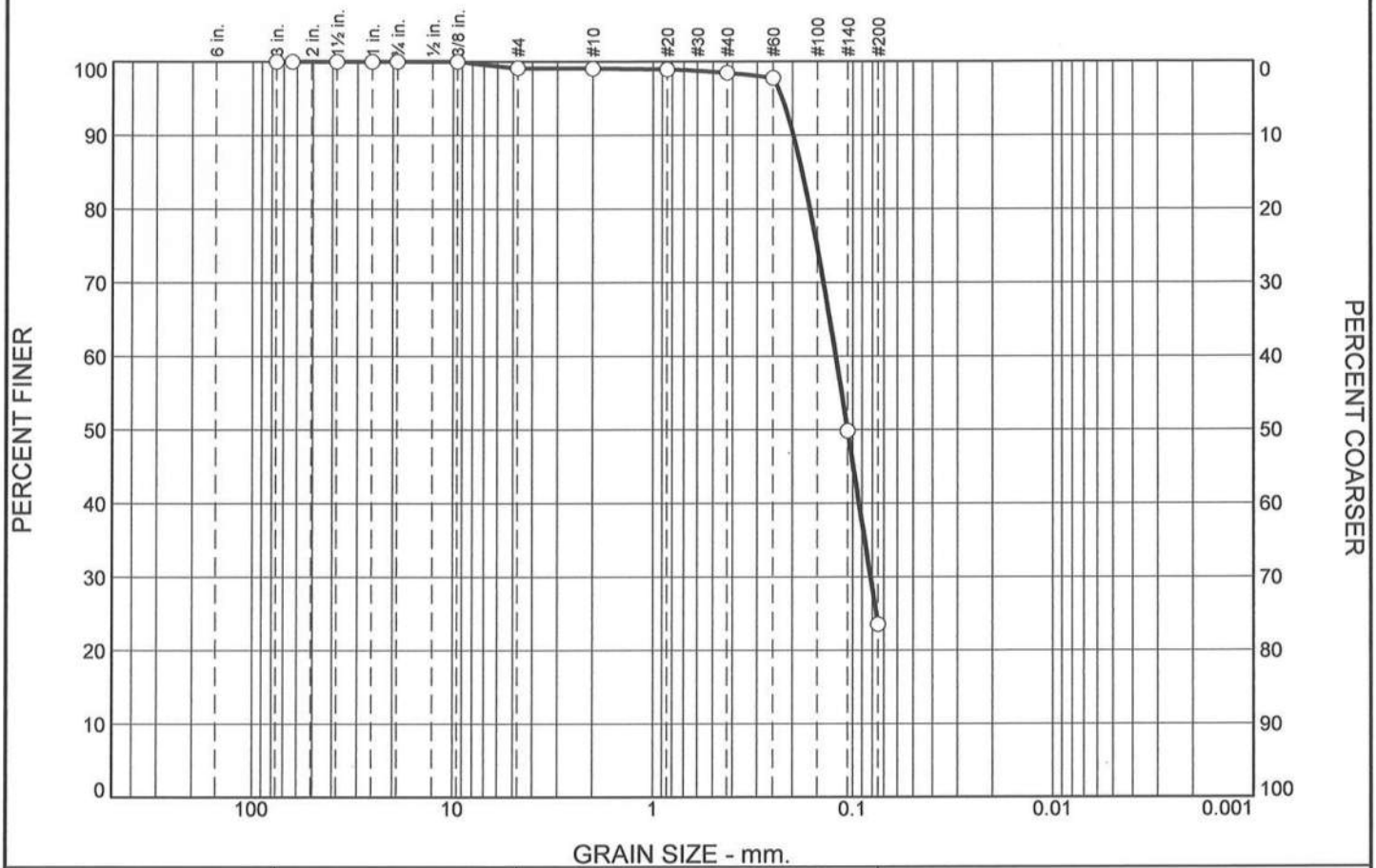
Natural Moisture: 19.1%

Source of Sample: CT-1 **Depth:** 3.0'-5.0'
Sample Number: S-2

Date: 11/21/2016

E2CR, Inc. **Baltimore, MD**	**Client:** JMT/PB **Project:** Nice Bridge **Project No:** 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.9	0.0	0.6	75.0	23.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.1		
#10	99.1		
#20	99.0		
#40	98.5		
#60	97.8		
#140	49.8		
#200	23.5		

* (no specification provided)

Material Description

Green, Gray, Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1978 D_{85}= 0.1787 D_{60}= 0.1215
D_{50}= 0.1062 D_{30}= 0.0816 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

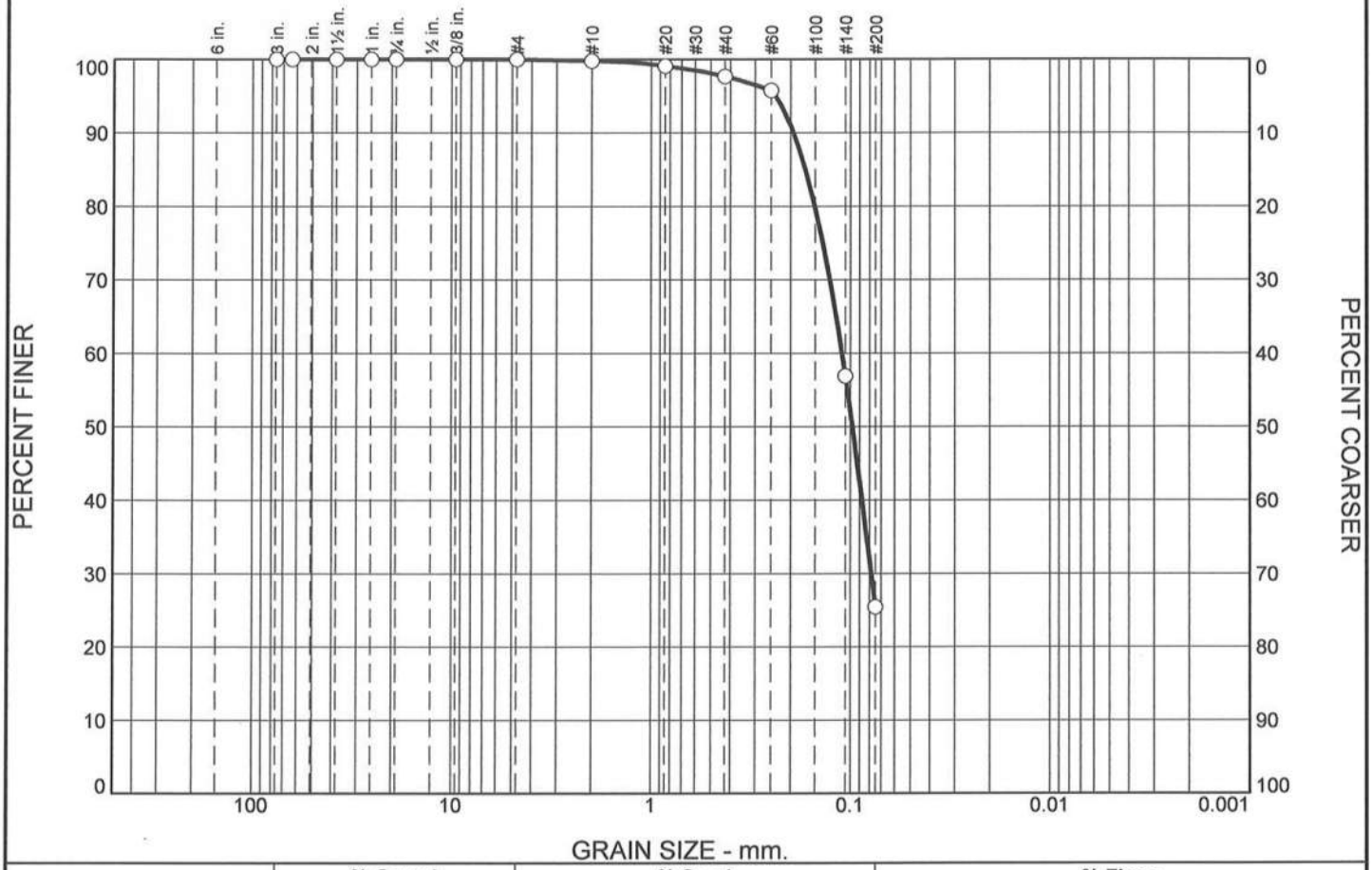
Natural Moisture: 26.3%

Source of Sample: CT-1 **Depth:** 9.0'-11.0'
Sample Number: S-5

Date: 11/21/2016

E2CR, Inc.	**Client:** JMT/PB
	Project: Nice Bridge
Baltimore, MD	**Project No:** 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	2.1	72.3	25.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.8		
#20	99.1		
#40	97.7		
#60	95.8		
#140	56.9		
#200	25.4		

* (no specification provided)

Material Description

Green, Gray, Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1934 D_{85}= 0.1687 D_{60}= 0.1102
D_{50}= 0.0976 D_{30}= 0.0786 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 29.7%

Source of Sample: CT-1 **Depth:** 18.5'-20.0'
Sample Number: S-8

Date: 11/21/2016

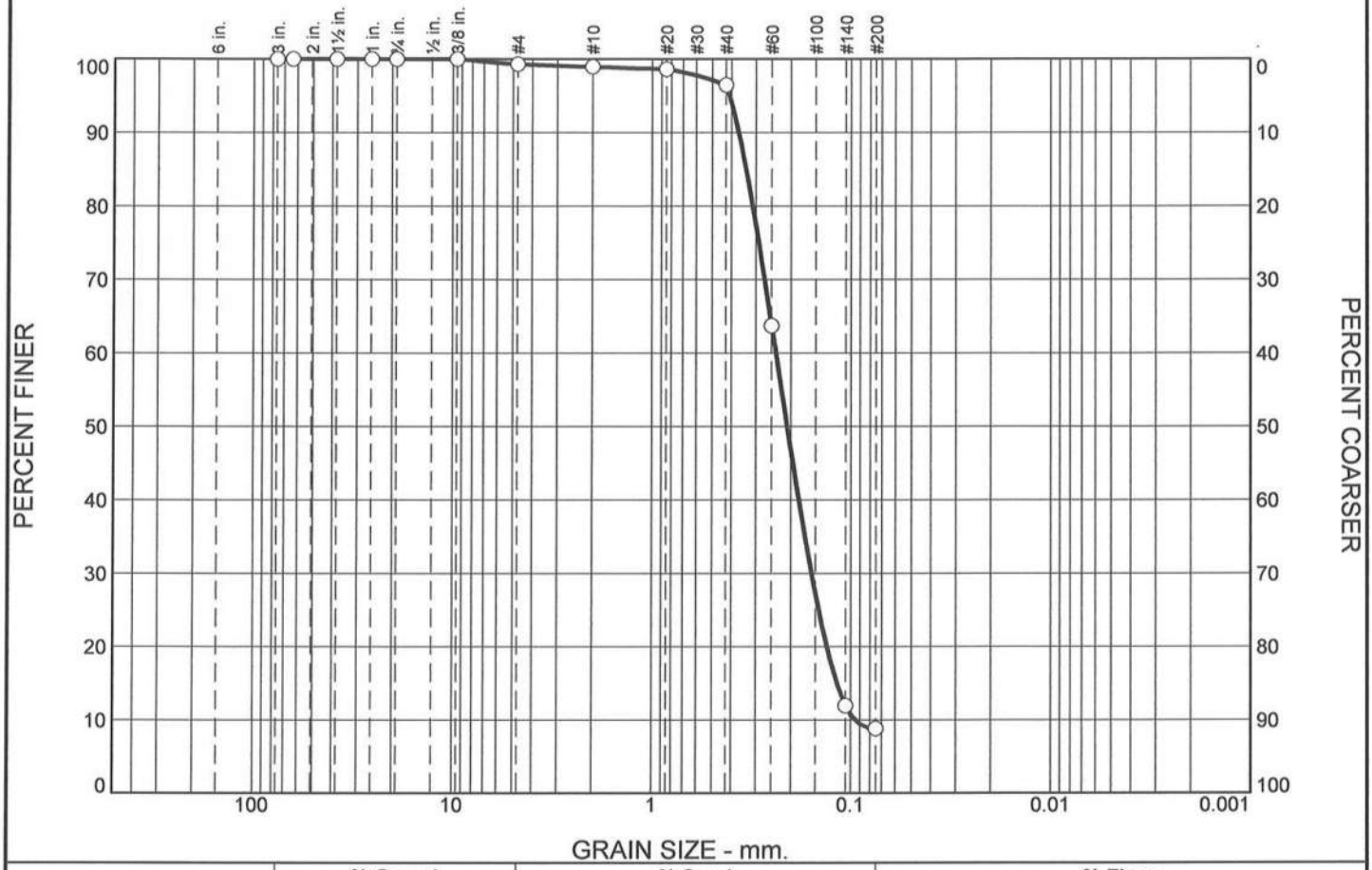
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.7	0.3	2.5	87.7	8.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.3		
#10	99.0		
#20	98.7		
#40	96.5		
#60	63.7		
#140	11.9		
#200	8.8		

* (no specification provided)

Material Description

Green, Poorly Graded SAND with Silt

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.3674 D_{85}= 0.3370 D_{60}= 0.2382
D_{50}= 0.2090 D_{30}= 0.1573 D_{15}= 0.1172
D_{10}= 0.0950 C_u= 2.51 C_c= 1.09

Classification

USCS= SP-SM AASHTO= A-3

Remarks

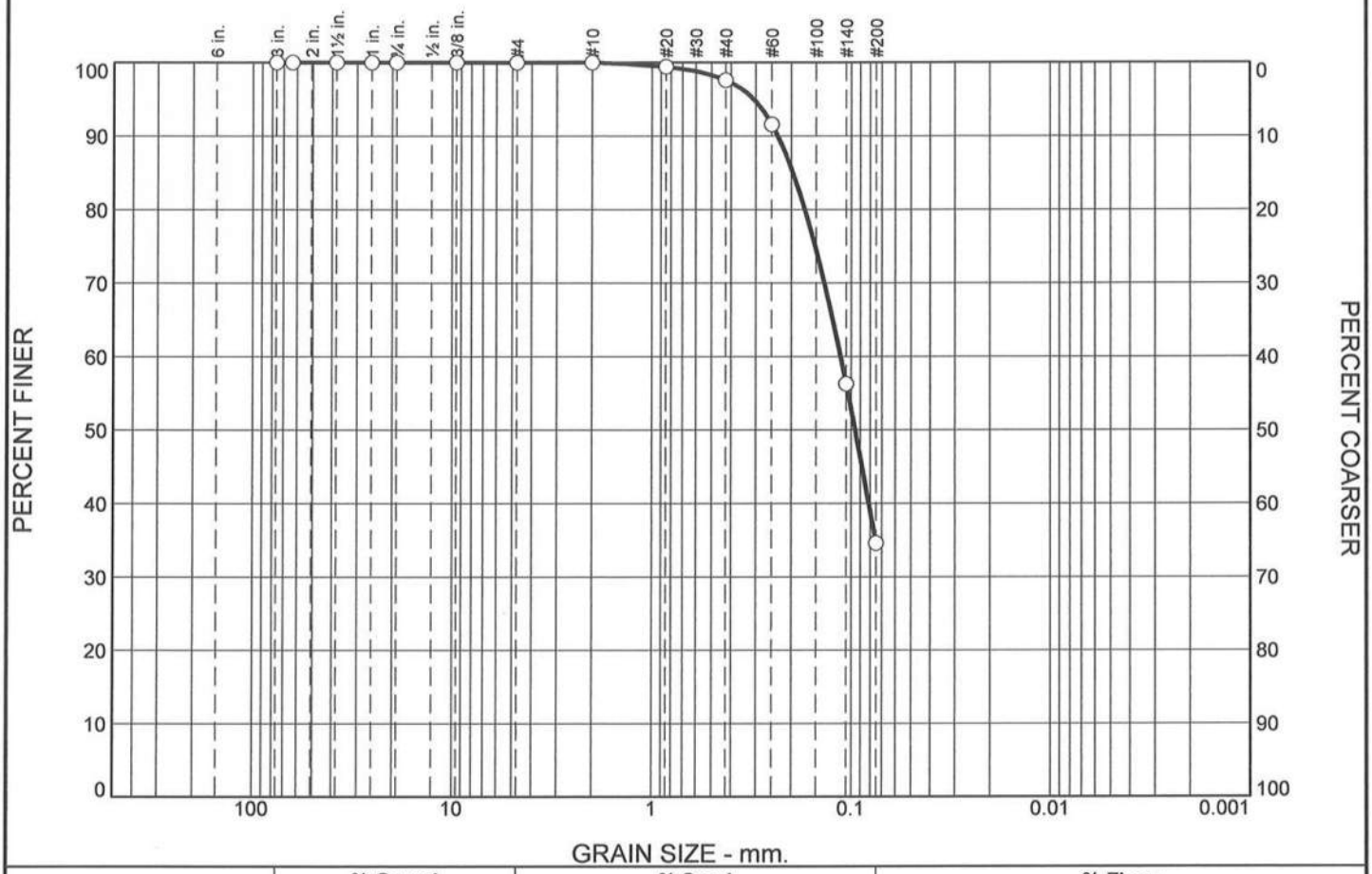
Natural Moisture: 23.2%

Source of Sample: CT-1 **Depth:** 28.5'-30.0'
Sample Number: S-10

Date: 11/21/2016

E2CR, Inc.	**Client:** JMT/PB
	Project: Nice Bridge
Baltimore, MD	**Project No:** 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.4	63.0	34.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	99.4		
#40	97.6		
#60	91.6		
#140	56.3		
#200	34.6		

* (no specification provided)

Material Description

Dark Brown, Black, Clayey SAND

Atterberg Limits

PL= 21 LL= 33 PI= 12

Coefficients

D_{90}= 0.2333 D_{85}= 0.1964 D_{60}= 0.1131
D_{50}= 0.0955 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-6(0)

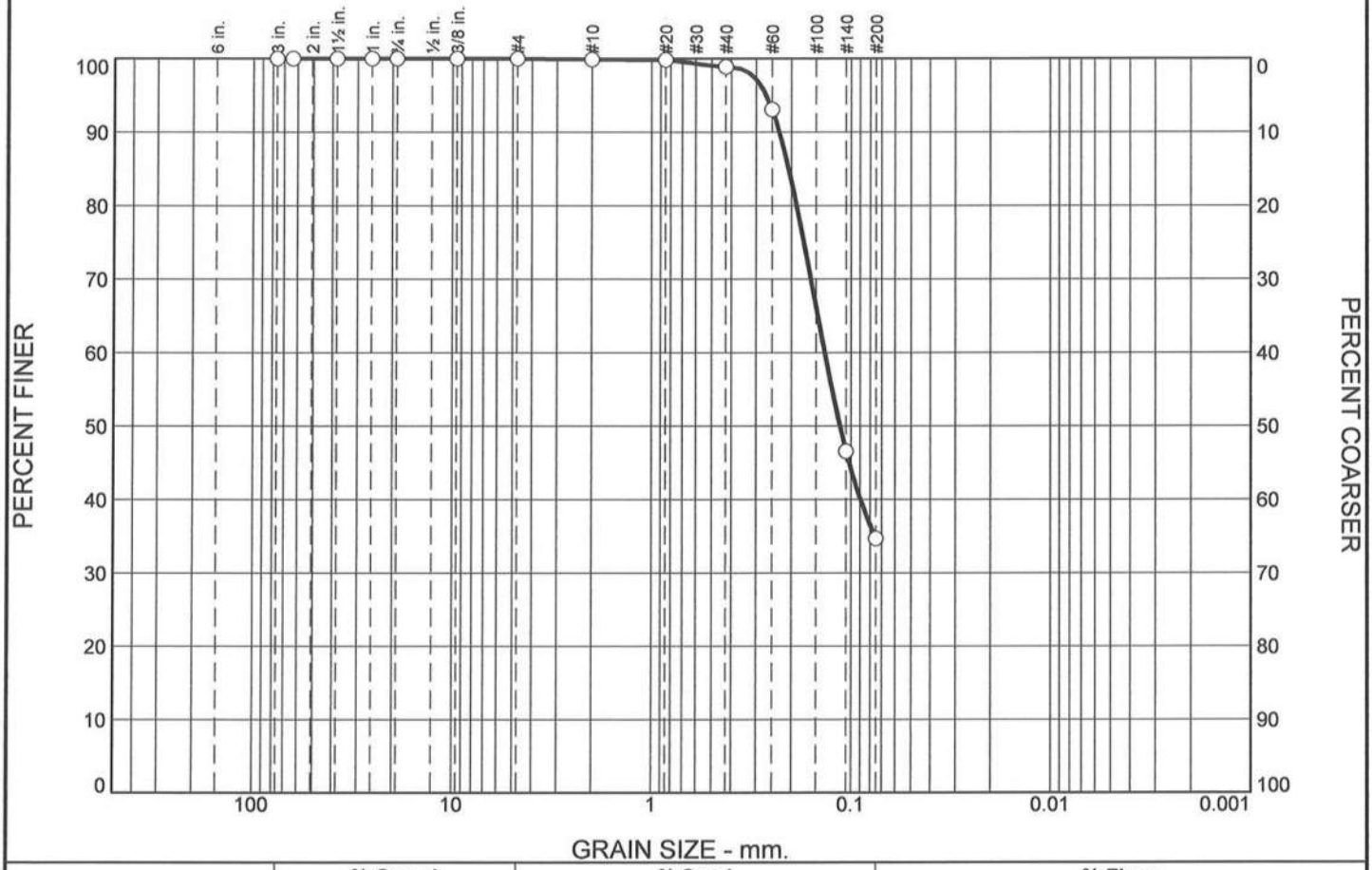
Remarks

Natural Moisture: 30.7%

Source of Sample: CT-1 **Depth:** 38.5'-40.0'
Sample Number: S-12 **Date:** 11/21/2016

E2CR, Inc.	**Client:** JMT/PB
	Project: Nice Bridge
Baltimore, MD	**Project No:** 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.0	64.2	34.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.9		
#20	99.8		
#40	98.9		
#60	93.1		
#140	46.6		
#200	34.7		

* (no specification provided)

Material Description

Dark Brown, Black, Clayey SAND

Atterberg Limits

PL= 26 LL= 44 PI= 18

Coefficients

D_{90}= 0.2301 D_{85}= 0.2068 D_{60}= 0.1359
D_{50}= 0.1138 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-7(2)

Remarks

Natural Moisture: 39.8%

Source of Sample: CT-1 **Depth:** 58.5'-60.0'
Sample Number: S-16

Date: 11/21/2016

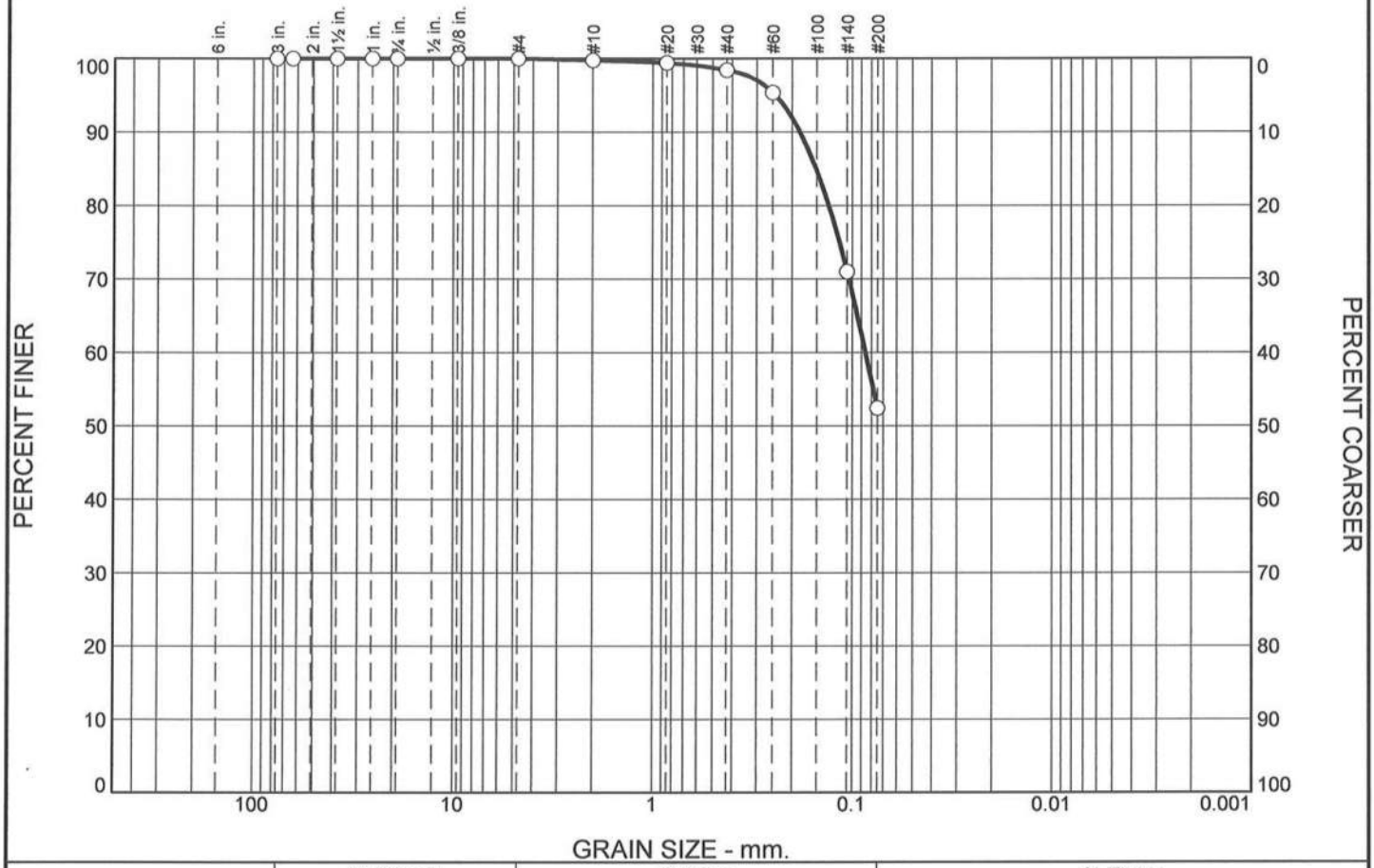
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge

Project No: 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	1.3	46.1	52.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.8		
#20	99.4		
#40	98.5		
#60	95.4		
#140	71.0		
#200	52.4		

* (no specification provided)

Material Description

Dark Gray, Sandy SILT

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1828 D_{85}= 0.1517 D_{60}= 0.0858
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 34.8%

Source of Sample: CT-1 **Depth:** 68.5'-70.0'
Sample Number: S-18

Date: 11/21/2016

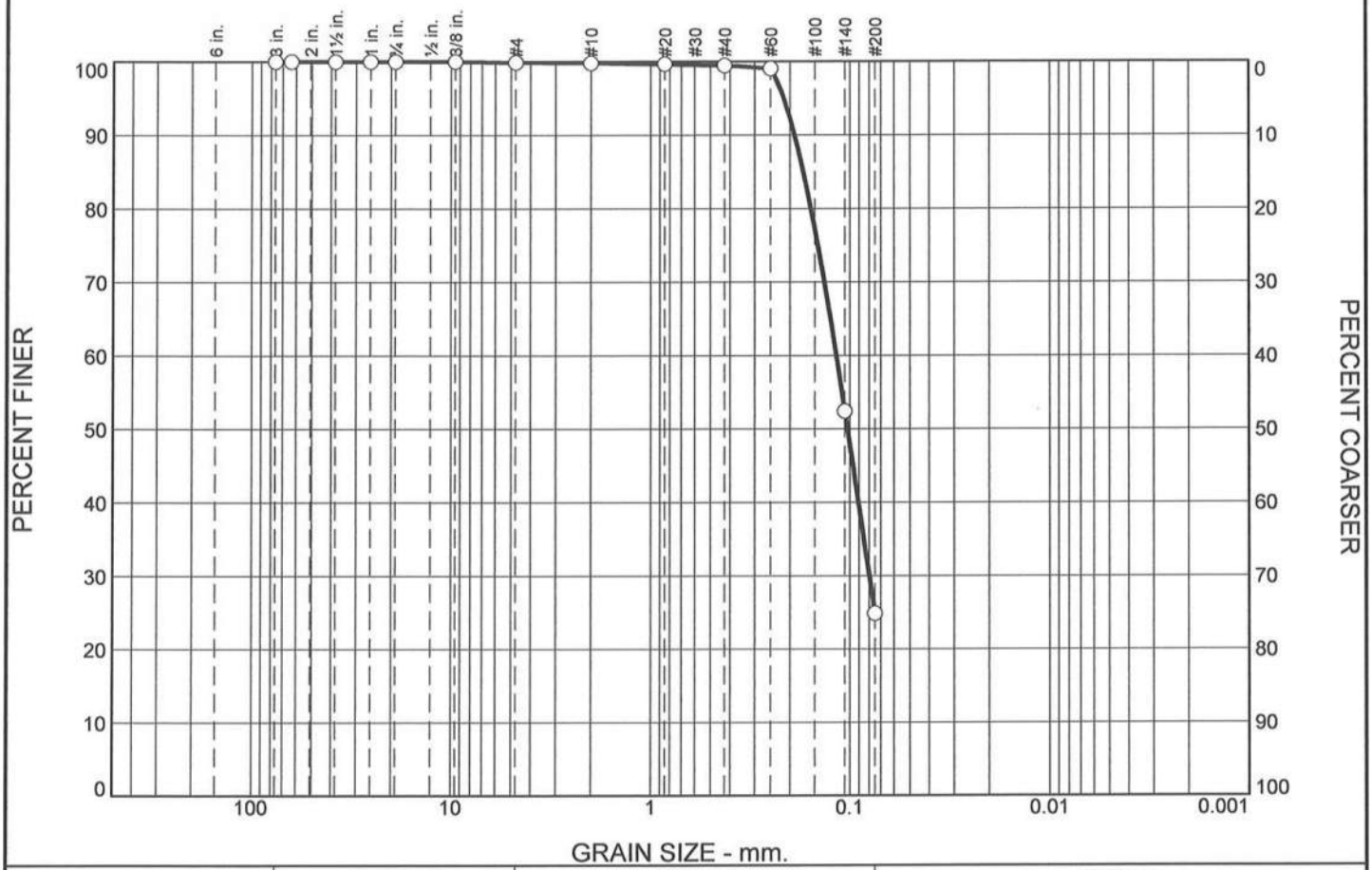
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge

Project No: 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.1	0.3	74.6	24.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.9		
#10	99.8		
#20	99.7		
#40	99.5		
#60	99.1		
#140	52.4		
#200	24.9		

* (no specification provided)

Material Description

Tan, Brown, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1898 D_{85}= 0.1717 D_{60}= 0.1171
D_{50}= 0.1027 D_{30}= 0.0799 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Natural Moisture: 25.9%

Source of Sample: CT-2 **Depth:** 9.0'-11.0'
Sample Number: S-5

Date: 11/21/2016

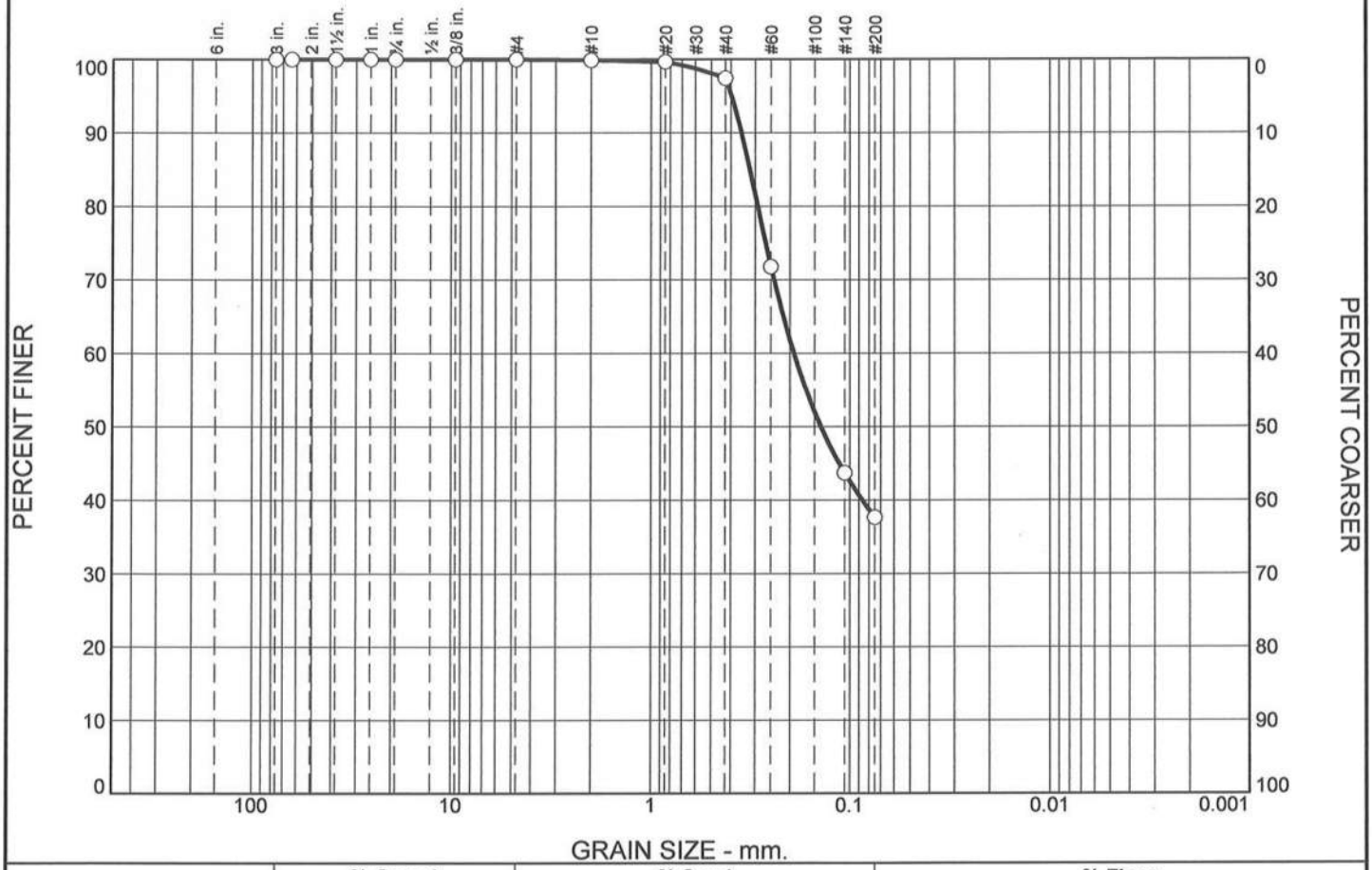
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge

Project No: 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	2.5	59.7	37.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.9		
#20	99.7		
#40	97.4		
#60	71.8		
#140	43.7		
#200	37.7		

* (no specification provided)

Material Description

Gray, Tan, Silty Clayey SAND

Atterberg Limits

PL= 13 LL= 19 PI= 6

Coefficients

D_{90}= 0.3531 D_{85}= 0.3201 D_{60}= 0.1911
D_{50}= 0.1395 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-4(0)

Remarks

Natural Moisture: 22.2%

Source of Sample: CT-2 **Depth:** 23.5'-25.0'
Sample Number: S-9

Date: 11/21/2016

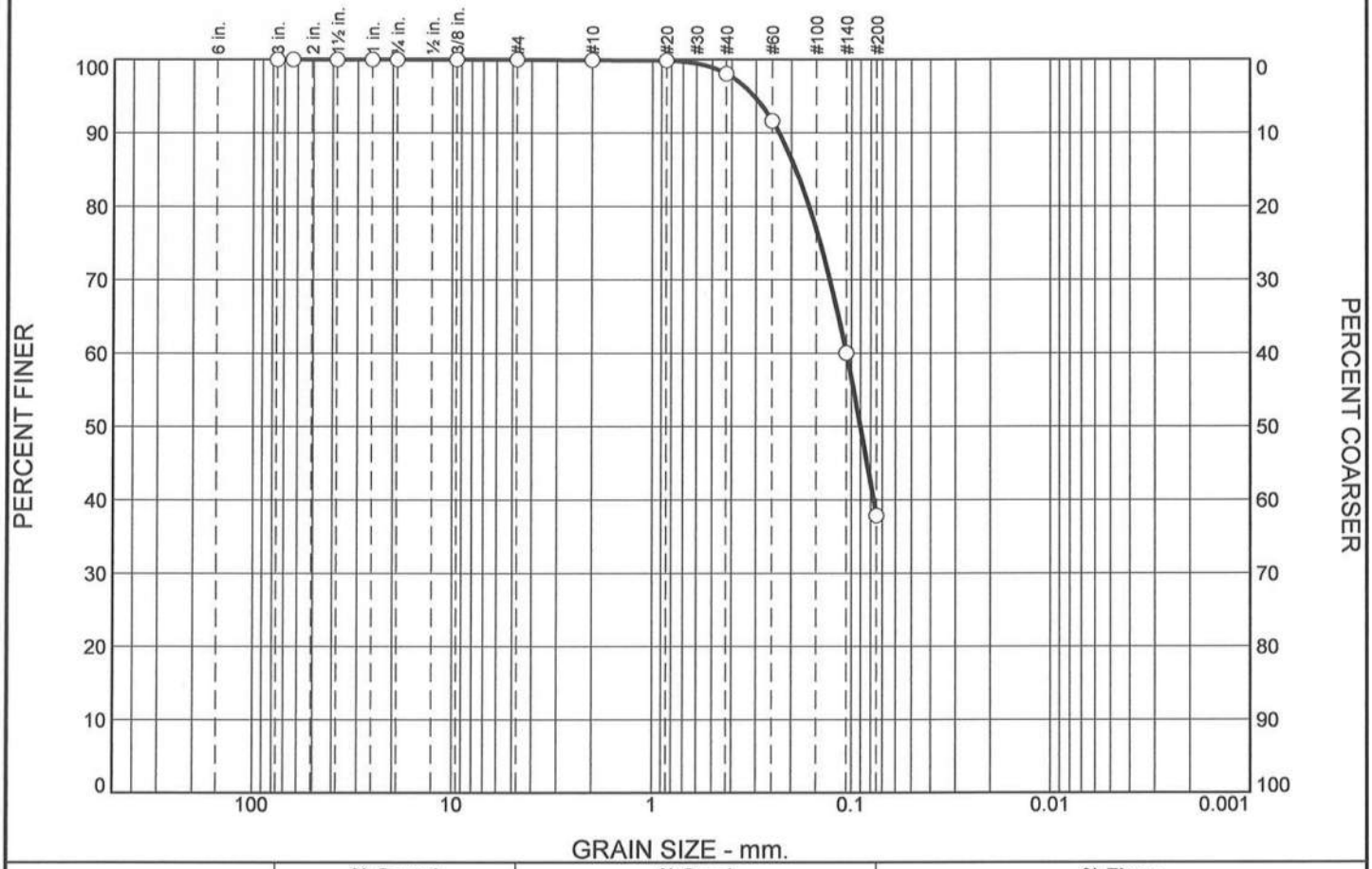
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.8	60.2	37.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.9		
#20	99.9		
#40	98.1		
#60	91.6		
#140	60.0		
#200	37.9		

* (no specification provided)

Material Description

Dark Gray, Black, Clayey SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2312 D_{85}= 0.1902 D_{60}= 0.1060
D_{50}= 0.0900 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 33.9%

Source of Sample: CT-2 **Depth:** 53.5'-55.0'
Sample Number: S-15

Date: 11/21/2016

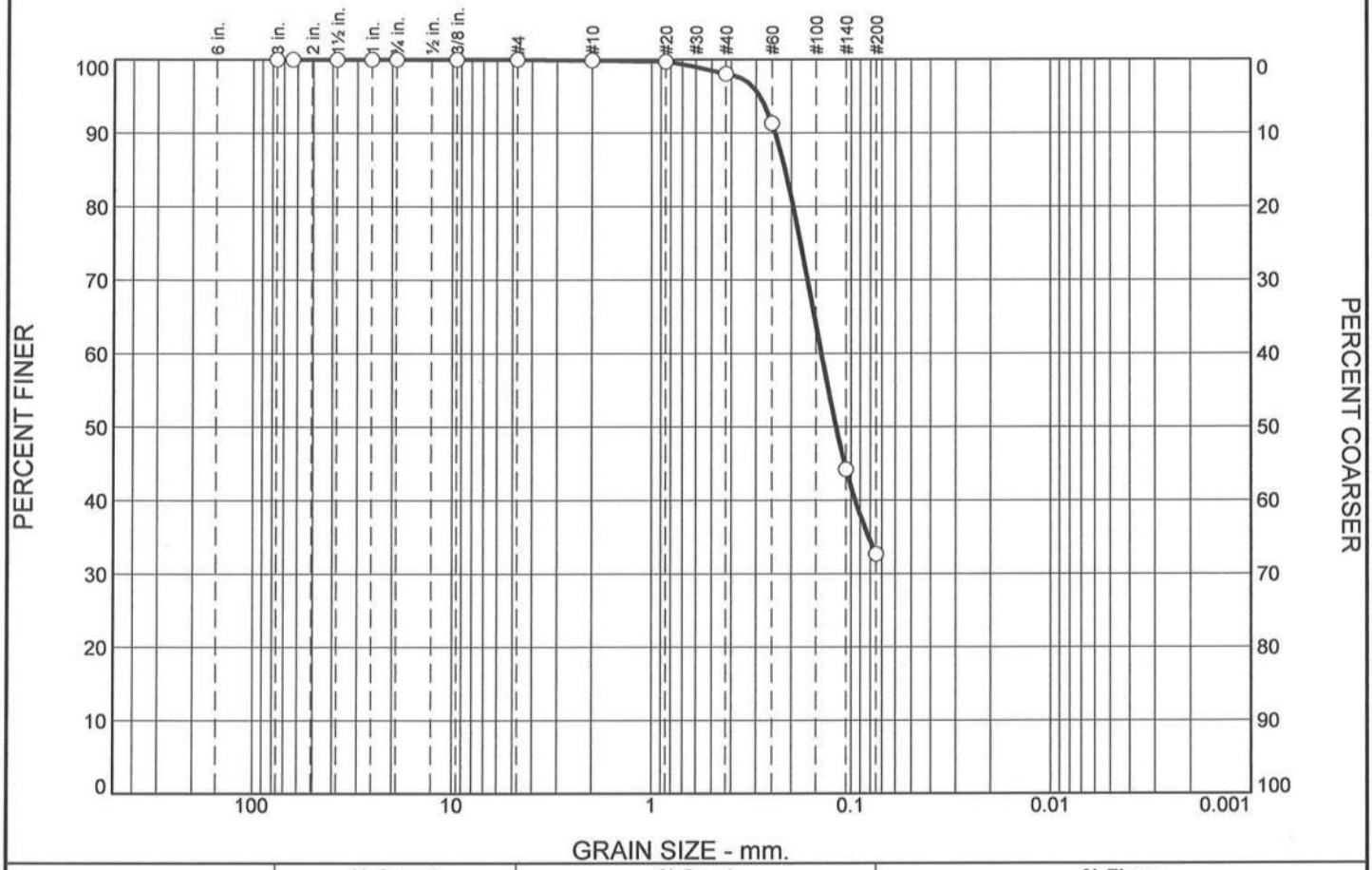
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.8	65.4	32.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.9		
#20	99.7		
#40	98.1		
#60	91.3		
#140	44.2		
#200	32.7		

* (no specification provided)

Material Description

Dark Gray, Black, Clayey SAND

Atterberg Limits

PL= 26 LL= 43 PI= 17

Coefficients

D_{90}= 0.2411 D_{85}= 0.2152 D_{60}= 0.1412
D_{50}= 0.1191 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-7(1)

Remarks

Natural Moisture: 36.3%

Source of Sample: CT-2 **Depth:** 58.5'-60.0'
Sample Number: S-16

Date: 11/21/2016

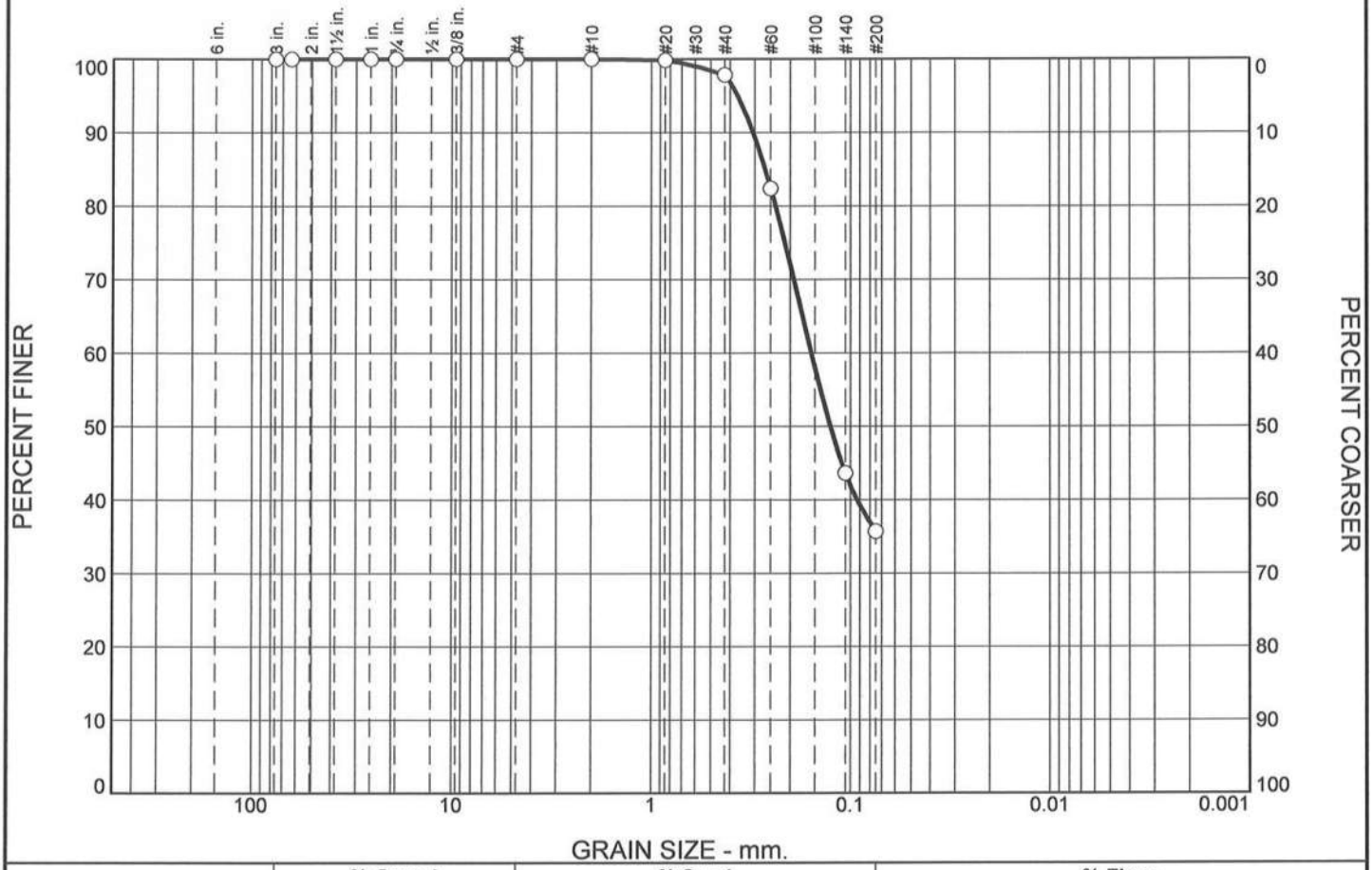
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.2	62.1	35.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	99.9		
#40	97.8		
#60	82.4		
#140	43.6		
#200	35.7		

* (no specification provided)

Material Description

Dark Gray, Black, Clayey SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3063 D_{85}= 0.2665 D_{60}= 0.1568
D_{50}= 0.1260 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 35.2%

Source of Sample: CT-2 **Depth:** 68.5'-70.0'
Sample Number: S-18

Date: 11/21/2016

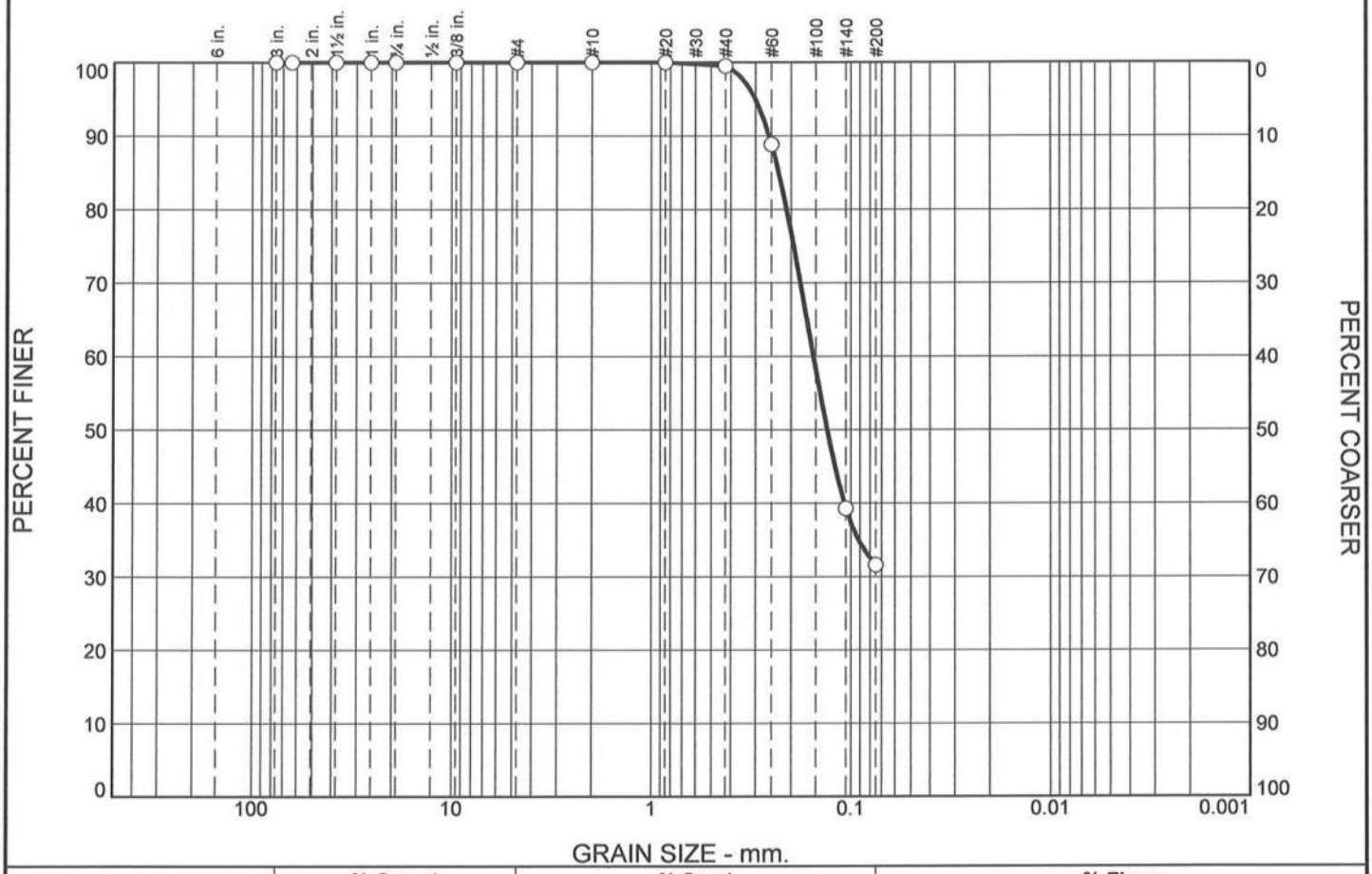
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.5	67.9	31.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.5		
#60	88.8		
#140	39.3		
#200	31.6		

* (no specification provided)

Material Description

Orange, Brown, Clayey SAND

Atterberg Limits

PL= 15 LL= 25 PI= 10

Coefficients

D_{90}= 0.2572 D_{85}= 0.2305 D_{60}= 0.1545
D_{50}= 0.1318 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-2-4(0)

Remarks

Natural Moisture: 11.7%

Source of Sample: CT-3 **Depth:** 5.0'-7.0'
Sample Number: S-3

Date: 11/21/2016

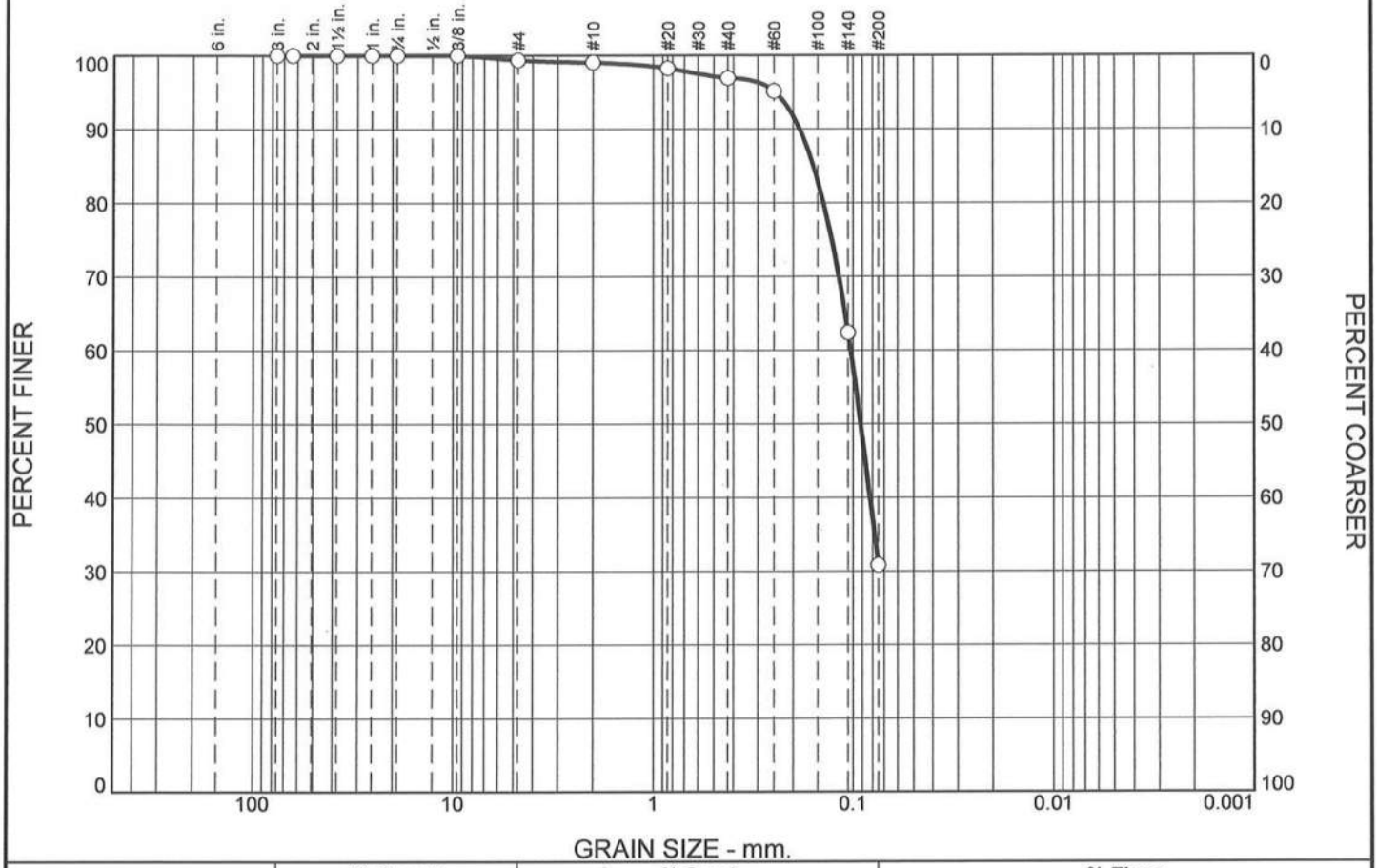
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	0.4	2.1	66.1	30.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.4		
#10	99.0		
#20	98.3		
#40	96.9		
#60	95.1		
#140	62.4		
#200	30.8		

* (no specification provided)

Material Description

Green, Gray, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.1854 D_{85}= 0.1582 D_{60}= 0.1028
D_{50}= 0.0916 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Natural Moisture: 28.9%

Source of Sample: CT-3 **Depth:** 18.5'-20.0'
Sample Number: S-8

Date: 11/22/2016

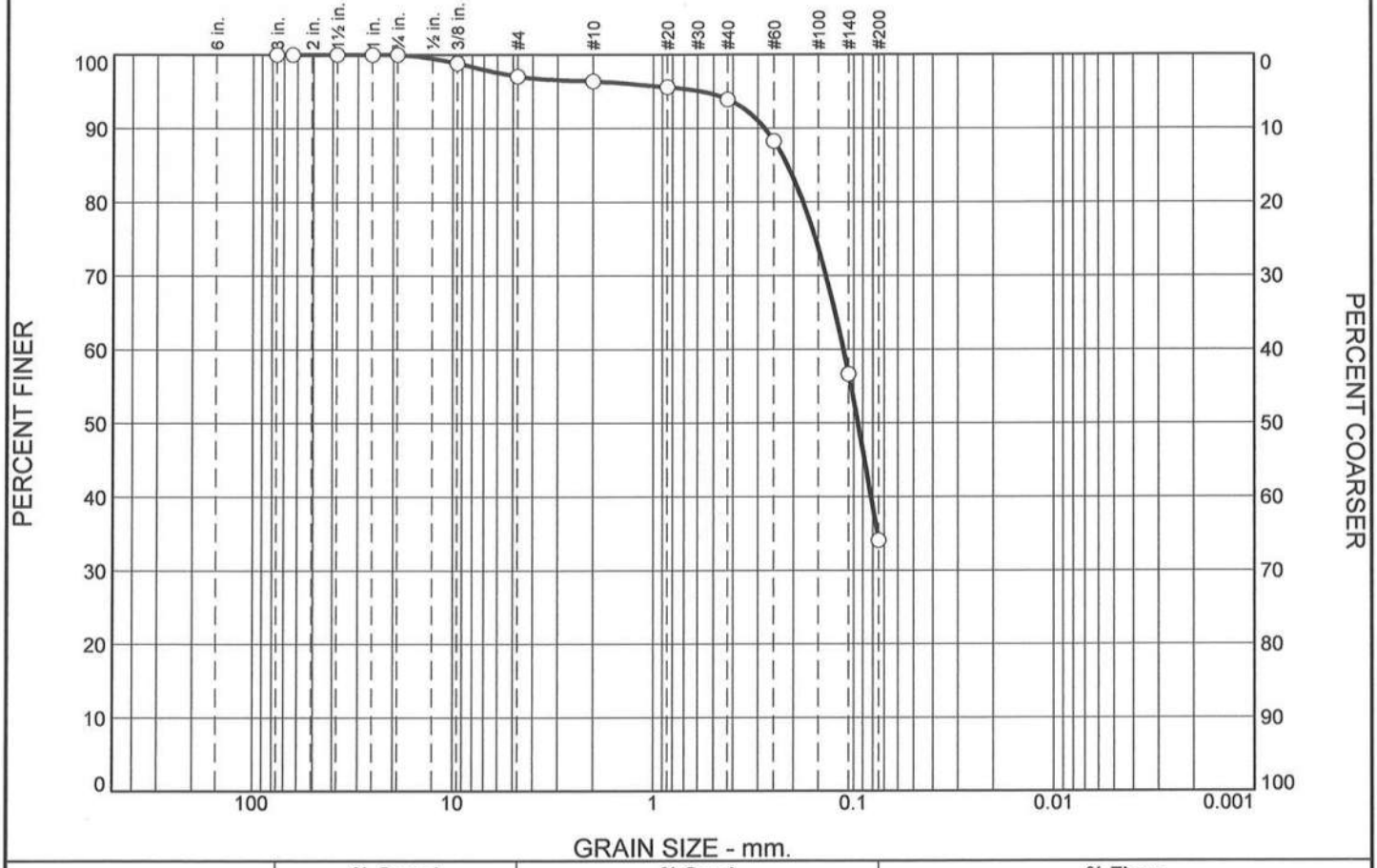
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.9	0.7	2.5	59.8	34.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	98.9		
#4	97.1		
#10	96.4		
#20	95.6		
#40	93.9		
#60	88.3		
#140	56.6		
#200	34.1		

* (no specification provided)

Material Description

Dark Gray, Black, Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2782 D_{85}= 0.2143 D_{60}= 0.1124
D_{50}= 0.0951 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 33.6%

Source of Sample: CT-3 **Depth:** 38.5'-40.0'
Sample Number: S-12

Date: 11/22/2016

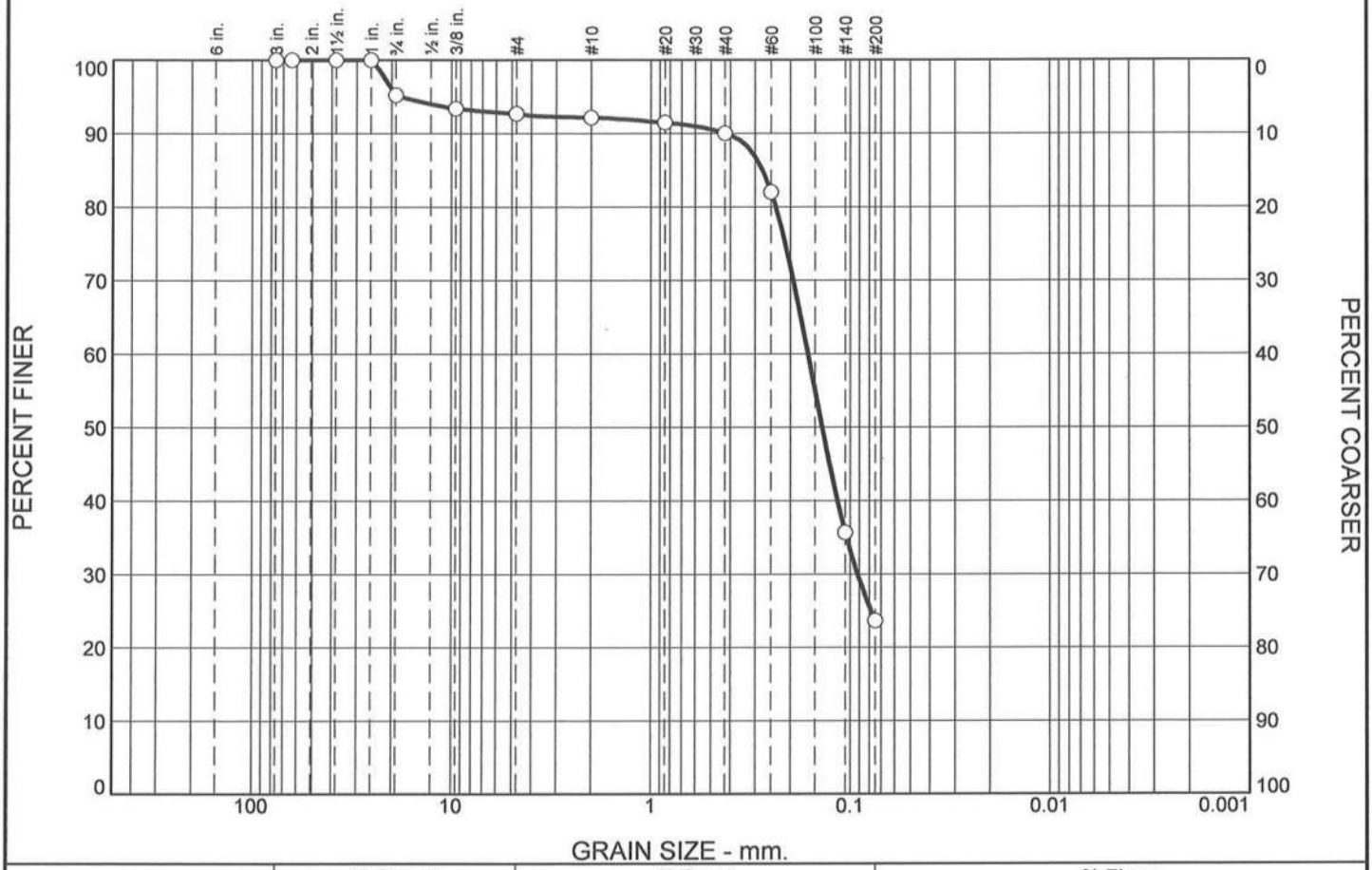
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.8	2.5	0.5	2.2	66.4	23.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	95.2		
.375	93.4		
#4	92.7		
#10	92.2		
#20	91.5		
#40	90.0		
#60	82.0		
#140	35.7		
#200	23.6		

* (no specification provided)

Material Description

Dark Gray, Black, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.4225 D_{85}= 0.2761 D_{60}= 0.1631
D_{50}= 0.1384 D_{30}= 0.0918 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Natural Moisture: 28.3%

Source of Sample: CT-3 **Depth:** 43.5'-45.0'
Sample Number: S-13

Date: 11/22/2016

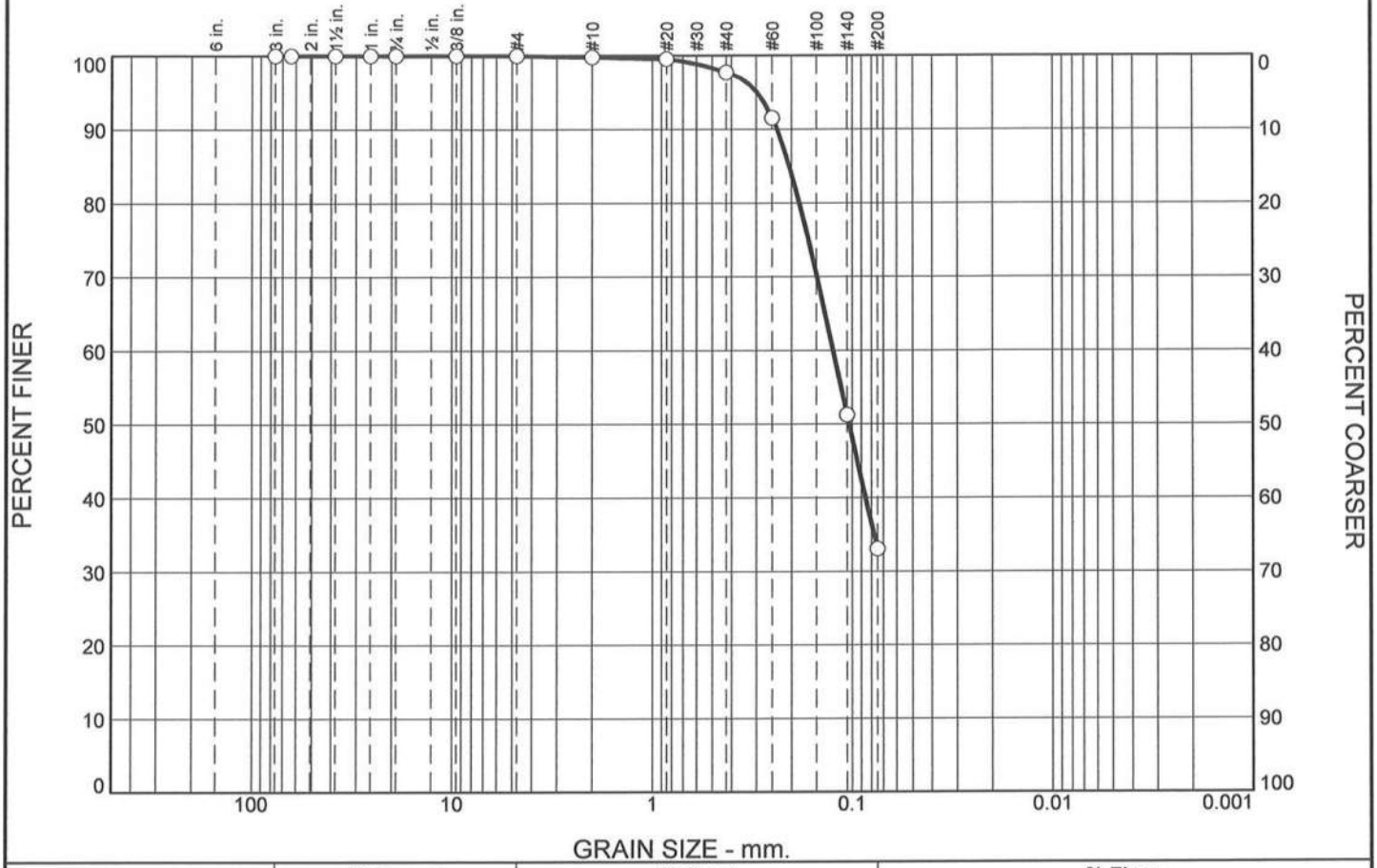
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge

Project No: 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	2.1	64.7	33.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.8		
#20	99.6		
#40	97.7		
#60	91.6		
#140	51.2		
#200	33.0		

* (no specification provided)

Material Description

Dark Gray, Black, Silty SAND

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= 0.2367 D_{85}= 0.2054 D_{60}= 0.1243
D_{50}= 0.1036 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

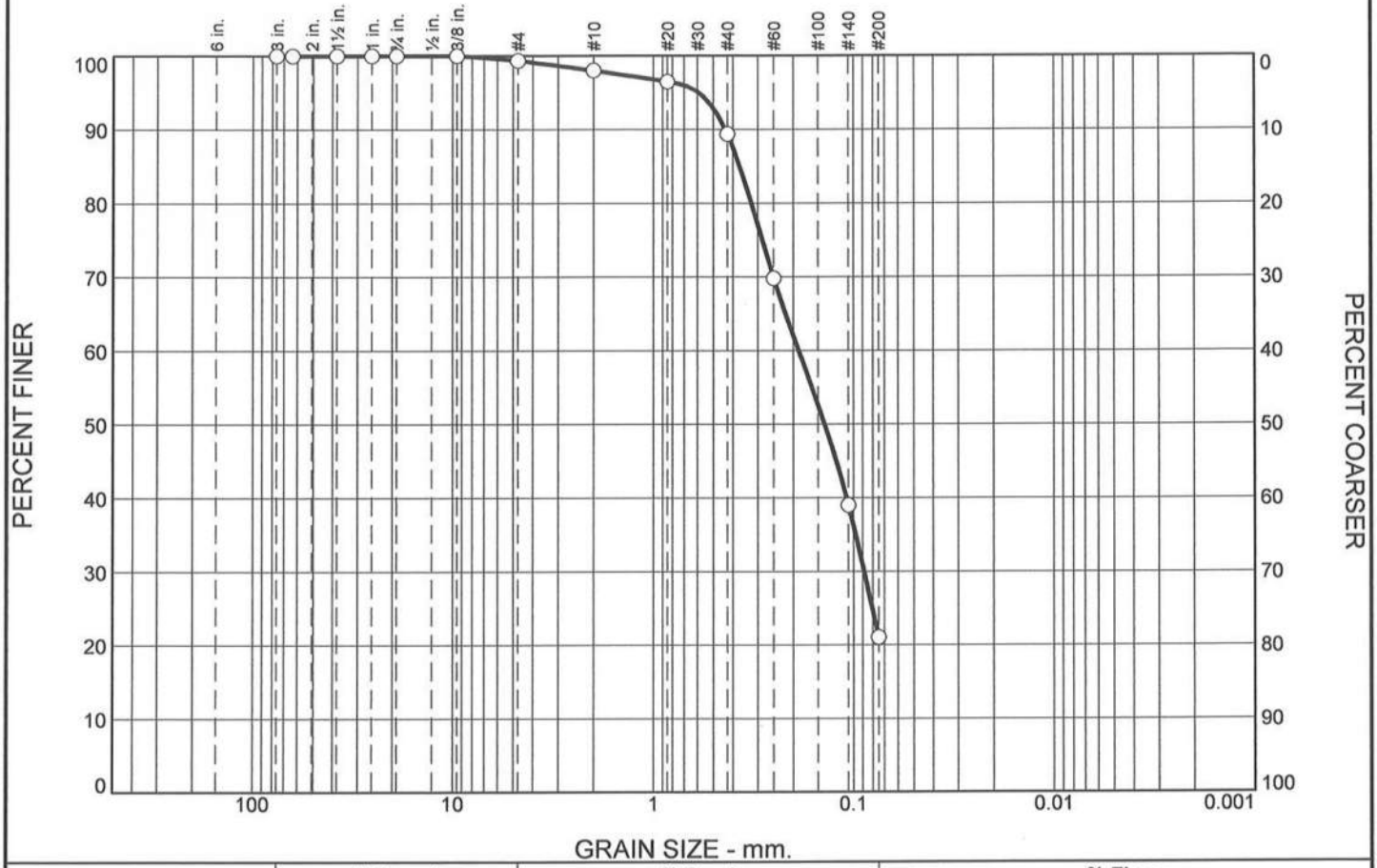
Natural Moisture: 33.6%

Source of Sample: CT-3 **Depth:** 58.5'-60.0'
Sample Number: S-16

Date: 11/22/2016

E2CR, Inc. **Baltimore, MD**	**Client:** JMT/PB **Project:** Nice Bridge **Project No:** 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.6	1.4	8.6	68.4	21.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.4		
#10	98.0		
#20	96.5		
#40	89.4		
#60	69.8		
#140	39.0		
#200	21.0		

* (no specification provided)

Material Description

Orange, Gray, Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4354 D_{85}= 0.3696 D_{60}= 0.1880
D_{50}= 0.1394 D_{30}= 0.0885 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 12.0%

Source of Sample: CT-4 **Depth:** 1.0'-3.0'
Sample Number: S-1

Date: 11/22/2016

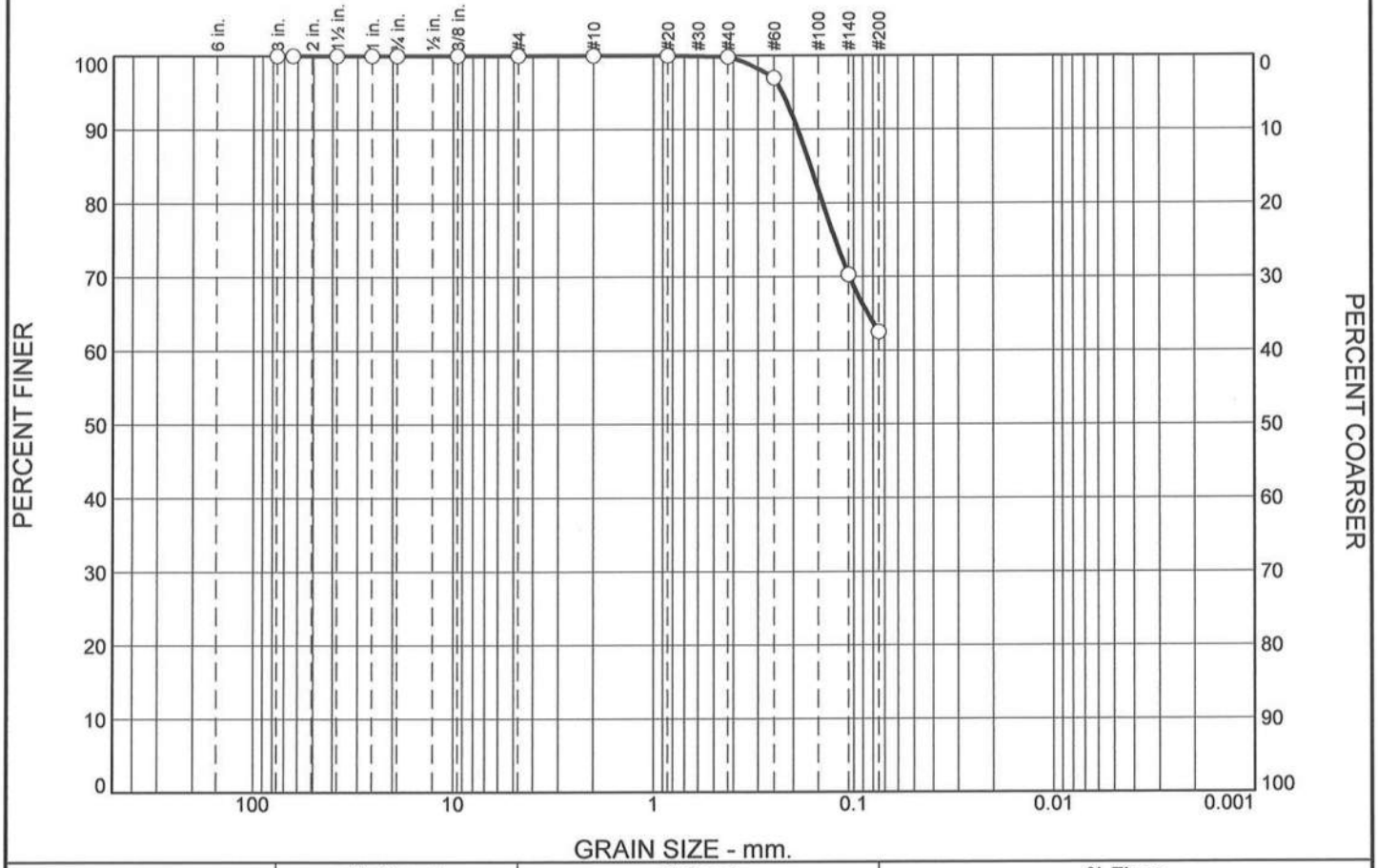
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge

Project No: 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.2	37.3	62.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	100.0		
#20	100.0		
#40	99.8		
#60	97.0		
#140	70.3		
#200	62.5		

* (no specification provided)

Material Description

Gray, Brown, Sandy Lean CLAY

Atterberg Limits

PL= 16 LL= 30 PI= 14

Coefficients

D_{90}= 0.1901 D_{85}= 0.1640 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(6)

Remarks

Natural Moisture: 17.7%

Source of Sample: CT-4 **Depth:** 3.0'-5.0'
Sample Number: S-2

Date: 11/22/2016

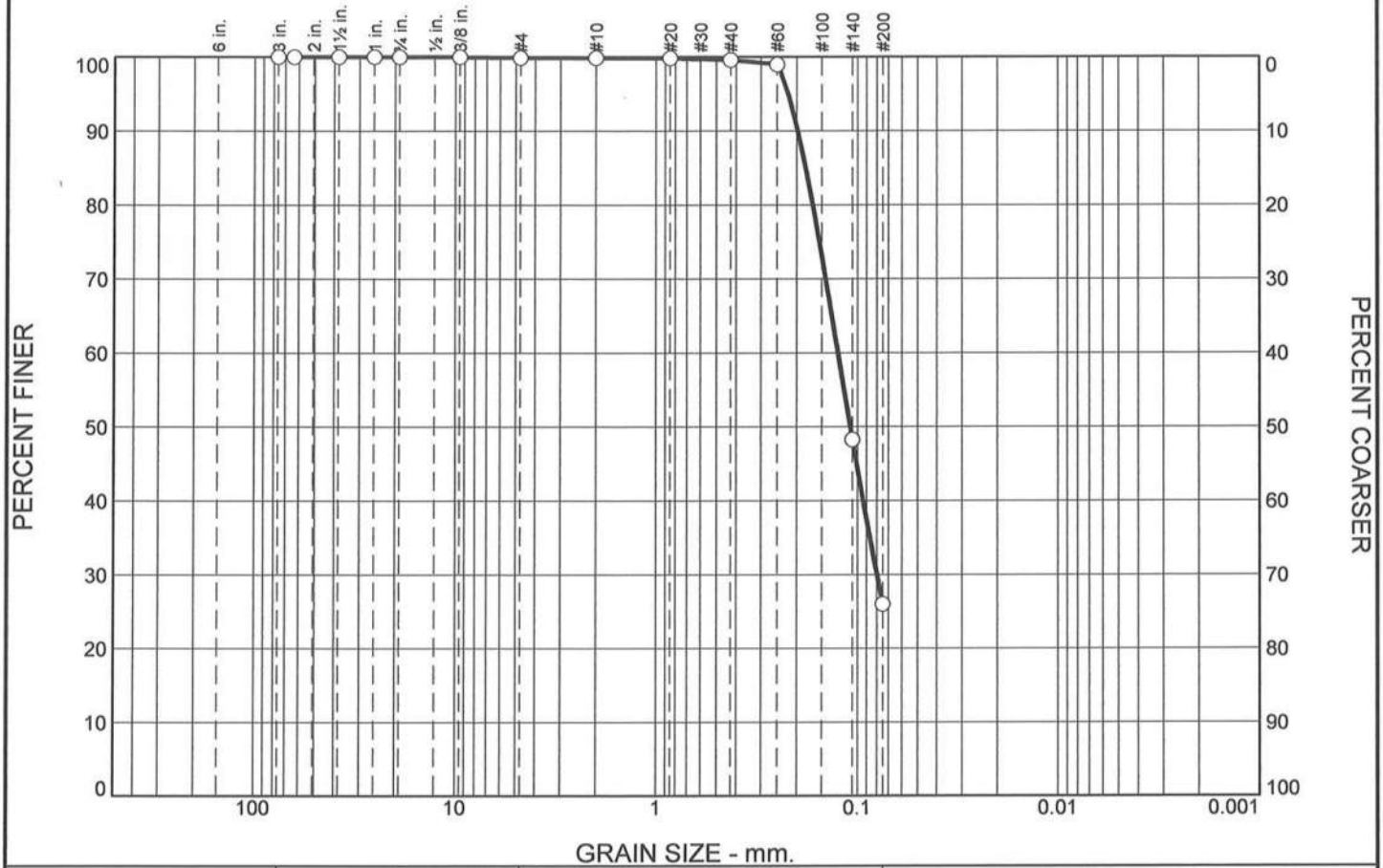
E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.0	0.3	73.6	26.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	99.9		
#10	99.9		
#20	99.8		
#40	99.6		
#60	99.0		
#140	48.3		
#200	26.0		

* (no specification provided)

Material Description

Brown, Tan, Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1979 D_{85}= 0.1807 D_{60}= 0.1251
D_{50}= 0.1087 D_{30}= 0.0800 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

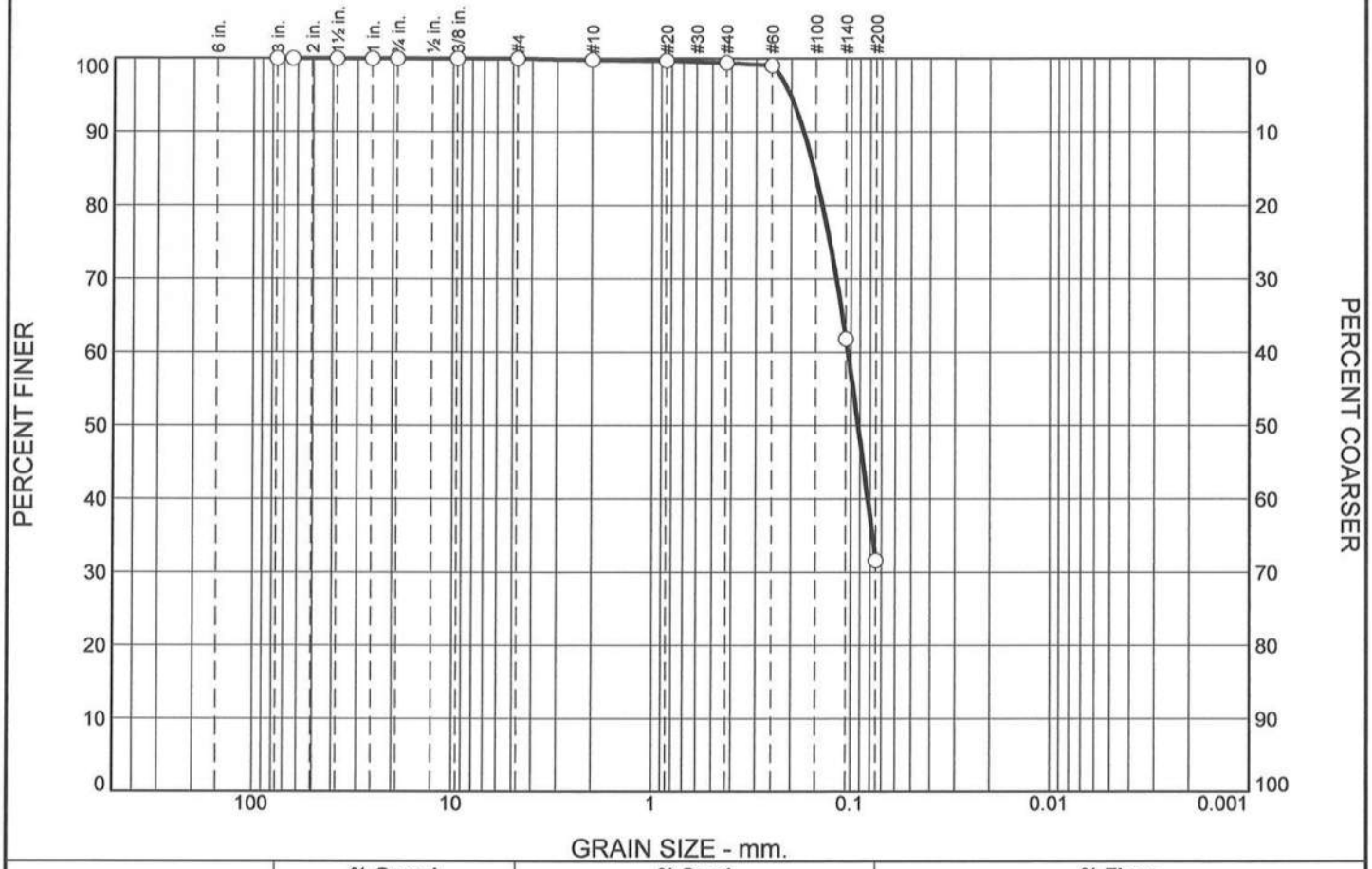
Natural Moisture: 22.3%

Source of Sample: CT-4 **Depth:** 9.0'-11.0'
Sample Number: S-5

Date: 11/22/2016

E2CR, Inc.	**Client:** JMT/PB
	Project: Nice Bridge
Baltimore, MD	**Project No:** 15530-04 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.4	67.8	31.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2.5	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	100.0		
#4	100.0		
#10	99.8		
#20	99.7		
#40	99.4		
#60	99.1		
#140	61.8		
#200	31.6		

* (no specification provided)

Material Description

Green, Gray, Silty SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1732 D_{85}= 0.1540 D_{60}= 0.1036
D_{50}= 0.0919 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Natural Moisture: 28.5%

Source of Sample: CT-4 **Depth:** 18.5'-20.0'
Sample Number: S-8

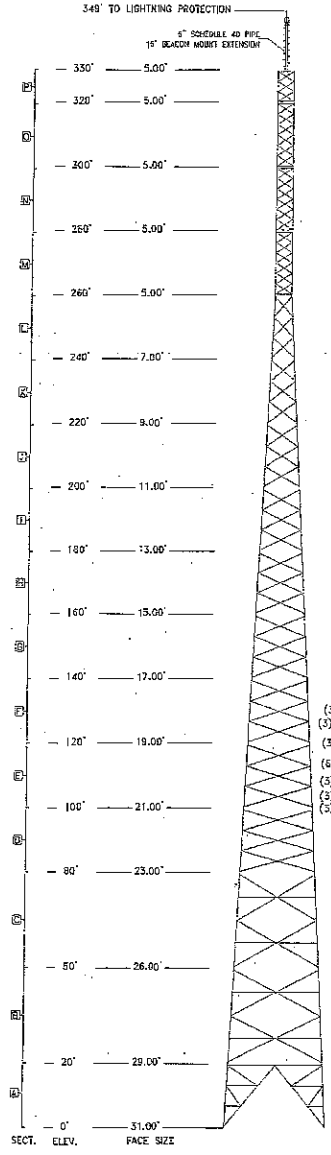
Date: 11/22/2016

E2CR, Inc.

Baltimore, MD

Client: JMT/PB
Project: Nice Bridge
Project No: 15530-04

Figure

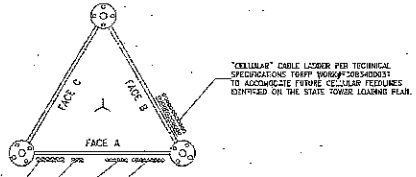


MEMBER CHART

SECTION	ELEVATION	FACE SIZE	LEGS	DIAGONALS	HORIZONTALS	SUB-HORIZONTALS	SUB-DIAGONALS	SEC-HORIZONTALS	INNER BRACING	REDUNDANT HIP BRACING	CLIMBING	SECTION WEIGHT (lbs.)
A	0' - 20'	31.00' - 29.00'	7-1/4	L 5 x 5 x 5/16	L 4 x 4 x 5/16	L 4 x 4 x 5/8	L 4 x 4 x 1/4	N/A	L 4 x 4 x 1/4	L 4 x 4 x 1/4	NOTE: 8	15200
B	20' - 50'	29.00' - 26.00'	7-1/4	L 5 x 5 x 5/16	N/A	N/A	N/A	L 4 x 4 x 1/4	N/A	N/A	NOTE: 8	23100
C	50' - 80'	26.00' - 23.00'	7	L 4 x 4 x 3/8	N/A	N/A	N/A	L 4 x 4 x 1/4	N/A	N/A	NOTE: 8	20900
D	80' - 100'	23.00' - 21.00'	6-1/4	L 4 x 4 x 1/4	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	12000
E	100' - 120'	21.00' - 19.00'	6	L 3-1/2 x 3-1/2 x 1/4	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	10400
F	120' - 140'	19.00' - 17.00'	5-1/2	L 5 x 5 x 5/16	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	8700
G	140' - 160'	17.00' - 15.00'	5-1/4	L 4 x 4 x 3/8	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	7700
H	160' - 180'	15.00' - 13.00'	5	L 4 x 4 x 1/4.	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	6000
I	180' - 200'	13.00' - 11.00'	4-3/4	L 3 1/2 x 3 1/2 x 1/4	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	5200
J	200' - 220'	11.00' - 9.00'	4-1/2	L 3 x 3 x 1/4	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	4500
K	220' - 240'	9.00' - 7.00'	4-1/4	L 2 1/2 x 2 1/2 x 3/16	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	3600
L	240' - 260'	7.00' - 5.00'	4	L 2 x 2 x 3/16	N/A	N/A	N/A	N/A	N/A	N/A	NOTE: 8	3100
M	260' - 280'	5.00'	3-1/2	1 1/8 S.R.	1 S.R.	N/A	N/A	N/A	N/A	N/A	NOTE: 8	2500
N	280' - 300'	5.00'	2-3/4	1 S.R.	1 S.R.	N/A	N/A	N/A	N/A	N/A	NOTE: 8	1700
O	300' - 320'	5.00'	2-1/4	7/8 S.R.	7/8 S.R.	N/A	N/A	N/A	N/A	N/A	NOTE: 8	1200
P	320' - 330'	5.00'	1-3/4	7/8 S.R.	7/8 S.R.	N/A	N/A	N/A	N/A	N/A	NOTE: 8	500

FEEDLINE DISTRIBUTION INFORMATION

THE TOWER STRUCTURE IS DESIGNED ACCORDING TO THE FEEDLINE DISTRIBUTION INFORMATION PROVIDED.



MATERIAL SPEC CHART

DESC.	MATR'L SPEC.	MIN. YIELD (ksi)
WELDED SECTIONS		
LEGS M-P	A-572 GRADE 50	50
INNER MEM.	A-36	36
FLANGE PL	A-572 GRADE 50	50
LEG PAD PL	A-36	36
BOLTED X-BRACED SECTIONS		
LEGS B-L	A-572 GRADE 50	50
INNER MEM.	A-36	36
FLANGE PL	A-572 GRADE 50	50
LEG PAD PL	A-36	36
BOLTED K-BRACED SECTIONS		
LEGS A	A-572 GRADE 50	50
INNER MEM.	A-36	36
FLANGE PL	A-572 GRADE 50	50
LEG PAD PL	A-36	36

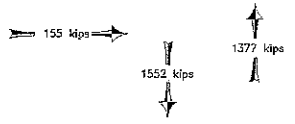
ANTENNA INFORMATION

ANTENNA	ELEVATION	LINE
4" LIGHTING ROD	@ 349'	N/A
BEACON LIGHTING	@ 349'	50 CORD
15' BEACON EXTENSION	@ 337.5'	N/A
(3) DMR12	@ 330'	(3) 1 5/8
6' SIDEARMS	@ 330'	N/A
(3) DMR12	@ 310'	(3) 1 5/8
6' SIDEARMS	@ 310'	N/A
(3) DMR12	@ 290'	(3) 1 5/8
6' SIDEARMS	@ 290'	N/A
(3) DB420-D	@ 270'	(6) 7/8
6' SIDEARMS	@ 270'	N/A
(3) DR224	@ 250'	(3) 7/8
6' SIDEARMS	@ 250'	N/A
(12) 58210	@ 250'	(12) 1-5/8
(3) 13' GATE MOUNTS	@ 230'	N/A
(12) DB858HD90ESX	@ 210'	(12) 1-5/8
(3) 13' GATE MOUNTS	@ 210'	N/A
(3) DISH MOUNTS	@ 190'	N/A
(3) 6' HP DISH	@ 190'	(3) EW63
(3) 13' GATE MOUNTS	@ 170'	N/A
(12) 58210	@ 170'	(12) 1-5/8
(3) 13' GATE MOUNTS	@ 150'	N/A
(12) DB858HD90ESX	@ 150'	(12) 1-5/8
(3) DISH MOUNTS	@ 130'	N/A
(3) 6' HP DISH	@ 130'	(3) EW63
(12) DB858HD90ESX	@ 110'	(12) 1-5/8
(3) 13' GATE MOUNTS	@ 110'	N/A
(3) 13' GATE MOUNTS	@ 90'	N/A
(12) 58210	@ 90'	(12) 1-5/8

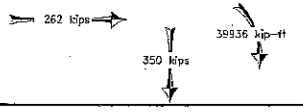
DESIGN & DRAWING NOTES:

1) SOME DETAIL HAS BEEN OMITTED FOR CLARITY OF ILLUSTRATION.
2) TOWER DESIGNED FOR EXPOSURE C TO THE TIA-222-G STANDARD.
3) TOWER STRUCTURE CLASS III.
4) TOPOGRAPHIC CATERGORY 1 WITH CREST HEIGHT OF 0.00FT.
5) TOWER DESIGNED FOR A 120 MPH BASIC WITH IN ACCORDANCE WITH TIA-222-G STANDARD.
6) TOWER IS ALSO DESIGNED FOR A 40 MPH BASIC WIND WITH 1/2" ICE.
7) DEFLECTIONS ARE BASED UPON A 60 MPH WIND.
8) TOWER DESIGNED FOR STEP BOLTS UP ALL THREE LEGS FROM 0'-260' AND UP ONE LEG THEREAFTER.
9) TOWER DESIGNED FOR FEEDLINES TO BE MOUNTED IN DOUBLE ROWS ON A CLIP-ON WAVEGUIDE LADDER.
10) SECTION A IS 3-BAY K-BRACED.
SECTIONS B - C ARE 2-BAY X-BRACED.
SECTIONS D - L ARE 3-BAY X-BRACED.
SECTIONS M - O ARE 6-BAY X-BRACED.
SECTION P IS 3-BAY X-BRACED.

MAX INDIVIDUAL LEG LOADS (FACTORED)



MAX TOTAL FOUNDATION LOAD (FACTORED)



REV.	DESCRIPTION	DATE	APP.

DRAWN J.W.L. DATE 1-22-13
CHECK G.O.T. DATE 1-22-13
APPROVAL G.R.F. DATE 1-22-13

THIRD ANGLE PROJECTION

TOLERANCES
.XX± 3/32" ANGLES± 2°
.XX± 3/32" DRILLED HOLES ±1/32"
.XXX± 1/16" BURNED HOLES ±1/16"

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN: INCHES

Tower Innovations
PH# (812) 853-0595
FAX# (812) 853-6652
2855 HIGHWAY 261
NEWBURGH, IN. 47630

TITLE
ELEVATION VIEW & MEMBER INFOMATION
VALLEY LEE, MD

DWG NO. 6036-T-1 REV -

DO NOT SCALE DRAWING

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.

STORMWATER MANAGEMENT AND SEDIMENT & EROSION CONTROL APPROVAL
STATE/FEDERAL PROJECTS
SEDIMENT & STORMWATER PLAN REVIEW DIVISION

MDE NUMBER: 19-SF-0008 APPROVED BY: for
Program Manager, Sediment, Stormwater, and Dam Safety

EFFECTIVE DATE: October 4, 2018 (Pursuant to Criteria Noted Below)

IN COMPLIANCE WITH: Environment Article, Sections 4-106 and 4-205 Annotated Code of Maryland

APPROVAL IS HEREBY GRANTED: Maryland Department of Information Technology
ADDRESS: 301 W. Preston Street, Suite 1304
Baltimore, MD 21201
Attn: Mr. Ed Macon

HEREINAFTER KNOWN AS OWNER,
FOR THE PLANS AND SPECIFICATIONS PRESENTED FOR: Contract No.14-0790-001
AI No.162034

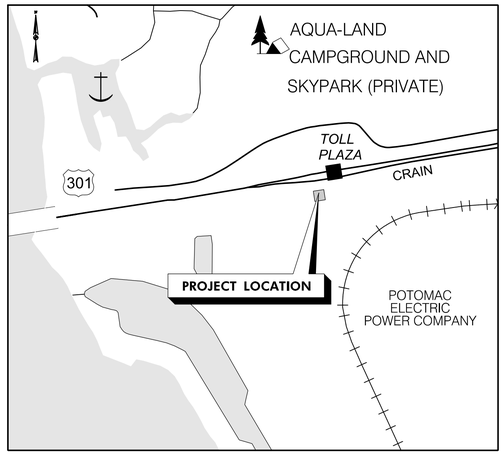
Nice Bridge Communications Tower - Charles County

PREPARED BY: Johnson, Mirmiran & Thompson

This APPROVAL is granted subject to the following conditions:

1. This Approval shall become null and void if the construction authorized herein has not been completed within three (3) years from the granting of this Approval, except that these limits may be extended at the discretion of the Department when requested by the owner or authorized agent.
2. The Approval is subject to all laws and regulations now in effect and may be revoked if it is subsequently determined that this authorization violates other laws of the State. Construction shall comply with approved terms.
3. The location and dimensions of all sediment control structures and stormwater management facilities, as well as grading, excavation, and filling shall be in accordance with plans approved by the Department of the Environment/ Water and Science Administration (MDE/WSA). The owner or authorized agent must obtain written approval from the MDE/WSA for any plan modifications or changes. A copy of the approved plan with any approved modifications and this Approval shall be available at the construction site for reference during the construction period.
4. Off-site borrow or waste sites require local county and Soil Conservation District approvals if they are located on private property or MDE/WSA approval if on State or federal property. Local approval numbers shall be furnished to the MDE/WSA Inspector.
5. The Owner or his authorized agent shall notify the MDE/WSA Compliance Program at (410) 537-3510, at least seven (7) days prior to initiation of the project and five (5) days after work ends.
6. This project has a disturbed area of less than 5,000 square feet and is therefore exempt from Stormwater Management in accordance with Section 3.2 of Maryland Stormwater Management and Erosion & Sediment Control Guidelines for State and Federal Projects.

APM/CRH



LOCATION MAP

500′ 0 500′ 1000′

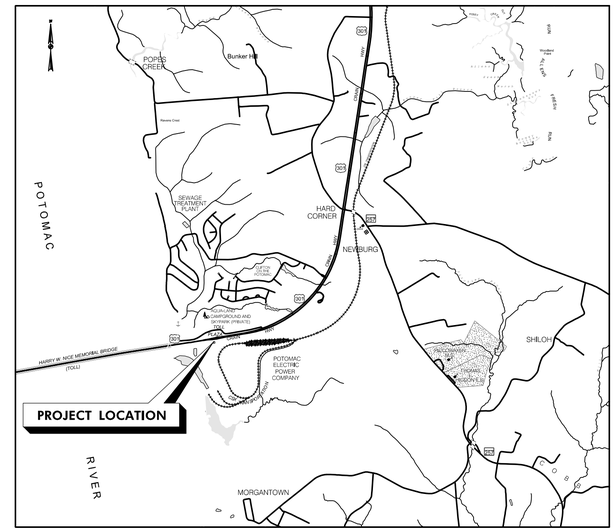
SCALE: 1" = 500′

STATE OF MARYLAND
Department of Information Technology
Wireless Division

Department of INFORMATION TECHNOLOGY

Site Development Engineering
Nice Bridge Communications Tower

Nice Bridge Tower Site (MDTA)
301 South Crain Highway
Newburg, Maryland, 20664



VICINITY MAP

3000′ 0 3000′ 6000′

SCALE: 1" = 3000′

INDEX OF DRAWINGS

SHEET NO.	DRAWING NO.	DESCRIPTION
1	G–01	COVER SHEET
2	C–01	OVERALL SITE PLAN
3	C–02	SITE ENLARGEMENT PLAN
4	C–03	SITE DETAILS
5	EN–01	EROSION AND SEDIMENT CONTROL GENERAL NOTES
6	EN–02	EROSION AND SEDIMENT CONTROL GENERAL NOTES
7	EN–03	EROSION AND SEDIMENT CONTROL GENERAL NOTES
8	EN–04	EROSION AND SEDIMENT CONTROL GENERAL NOTES
9	ES–01	EROSION AND SEDIMENT CONTROL OVERALL SITE PLAN
10	ES–02	EROSION AND SEDIMENT CONTROL ENLARGEMENT PLAN
11	ED–01	EROSION AND SEDIMENT CONTROL DETAILS

MDE # 19-SF-0008

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · HUGHES ZACHARY HEFLIN · No. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	NOV. 2018

COVER SHEET

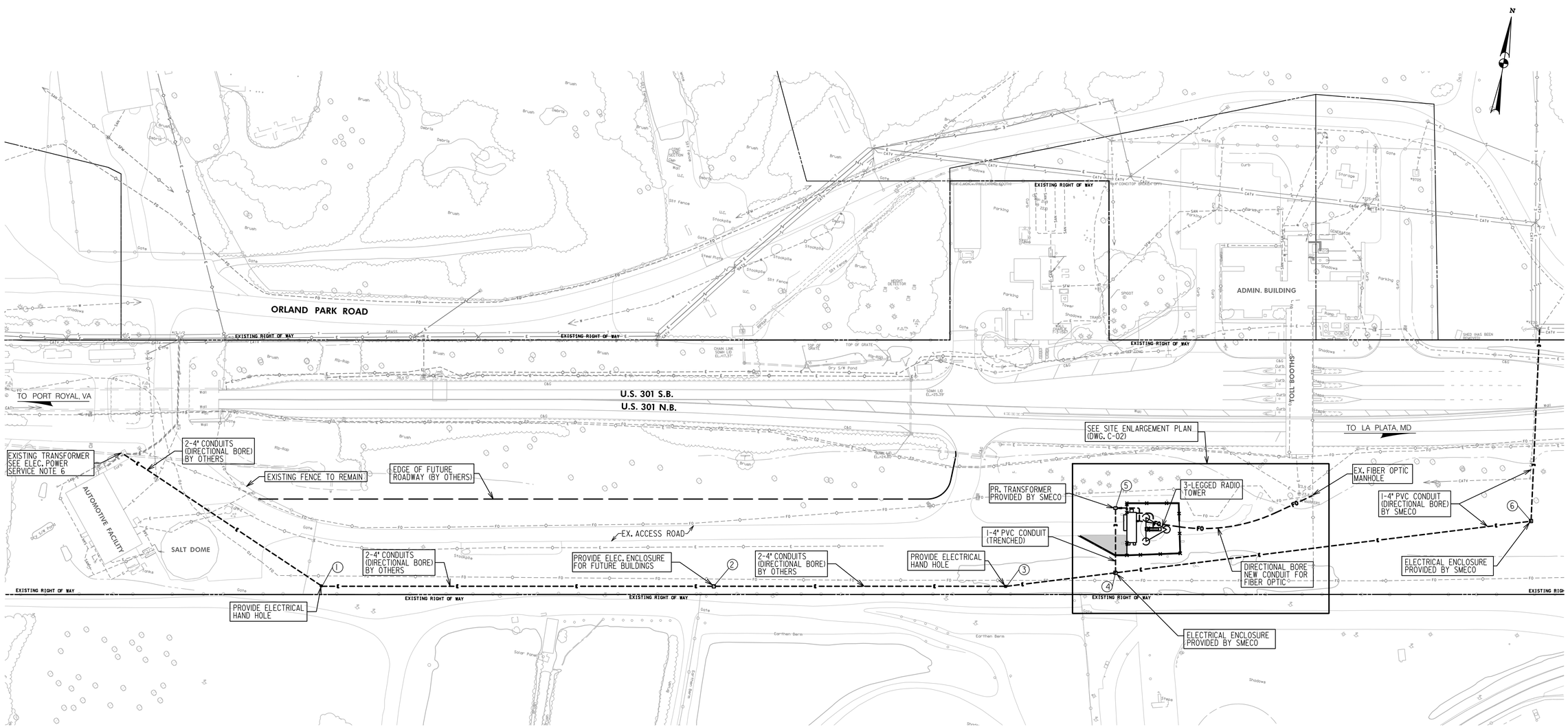
SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001

DRAWING NO. G–01

SET SHEET I OF II



ELECTRICAL POWER SERVICE NOTES:

1. INSTALL TRANSFORMER PAD PER SMECO STANDARDS. SMECO WILL PROVIDE NEW TRANSFORMER.
2. CONTRACTOR TO PROVIDE 1-4" PVC CONDUITS FROM THE TAP POINT TO NEW TRANSFORMER.
3. SMECO REQUIRES AN EASEMENT FOR THE CONDUIT ROUTED FROM THE TAP POINT TO THE NEW TRANSFORMER.
4. CONTRACTOR TO PROVIDE CT CABINET AND METER SOCKET.
5. ALL PRIMARY CONDUIT SHALL HAVE 36" OF COVER.
6. INSTALL 1-36"R 4" CONDUIT BENDS IN TRANSFORMER PAD WITH SMECO ASSISTANCE.
7. INSTALL 3-36"R 4" CONDUIT BENDS IN SECONDARY WINDOW OF TRANSFORMER PAD FOR CONNECTION TO CT CABINET.

FIBER OPTIC NOTES:

1. EXISTING CONDUITS AND FIBER OPTIC CABLES EXTEND FROM THE TOLL PLAZA TUNNEL TO A MANHOLE NEAR THE RADIO TOWER SITE. THE FIBER OPTIC CABLE IS ROUTED THROUGH THE TOLL PLAZA TUNNEL TO THE IT ROOM LOCATED IN THE ADMINISTRATION BUILDING.
2. THE CONTRACTOR WILL PROVIDE NEW CONDUIT FROM THE RADIO TOWER TO THE EXISTING FIBER OPTIC MANHOLE.

DIRECTIONAL BORE NOTE:

DRILL STAGING AREAS SHALL BE KEPT NEAT AND ORDERLY AND DISTURB AS LITTLE AREA AS POSSIBLE AND NOT EXCEED THE LIMITS OF DISTURBANCE AS SHOWN ON THE EROSION AND SEDIMENT CONTROL DRAWINGS.

USE AN ANSI/NSF 60 (DRINKING WATER TREATMENT CHEMICALS - HEALTH EFFECTS) CERTIFIED BENTONITE-BASED DRILLING FLUID.

UTILIZE A DRILLING FLUID CLEANING/RECYCLING SYSTEM. THE ENTRY AND RECEIVING PITS SHALL BE SIZED AND CONSTRUCTED TO COMPLETELY CONTAIN THE DRILLING FLUID. THE PITS SHALL NOT EXCEED THE LIMITS OF DISTURBANCE AS SHOWN ON THE EROSION AND SEDIMENT CONTROL DRAWINGS.

ELECTRICAL STAKEOUT COORDINATES

PT	NORTHING	EASTING	DESCRIPTION
1	253657.90	1317988.99	ELECTRICAL HAND HOLE
2	253740.06	1318474.51	ELECTRICAL ENCLOSURE
3	253801.53	1318837.74	ELECTRICAL HAND HOLE
4	253841.56	1318969.87	ELECTRICAL ENCLOSURE
5	253921.32	1318956.21	TRANSFORMER
6	253992.20	1319474.06	ELECTRICAL ENCLOSURE

NOTE: COORDINATES GIVEN TO CENTER OF STRUCTURE

60' 0 60' 120'
SCALE: 1"=60'

MDE # 19-SF-0008

JMT

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · NICHOLAS ZACHARY FRIEDMAN · NO. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	NOV. 2018

OVERALL SITE PLAN

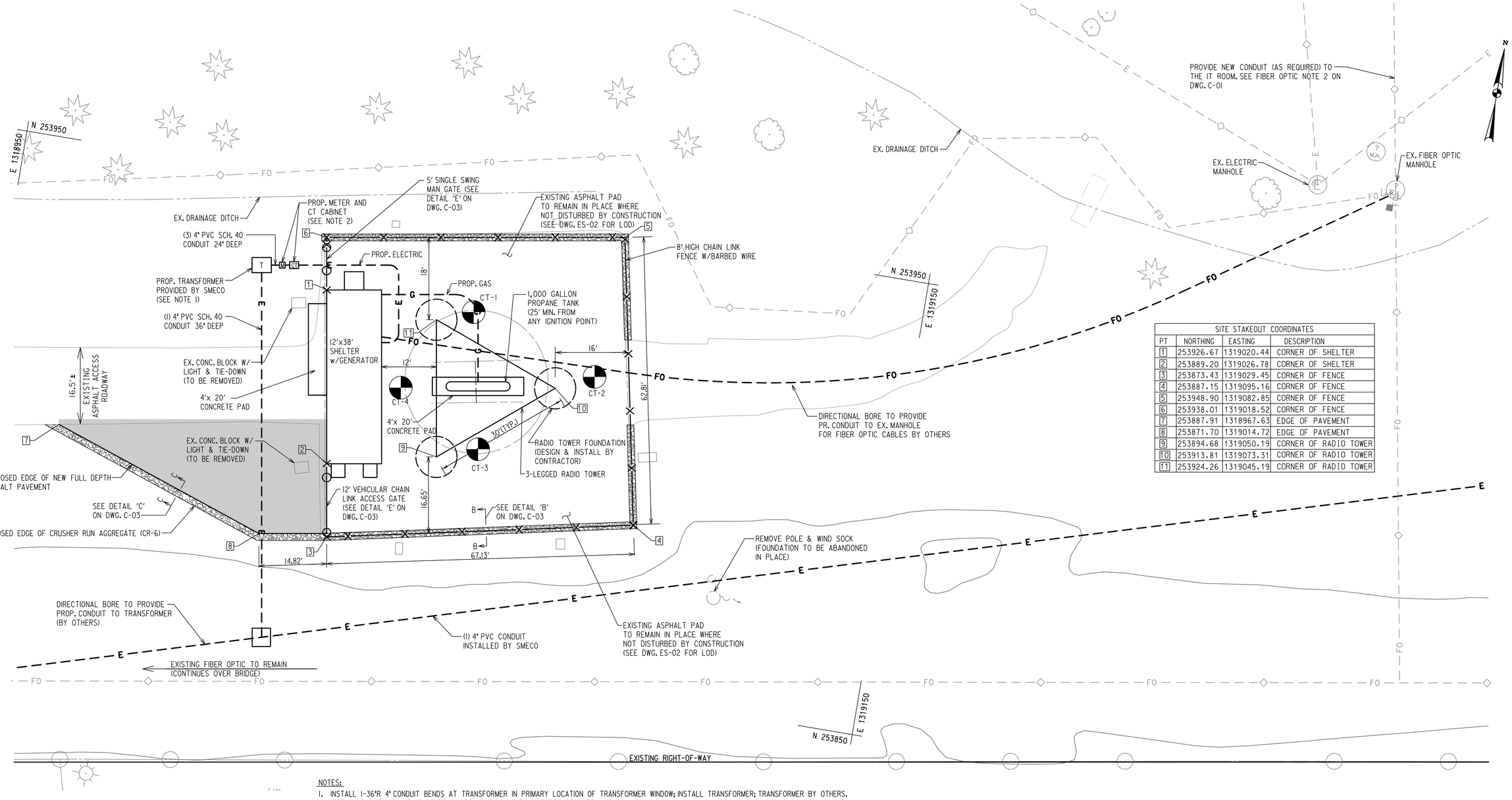
SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001

DRAWING NO. C-01

SET SHEET 2 OF 11



SITE STAKEOUT COORDINATES			
PT	NORTHING	EASTING	DESCRIPTION
1	253926.67	1319020.44	CORNER OF SHELTER
2	253889.20	1319026.78	CORNER OF SHELTER
3	253873.43	1319029.45	CORNER OF FENCE
4	253887.15	1319095.16	CORNER OF FENCE
5	253948.90	1319082.85	CORNER OF FENCE
6	253938.01	1319018.52	CORNER OF FENCE
7	253887.91	1318967.63	EDGE OF PAVEMENT
8	253871.70	1319014.72	EDGE OF PAVEMENT
9	253894.68	1319050.19	CORNER OF RADIO TOWER
10	253913.81	1319073.31	CORNER OF RADIO TOWER
11	253924.26	1319045.19	CORNER OF RADIO TOWER

NOTES:

1. INSTALL 1-36'R 4" CONDUIT BENDS AT TRANSFORMER IN PRIMARY LOCATION OF TRANSFORMER WINDOW; INSTALL TRANSFORMER; TRANSFORMER BY OTHERS. INSTALL 3-36'R 4" CONDUIT BENDS IN SECONDARY LOCATION OF TRANSFORMER WINDOW.
2. INSTALL 3-4" PVC CONDUIT WITH 24" OF COVER FROM TRANSFORMER TO CT CABINET; CT CABINET BY CONTRACTOR PER SMECO STANDARDS.

LEGEND

- FULL DEPTH ASPHALT PAVEMENT (SEE DETAIL 'A' ON DWG. C-03)
- CRUSHER RUN AGGREGATE (CR-6)
- 8' HIGH CHAIN LINK FENCE W/BARBED WIRE (SEE DETAIL 'D' ON DWG. C-03)

10' 0 10' 20'
SCALE: 1"=10'

MDE # 19-SF-0008

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · NICHOLAS ZACHARIAH FRIEDEL · NO. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

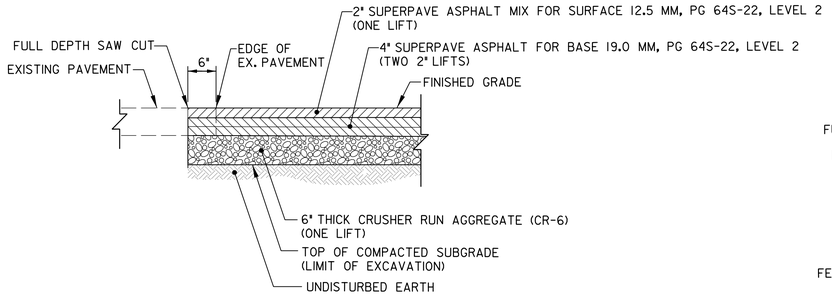
DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	NOV. 2018

SITE ENLARGEMENT PLAN

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

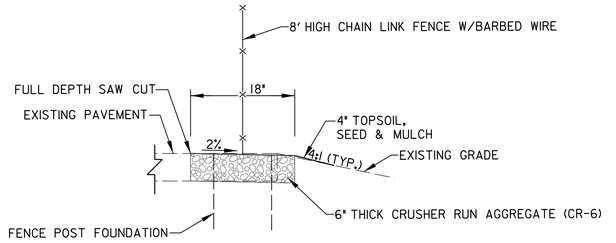
DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001
DRAWING NO. C-02
SET SHEET 3 OF 11



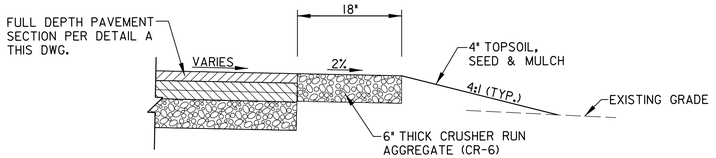
A FULL DEPTH ASPHALT PAVEMENT DETAIL

N.T.S.



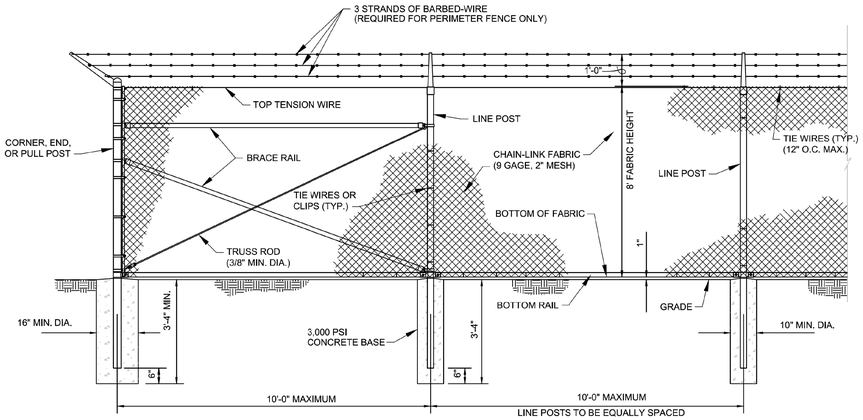
B SECTION DETAIL AT FENCE

N.T.S.



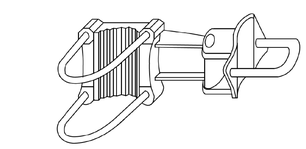
C SECTION DETAIL PAVEMENT EDGE

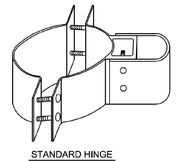
N.T.S.

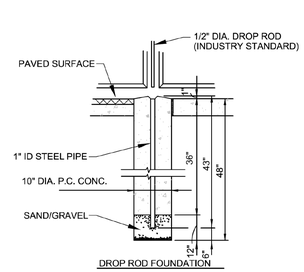


D CHAIN LINK FENCE

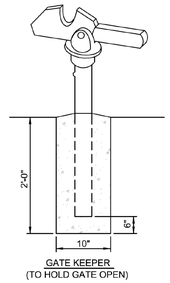
N.T.S.



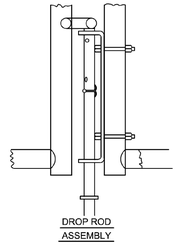




DROP ROD FOUNDATION

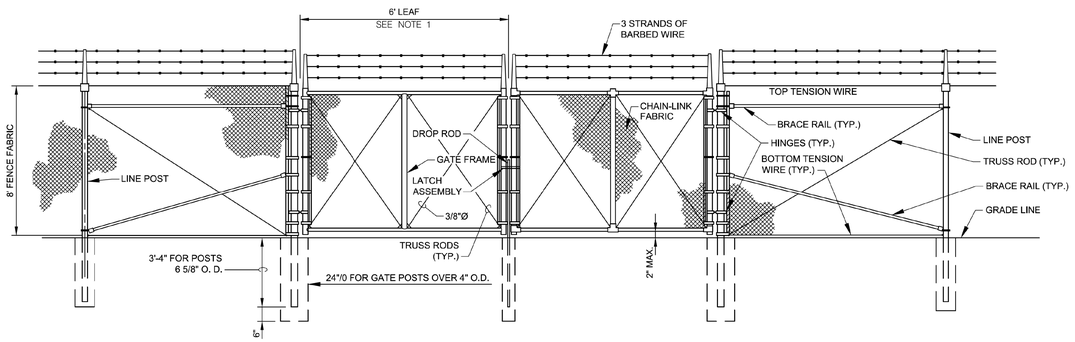


GATE KEEPER (TO HOLD GATE OPEN)



F SWING GATE DETAILS

N.T.S.



E SWING GATE

N.T.S.

NOTES:

1. DOUBLE SWING GATE SHOWN IN THIS DETAIL. 5' SINGLE SWING MAN GATE SHALL BE THE SAME AS THE DOUBLE SWING GATE EXCEPT THE SINGLE LEAF SHALL BE 5' WIDE WITHOUT A DROP ROD.

MDE # 19-SF-0008

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · NICHOLAS ZACHARY FRENCH · No. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	SEPT. 2018

SITE DETAILS

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001

DRAWING NO. C-03

SET SHEET 4 OF 11

EROSION AND SEDIMENT CONTROL GENERAL NOTES

MDE REQUIRES THAT THESE NOTES, IN THEIR ENTIRETY, BE INCLUDED ON THE EROSION AND SEDIMENT CONTROL PLAN. IT IS RECOGNIZED THAT NOT EVERY NOTE MAY APPLY TO ALL PROJECTS. THE REQUIREMENT OF ANY INDIVIDUAL NOTE NOT APPLICABLE TO THE SUBJECT PROJECT IS NOT BINDING UPON THE APPLICATION OR THE APPLICANT'S CONTRACTOR.

1. THE CONTRACTOR SHALL NOTIFY MDE AT (410) 537-3510 SEVEN (7) DAYS BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY AND, UNLESS WAIVED BY MDE, 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. 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 PLAN 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 MDE AND THE AGENCY RESPONSIBLE FOR THE PROJECT.

4. 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 MDE 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 MDE INSPECTOR. THE CONTRACTOR MUST OBTAIN PRIOR AGENCY AND MDE APPROVAL FOR MODIFICATIONS TO THE EROSION AND SEDIMENT CONTROL PLAN AND/OR SEQUENCE OF CONSTRUCTION.

5. THE MDE INSPECTOR HAS THE OPTION OF REQUIRING ADDITIONAL SAFETY OR SEDIMENT CONTROL MEASURES, IF DEEMED NECESSARY.

6. 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.

7. 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 THE MDE INSPECTOR.

8. EROSION AND SEDIMENT CONTROL FOR UTILITY CONSTRUCTION SHALL BE PROVIDED IN ACCORDANCE WITH APPROVED PLANS. UTILITY CONSTRUCTION SHALL ONLY BE FOR AREAS WITHIN THE DELINEATED LIMIT OF DISTURBANCE. CALL "MISS UTILITY" AT 1-800-257-7777 48 HOURS PRIOR TO THE START OF WORK.
   WHEN SAME DAY STABILIZATION IS APPROVED:
   A. EXCAVATED TRENCH MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF THE TRENCH.
   B. 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.

9. ALL WATER REMOVED FROM EXCAVATED AREAS SHALL BE PASSED THROUGH AN MDE APPROVED DEWATERING PRACTICE OR PUMPED TO A SEDIMENT TRAP OR BASIN PRIOR TO DISCHARGE TO A FUNCTIONAL STORM DRAIN SYSTEM OR TO STABLE GROUND SURFACE.

10. CONCRETE WASHOUT STRUCTURES SHALL BE USED WHEN CONCRETE TRUCKS, DRUMS, PUMPS, CHUTES OR OTHER EQUIPMENT IS RINSED OR CLEANED ON SITE.

11. CONSTRUCTION ACTIVITIES PRODUCING DUST SHALL IMPLEMENT CONTROL MEASURES TO AVOID THE SUSPENSION OF DUST PARTICLES AND/OR PREVENT DUST FROM BLOWING OFF SITE OR TO AREAS WITHOUT TREATMENT.

12. FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN:
   A. 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
   B. SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.

13. VEGETATIVE STABILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. REFER TO APPROPRIATE SPECIFICATIONS FOR TEMPORARY SEEDING, PERMENANT SEEDING, MULCHING, SODDING AND GROUND COVERS.

14. WHEN SEEDING, ALL DISTURBED AREAS WITH SLOPES FLATTER THAN 2:1 SHALL BE STABILIZED WITH 4 INCHES OF TOPSOIL, SEED AND MULCH. ALL DISTURBED AREAS WITH SLOPES 2:1 OR STEEPER SHALL BE STABILIZED WITH MATTING OVER 2 INCHES OF TOPSOIL AND SEED.

15. ALL SEDIMENT BASINS, TRAP EMBANKMENTS AND SLOPES, PERIMETER DIKES, SWALES AND ALL DISTURBED SLOPES STEEPER OR EQUAL TO 3:1 SHALL BE STABILIZED WITH SEED AND ANCHORED STRAW MULCH, SOD OR OTHER APPROVED STABILIZATION MEASURES, AS SOON AS POSSIBLE BUT NO LATER THAN THREE (3) CALENDAR DAYS AFTER ESTABLISHMENT. ALL AREAS DISTURBED OUTSIDE OF THE PERIMETER SEDIMENT CONTROL SYSTEM SHALL BE MINIMIZED. MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION.

16. PERMANENT SWALES OR OTHER POINTS OF CONCENTRATED WATER FLOW SHALL BE STABILIZED WITH SEED AND AN APPROVED EROSION CONTROL MATTING, SOD, RIPRAP OR OTHER APPROVED STABILIZATION MEASURES.

17. FOR STOCKPILE SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1), THE CONTRACTOR SHALL APPLY SEED AND ANCHORED STRAW MULCH, SOD OR OTHER APPROVED STABILIZATION MEASURES TO THE FACE OF THE STOCKPILE WITHIN THREE (3) CALENDAR DAYS OF ACTIVITY HAVING CEASED ON THE RESPECTIVE FACE. FOR SLOPES 3:1 OR FLATTER, THE CONTRACTOR SHALL APPLY STABILIZATION MEASURES TO THE FACE OF THE STOCKPILE WITHIN SEVEN (7) CALENDAR DAYS OF ACTIVITY HAVING CEASED ON THE RESPECTIVE FACE. MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE CONTINUED STABILIZATION.

18. 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 DESIGNED TO HAVE STANDING WATER SHALL NOT BE REQUIRED TO MEET THIS REQUIREMENT.

19. 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 THE LOCAL BUILDING 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 SHALL 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 SHALL BE MAINTAINED AND IN GOOD CONDITION AT ALL TIMES.

20. ALL SEDIMENT TRAP DEPTH DIMENSIONS ARE RELATIVE TO THE OUTLET ELEVATION. ALL TRAPS SHALL HAVE A STABLE OUTFALL. ALL TRAPS AND BASINS SHALL HAVE STABLE INFLOW POINTS.

21. SEDIMENT SHALL BE REMOVED AND THE TRAP OR BASIN RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEIMENT 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.

22. 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 SHALL BE DIRECTED TO AN MDE APPROVED SEDIMENT TRAPPING DEVICE PRIOR TO RELEASE FROM THE SITE. A SUMP PIT MAY BE USED IF SEDIMENT TRAPS THEMSELVES ARE BEING PUMPED OUT.

23. 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 NOT LATER THAN THREE (3) CALENDAR DAYS AFTER ESTABLISHMENT FOR SLOPES STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1) AND SVEN (7) CALENDAR DAYS FOR FLATTER SLOPES. 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.

24. TEMPORARY SEDIMENT CONTROL DEVICES SHALL BE REMOVED WITH PERMISSION OF THE MDE INSPECTOR WITHIN THIRTY (30) CALENDAR DAYS FOLLOWING ESTABLISHMENT OF PERMANENT STABILIZATION IN ALL CONTRIBUTORY DRAINAGE AREAS. UPON REMOVAL OF SEDIMENT CONTROL DEVICES, THE AREA DISTURBED BY REMOVAL SHALL BE STABILZED WITH TOPSOIL, SEED AND MULCH, OR AS SPECIFIED, WITHIN 24 HOURS OF SAID REMOVAL. STORMWATER MANAGEMENT STRUCTURES USED TEMPORARILY FOR SEDIMENT CONTROL SHALL BE CONVERTED TO THE PERMANENT CONFIGURATION WITHIN THIS TIME PERIOD AS WELL.

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 0.09 ACRES
   B. TOTAL CUT 720 CUBIC YARDS
   C. TOTAL FILL 30 CUBIC YARDS
   D. OFF-SITE WASTE/BORROW AREA LOCATION: SITES WITH AN ACTIVE GRADING PERMIT

ESC LEGEND

- (A) — ABANDON EXISTING PIPE OR STRUCTURE
- (R) — REMOVE EXISTING PIPE OR STRUCTURE
- GM — GABION INFLOW PROTECTION
- RRP — RIP-RAP INFLOW PROTECTION
- DF — DIVERSION FENCE
- SSF — SUPER SILT FENCE
- SF — SILT FENCE
- SFOP — SILT FENCE ON PAVEMENT
- TSOS — TEMPORARY STONE OUTLET STRUCTURE
- TGOS — TEMPORARY GABION OUTLET STRUCTURE
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- MIP — MEDIAN INLET PROTECTIION
- SIP — STANDARD INLET PROTECTION
- CIP — CURB INLET PROTECTION
- MOD MIP — MODIFIED MEDIAN INLET PROTECTION
- A-2 / A-2 — EARTH DIKE
- A - 2 / A - 2 — TEMPORARY SWALE
- PST — PORTABLE SEDIMENT TANK
- SP — SUMP PIT
- RPS — REMOVABLE PUMPING STATION
- A-2 / A - 2 — PERIMETER DIKE / SWALE
- TREE PROTECTION FENCE / ORANGE CONSTRUCTION FENCE (OCF)
- LOD — LIMIT OF DISTURBANCE

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 GREATER 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.

EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED.

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 I & II INCLUDING SUPPLEMENTS, THE ENVIRONMENTAL 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.

9/6/2018 — DATE

Nicholas Farver — DESIGNER'S SIGNATURE

MD. REGISTRATION NO. 29684

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

Nicholas Farver — PRINTED NAME

"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. 29684 , EXPIRATION DATE: 01-25-2020 ."

OWNER'S / DEVELOPERS 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 ON-SITE 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.

9/6/2018 — DATE

OWNER / DEVELOPER SIGNATURE

44812 — RESPONSIBLE PERSONNEL CERTIFICATION NO.

EDWARD R. MARON PROJ. MGR. — PRINTED NAME AND TITLE

MDE # 19-SF-0008

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND — NICHOLAS ZACHARY FARVER — NO. 29684 — PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	SEPT. 2018

EROSION AND SEDIMENT CONTROL GENERAL NOTES

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 — SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001
DRAWING NO. EN-01
SET SHEET 5 OF 11

B4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

DEFINITION

USING VEGETATION AS COVER TO PROTECT EXPOSED SOIL FROM EROSION.

PURPOSE

TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL.

CONDITIONS WHERE PRACTICE APPLIES

ON ALL DISTURBED AREAS NOT STABILIZED BY OTHER METHODS. THIS SPECIFICATION IS DIVIDED INTO SECTIONS ON INCREMENTAL STABILIZATION; SOIL PREPARATION, SOIL AMENDMENTS AND TOPSOILING; SEEDING AND MULCHING; TEMPORARY STABILIZATION; AND PERMANENT STABILIZATION.

EFFECTS ON WATER QUALITY AND QUANTITY

STABILIZATION PRACTICES ARE USED TO PROMOTE THE ESTABLISHMENT OF VEGETATION ON EXPOSED SOIL. WHEN SOIL IS STABILIZED WITH VEGETATION, THE SOIL IS LESS LIKELY TO ERODE AND MORE LIKELY TO ALLOW INFILTRATION OF RAINFALL, THEREBY REDUCING SEDIMENT LOADS AND RUNOFF TO DOWNSTREAM AREAS.

PLANTING VEGETATION IN DISTURBED AREAS WILL HAVE AN EFFECT ON THE WATER BUDGET, ESPECIALLY ON VOLUMES AND RATES OF RUNOFF, INFILTRATION, EVAPORATION, TRANSPIRATION, PERCOLATION AND GROUNDWATER RECHARGE. OVER TIME, VEGETATION WILL INCREASE ORGANIC MATTER CONTENT AND IMPROVE THE WATER HOLDING CAPACITY OF THE SOIL AND SUBSEQUENT PLANT GROWTH.

VEGETATION WILL HELP REDUCE THE MOVEMENT OF SEDIMENT, NUTRIENTS AND OTHER CHEMICALS CARRIED BY RUNOFF TO RECEIVING WATERS. PLANTS WILL ALSO HELP PROTECT GROUNDWATER SUPPLIES BY ASSIMILATING THOSE SUBSTANCES PRESENT WITHIN THE ROOT ZONE.

SEDIMENT CONTROL PRACTICES MUST REMAIN IN PLACE DURING GRADING, SEEDBED PREPARATION, SEEDING, MULCHING AND VEGETATIVE ESTABLISHMENT.

ADEQUATE VEGETATIVE ESTABLISHMENT

INSPECT SEEDED AREAS FOR VEGETATIVE ESTABLISHMENT AND MAKE NECESSARY REPAIRS, REPLACEMENTS AND RESEEDINGS WITHIN THE PLANTING SEASON.

1. ADEQUATE VEGETATIVE STABILIZATION REQUIRES 95 PERCENT GROUNDCOVER.

2. IF AN AREA HAS ELSS THAN 40 PERCENT GROUNDCOVER, RESTABILIZE FOLLOWING THE ORIGINAL RECOMMENDATIONS FOR LIME, FERTILIZER, SEEDBED PREPARATION AND SEEDING.

3. IF AN AREA HAS BETWEEN 40 AND 94 PERCENT GROUNDCOVER, OVER-SEED AND FERTILIZE USING HALF THE RATES ORIGINALLY SPECIFIED.

4 MAINTENANCE FERTILIZER RATES FOR PERMANENT SEEDING ARE SHOWN IN TABLE B.6.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

DEFINITION

ESTABLISHMENT OF VEGETATIVE COVER ON CUT AND FILL SLOPES

PURPOSE

TO PROVIDE TIMELY VEGETATIVE COVER ON CUT AND FILL SLOPES AS WORK PROGRESSES

CONDITIONS WHERE PRACTICE APPLIES

ANY CUT OR FILL SLOPE GREATER THAN 15 FEET IN HEIGHT. THIS PRACTICE ALSO APPLIES TO STOCKPILES.

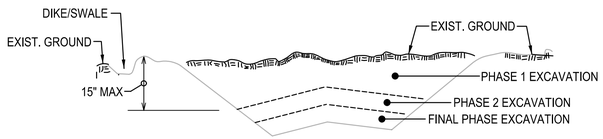
CRITERIA

A. INCREMENTAL STABILIZATION - CUT SLOPES

1. EXCAVATE AND STABILIZE CUT SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL CUT SLOPES AS THE WORK PROGRESSES.

2. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.1)
   A. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO CONVEY RUNOFF AROUND THE EXCAVATION.
   B. PERFORM PHASE 1 EXCAVATION, PREPARE SEEDBED AND STABILIZE.
   C. PERFORM PHASE 2 EXCAVATION, PREPARE SEEDBED AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY
   D. PERFORM FINAL PHASE EXCAVATION, PREPARE SEEDBED 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.



INCREMENTAL STABILIZATION - CUT

B. INCREMENTAL STABILIZATION - FILL SLOPES

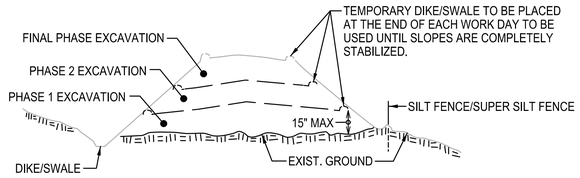
1. CONSTRUCT AND STABILIZE FILL SLOPES IN INCREMENTS NOT TO EXCEED 15 FEET IN HEIGHT. PREPARE SEEDBED AND APPLY SEED AND MULCH ON ALL SLOPES AS THE WORK PROGRESSES.

2. STABILIZE SLOPES IMMEDIATELY WHEN THE VERTICAL HEIGHT OF A LIFT REACHES 15 FEET, OR WHEN THE GRADING OPERATION CEASES AS PRESCRIBED IN THE PLANS.

3. AT THE END OF EACH WORKING DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.

4. CONSTRUCTION SEQUENCE EXAMPLE (REFER TO FIGURE B.2):
   A. CONSTRUCT AND STABILIZE ALL TEMPORARY SWALES OR DIKES THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SILT FENCE ON LOW SIDE OF FILL UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.
   B. AT THE END OF EACH WORKING DAY, INSTALL TEMPORARY WATER CONVEYANCE PRACTICE(S), AS NECESSARY, TO INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON-EROSIVE MANNER.
   C. PLACE PHASE 1 FILL, PREPARE SEEDBED AND STABILIZE.
   D. PLACE PHASE 2 FILL, PREPARE SEEDBED AND STABILIZE.
   E. PLACE FINAL PHASE FILL, PREPARE SEEDBED AND STABILIZE. OVERSEED PREVIOUSLY AREAS AS NECESSARY.

   NOTE: ONCEE THE PLACEMENT OF FILL HAS BEGUN, THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETIION 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.



INCREMENTAL STABILIZATION - FILL

B-4-2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING AND SOIL AMENDMENTS

DEFINITION

THE PROCESS OF PREPARING THE SOILS TO SUSTAIN ADEQUATE VEGETATIVE STABILIZATION.

PURPOSE

TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH.

CONDITIONS WHERE PRACTICE APPLIES

WHERE VEGETATIVE STABILIZATION IS TO BE ESTABLISHED.

CRITERIA

A. SOIL PREPARATION

1. TEMPORARY STABILIZATION

   a. SEEDBED PREPARATION CONSISTS OF LOOSENING SOIL TO A DEPTH OF 3 TO 5 INCHES 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 MUST NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPES 3:1 OR FLATTER ARE TO BE TRACKED 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 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

2. PERMANENT STABILIZATION

   a. A SOIL TEST IS REQUIRED FOR ANY EARTH DISTURBANCE OF 5 ACRES OR MORE. THE MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT ARE:

      i. SOIL pH BETWEEN 6.0 AND 7.0.

      ii. SOLUBLE SALTS LESS THAN 500 PARTS PER MILLION (ppm).

      iii. SOIL CONTAINS LESS THAN 40 PERCENT CLAY BUT ENOUGH FINE GRAINED MATERIAL (GREATER THAN 30 PERCENT SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION: IF LOVEGRASS WILL BE PLANTED, THEN A SANDY SOIL (LESS THAN 30 PERCENT SILT PLUS CLAY) WOULD BE ACCEPTABLE.

      iv. SOIL CONTAINS 1.5 PERCENT MINIMUM ORGANIC MATTER BY WEIGHT.

      v. SOIL CONTAINS SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.

   b. APPLICATION OF AMENDMENTS OR TOPSOIL IS REQUIRED IF ON-SITE SOILS DO NOT MEET THE ABOVE CONDITIONS.

   c. GRADED AREAS MUST BE MAINTAINED IN A TRUE AND EVEN GRADE AS SPECIFIED ON THE APPROVED PLAN, THE SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES.

   d. APPLY SOIL AMENDMENTS AS SPECIFIED ON THE APPROVED PLAN OR AS INDICATED BY THE RESULTS OF A SOIL TEST.

   e. MIX SOIL AMENDMENTS INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS. RAKE LAWN AREAS TO SMOOTH THE SURFACE, REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES AND READY THE AREA FOR SEED APPLICATION. LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION. TRACK SLOPES 3:1 OR FLATTER WITH TRACKED EQUIPMENT LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. LEAVE THE TOP 1 TO 3 INCHES OF SOIL LOOSE AND FRIABLE. SEEDBED LOOSENING MAY BE UNNECESSARY ON NEWLY DISTURBED AREAS.

B. TOPSOILING

1. TOPSOIL IS PLACED OVER PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION. THE PURPOSE IS TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETATIVE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW pH, MATERIALS TOXIC TO PLANTS AND/OR UNACCEPTABLE SOIL GRADATION.

2. TOPSOIL SALVAGED FROM AN EXISTING SITE MAY BE USED PROVIDED IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-NRCS.

3. TOPSOILING IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:

   a. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.

   b. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.

   c. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS MATERIAL TOXIC TO PLANT GROWTH.

   d. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.

4. AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN.

5. TOPSOIL SPECIFICATIONS: SOILS TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING CRITERIA:

   a. TOPSOIL MUST BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM OR LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. TOPSOIL MUST NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND MUST CONTAIN LESS THAN 5 PERCENT BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH OR OTHER MATERIALS LARGER THAN 1½ INCHES IN DIAMETER.

MDE # 19-SF-0008

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · HIGHLEZ ZACHARY FISHER · No. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	SEPT. 2018

EROSION AND SEDIMENT CONTROL GENERAL NOTES

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001

DRAWING NO. EN–02

SET SHEET 6 OF 11

b. TOPSOIL MUST BE FREE OF NOXIOUS PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACK GRASS, JOHNSON GRASS, NUT SEDGE, POISON IVY, THISTLE OR OTHERS AS SPECIFIED.

c. TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF NATURAL TOPSOIL.

TOPSOIL APPLICATION

a. EROSION AND SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED WHEN APPLYING TOPSOIL.

b. UNIFORMLY DISTRIBUTE TOPSOIL IN A 5 TO 8 INCH LAYER AND LIGHTLY COMPACT TO A MINIMUM THICKNESS OF 4 INCHES. SPREADING IS TO BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS MUST BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.

c. TOPSOIL MUST NOT BE PLACED IF THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING ABD SEEDING PREPARATION.

C. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)

1. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OF 5 ACRES OR MORE. SOIL ANALYSIS MAY BE PERFORMED BY A RECOGNIZED PRIVATE OR COMMERCIAL ANALYSES.

2. FERTILIZERS MUST BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROPRIATE EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRRIATE APPROVAL AUTHORITY. FERTILIZERS MUST ALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE LAWS AND MUST BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTY OF THE PRODUCER.

3. LIME MATERIALS MUST BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED EXCEPT WHEN HYDROSEEDING) WHICH CONTAINS AT LEAST 50 PERCENT TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE MUST BE GROUND TO SUCH FINENESS THAT AT LEAST 50 PERCENT WILL PASS THROUGH A #100 MESH SIEVE AND 98 TO 100 PERCENT WILL PASS THROUGH A #20 MESH SIEVE.

4. LIME AND FERTILIZER ARE TO BE EVENLY DISTRIBUTED AND INCORPORATED INTO THE TOP 3 TO 5 INCHES OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

5. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, SPREAD GROUND LIMESTONE AT THE RATE OF 4 TO 8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL.

B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING

DEFINITION

THE APPLICATION OF SEED AND MULCH TO ESTABLISH VEGETATIVE COVER.

PURPOSE

TO PROTECT DISTURBED SOILS FROM EROSION DURING AND AT THE END OF CONSTRUCTION.

CONDITIONS WHERE PRACTICE APPLIES

TO THE SURFACE OF ALL PERIMETER CONTROLS, SLOPES AND ANY DISTURBED AREA NOT UNDER ACTIVE GRADING.

CRITERIA

A. SEEDING

1. SPECIFICATIONS

a. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED MUST BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED MUST HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON ANY PROJECT. REFER TO TABLE B.4 REGARDING THE QUALITY OF SEED. SEED TAGS MUST BE AVAILABLE UPON REQUEST TO THE INSPECTOR TO VERIFY TYPE OF SEED AND SEEDING RATE.

b. MULCH ALONE MAY BE APPLIED BETWEEN THE FALL AND SPRING SEEDING DATES ONLY IF THE GROUND IS FROZEN. THE APPROPRIATE SEEDING MIXTURE MUST BE APPLIED WHEN THE GROUND THAWS.

c. NOCULANTS: THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES MUST BE A PURE CULTURE OF NITROGEN FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS MUST NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANTS AS DIRECTED ON THE 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 TO 80 DEGREES FARENHEIT CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.

d. SOD OR SEED MUST NOT BE PLACED ON SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.

2. APPLICATION

a. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.

i. INCORPORATE SEED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON TEMPORARY SEEDING TABLE B.1, PERMANENT SEEDING TABLE B.3 OR SITE-SPECIFIC SEEDING SUMMARIES.

ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION. ROLL THE SEEDED AREA WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.

b. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.

i. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST¼ INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.

ii. APPLY SEED IN TWO DIRECTIONS, PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

DEFINITION

TO STABILIZE DISTURBED SOILS WITH VEGETATION FOR UP TO 6 MONTHS.

PURPOSE

TO USE FAST GROWING VEGETATION THAT PROVIDES COVER ON DISTURBED SOILS.

CONDITIONS WHERE PRACTICE APPLIES

EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR A PERIOD OF 6 MONTHS OR LESS. FOR LONGER DURATION OF TIME, PERMANENT STABILIZATION PRACTICES ARE REQUIRED.

CRITERIA

1. SELECT ONE OR MORE OF THE SPECIES OR SEED MIXTURES LISTED IN TABLE B.1 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3), AND ENTER THEM IN THE TEMPORARY SEEDING SUMMARY BELOW ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. IF THIS SUMMARY IS NOT PUT ON THE PLAN AND COMPLETED, THEN TABLE B.1 PLUS FERTILIZER AND LIME RATES MUST BE PUT ON THE PLAN.

2. FOR SITES HAVING SOIL TESTS PERFORMED, USE AND SHOW THE RECOMMENDED RATES BY THE TESTING AGENCY. SOIL TESTS ARE NOT REQUIRED FOR TEMPORARY SEEDING.

3. WHEN STABILIZATION IS REQUIRED OUTSIDE OF A SEEDING SEASON, APPLY SEED AND MULCH OR STRAW MULCH ALONE AS PRESCRIBED IN SECTION B-4-3.1.b AND MAINTAIN UNTIL THE NEXT SEEDING SEASON.

TEMPORARY SEEDING SUMMARY

HARDINESS ZONE: 7A SEED MIXTURE:					
SPECIES	APPLICATION RATE (LBS/AC.)	SEEDING DATE	SEEDING DEPTH	FERTILIZER RATE (10-20-20)	LIME RATE
ANNUAL RYEGRASS	40	2.15 - 4.30, 8.15 - 11.30	0.5	436 LB/AC (10 LB/1,000 SF)	2 TON/AC. (90 LB/1,000 SF)
FOXTAIL MILLET	30	5.1 - 8.14	0.5		

B-4-5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION

DEFINITION

TO STABILIZE DISTURBED SOILS WITH PERMANENT VEGETATION.

PURPOSE

TO USE LONG-LIVED PERENNIAL GRASSES AND LEGUMES TO ESTABLISH PERMANENT GROUND COVER ON DISTURBED SOILS.

CONDITIONS WHERE PRACTICE APPLIES

EXPOSED SOILS WHERE GROUND COVER IS NEEDED FOR 6 MONTHS OR MORE.

CRITERIA

A. SEED MIXTURES

1. GENERAL USE

a. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE B.3 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE B.3) AND BASED ON THE SITE CONDITION OR PURPOSE FOUND ON TABLE B.2. ENTER SELECTED MIXTURE(S), APPLICATION RATES AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.

b. ADDITIONAL PLANTING SPECIFICATIONS FOR EXCEPTIONAL SITES SUCH AS SHORELINES, STREAM BANKS OR DUNES OR FOR SPECIAL PURPOSES SUCH AS WILDLIFE OR AESTHETIC TREATMENT MAY BE FOUND IN USDA-NRCS TECHNICAL FIELD OFFICE GUIDE, SECTION 342 - CRITICAL AREA PLANTING.

c. FOR SITES HAVING DISTURBED AREA OVER 5 ACRES, USE AND SHOW THE RATES RECOMMENDED BY THE SOIL TESTING AGENCY.

d. FOR AREAS RECEIVING LOW MAINTENANCE, APPLY UREA FORM FERTILIZER (46-0-0) AT 3½ POUNDS PER 1000 SQUARE FEET (150 POUNDS PER ACRE) AT THE TIME OF SEEDING IN ADDITION TO THE SOIL AMENDMENTS SHOWN IN THE PERMANENT SEEDING SUMMARY.

2. TURFGRASS MIXTURES

a. AREAS WHERE TURFGRASS MAY BE DESIRED INCLUDE LAWNS, PARKS, PLAYGROUNDS AND COMMERCIAL SITES WHICH RECEIVE A MEDIUM TO HIGH LEVEL OF MAINTENANCE.

b. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED BELOW BASED ON THE SITE CONDITIONS OR PURPOSE. ENTER SELECTED MIXTURE(S), APPLICATION RATES AND SEEDING DATES IN THE PERMANENT SEEDING SUMMARY. THE SUMMARY IS TO BE PLACED ON THE PLAN.

i. KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN AREAS THAT RECEIVE INTENSIVE

c. MANAGEMENT. IRRIGATION REQUIRED IN THE AREAS OF CENTRAL MARYLAND AND EASTERN SHORE. RECOMMENDED CERTIFIED KENTUCKY BLUEGRASS CULTIVARS SEEDING RATE: 1.5 TO 2.0 POUNDS PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.

ii. KENTUCKY BLUEGRASS/PERENNIAL RYE: FULL SUN MIXTURE: FOR USE IN FULL SUN AREAS WHERE RAPID ESTABLISHMENT IS NECESSARY AND WHEN TURF WILL RECEIVE MEDIUM TO INTENSIVE MANAGEMENT. CERTIFIED PERENNIAL RYEGRASS CULTIVARS/CERTIFIED KENTUCKY BLUEGRASS SEEDING RATE: 2 POUNDS MIXTURE PER 1000 SQUARE FEET. CHOOSE A MINIMUM OF THREE KENTUCKY BLUEGRASS CULTIVARS WITH EACH RANGING FROM 10 TO 35 PERCENT OF THE TOTAL MIXTURE BY WEIGHT.

iii. TALL FESCUE/KENTUCKY BLUEGRASS: FULL SUN MIXTURE: FOR USE IN DROUGHT PRONE AREAS AND/OR FOR AREAS RECEIVING LOW TO MEDIUM MANAGEMENT IN FULL SUN TO MEDIUM SHADE. RECOMMENDED MIXTURE INCLUDES; CERTIFIED TALL FESCUE CULTIVARS 95 TO 100 PERCENT, CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 0 TO 5 PERCENT. SEEDING RATE: 5 TO 8 POUNDS PER 1000 SQUARE FEET. ONE OR MORE CULTIVARS MAY BE BLENDED.

iv. KENTUCKY BLUEGRASS/FINE FESCUE: SHADE MIXTURE: FOR USE IN AREAS WITH SHADE IN BLUEGRASS LAWNS. FOR ESTABLISHMENT IN HIGH QUALITY, INTENSIVELY MANAGED TURF AREA. MIXTURE INCLUDES; CERTIFIED KENTUCKY BLUEGRASS CULTIVARS 30 TO 40 PERCENT AND CERTIFIED FINE FESCUE AND 60 TO 70 PERCENT. SEEDING RATE: 1½ TO 3 POUNDS PER 1000 SQUARE FEET.

PERMANENT SEEDING SUMMARY

HARDINESS ZONE: 7A SEED MIXTURE:						
SPECIES	APPLICATION RATE (LBS/AC.)	SEEDING DATE	SEEDING DEPTH (IN.)	FERTILIZER RATE (10-20-20)			LIME RATE
				N	P_2O_5	K_2O	
TALL FESCUE	100	2.15 - 4.30 8.15 - 11.30	0.25 - 0.50	45 LB/AC (1 LB/ 1,000 SF)	90 LB/AC (2 LB/ 1,000 SF)	90 LB/AC (2 LB/ 1,000 SF)	2 TON/AC. (90 LB/ 1,000 SF)

NOTES:

SELECT TURFGRASS VARIETIES FROM THOSE LISTED IN THE MOST CURRENT UNIVERSITY OF MARYLAND PUBLICATION, AGRONOMY MEMO #77, "TURFGRASS CULTIVAR RECOMMENDATIONS FOR MARYLAND".

CHOOSE CERTIFIED MATERIAL. CERTIFIED MATERIAL IS THE BEST GUARANTEE OF CULTIVAR PURITY. THE CERTIFICATION PROGRAM OF THE MARYLAND DEPARTMENT OF AGRICULTURE, TURF AND SEED SECTION, PROVIDES A RELIABLE MEANS OF CONSUMENR PROTECTION AND ASSURES A PURE GENERIC LINE.

MDE # 19-SF-0008

JMT

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · NICHOLAS ZACHARY FRENCH · No. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	SEPT. 2018

EROSION AND SEDIMENT CONTROL GENERAL NOTES

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001

DRAWING NO. EN–03

SET SHEET 7 OF 11

IDEAL TIMES OF SEEDING FOR TURF GRASS MIXTURES

WESTERN MARYLAND:	MARCH 15 TO JUNE 1, AUGUST 1 TO OCTOBER 1 (HARDINESS ZONES: 5b, 6a)
CENTRAL MARYLAND:	MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONE: 6b)
SOUTHERN MARYLAND, EASTERN SHORE	MARCH 1 TO MAY 15, AUGUST 15 TO OCTOBER 15 (HARDINESS ZONES: 7a, 7b)

d. TILL AREAS TO RECEIVE SEED BY DISKING OR OTHER APPROVED METHODS TO A DEPTH OF 2 TO 4 INCHES, LEVEL AND RAKE THE AREAS TP PREPARE A PROPER SEEDBED. REMOVE STONES AND DEBRIS OVER 1½ INCHES IN DIAMETER. THE RESULTING SEEDBED MUST BE IN SUCH CONDITION THAT FUTURE MOWING OF GRASSES WILL POSE NO DIFFICULTY.

e. IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER FOR PLANT GROWTH (1/2 TO 1 INCH EVERY 3 TO 4 DAYS DEPENDING ON SOIL TEXTURE) UNTIL THEY ARE FIRMLY ESTABLISHED. THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE LATE IN THE PLANTING SEASON, IN ABNORMALLY DRY OR HOT SEASONS OR ON ADVERSE SITES.

B. SOD: TO PROVIDE QUICK COVER ON DISTURBED AREAS (2:1 GRADE OR FLATTER).

1. GENERAL SPECIFICATIONS

A. CLASS OF TURFGRASS SOD MUST BE MARYLAND STATE CERTIFIED. SOD LABELS MUST BE MADE AVAILABLE TO THE JOB FOREMAN AND INSPECTOR.

B. SOD MUST BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF ¾ INCH, PLUS OR MINUS ¼ INCH, AT THE TIME OF CUTTING. MEASUREMENT FOR THICKNESS MUST EXCLUDE TOP GROWTH AND THATCH. BROKEN PADS AND TORN OR UNEVEN ENDS WILL NOT BE ACCEPTABLE.

C. STANDARD SIZE SECTIONS OF SOD MUST 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.

D. SOD MUST NOT BE HARVESTED OR TRANSPLANTED WHEN MOISTURE CONTENT (EXCESSIVELY DRY OR WET) MAY ADVERSELY AFFECT ITS SURVIVAL.

E. SOD MUST BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS. SOD NOT TRANSPLANTED WITHIN THIS PERIOD MUST BE APPROVED BY AN AGRONOMIST OR SOIL SCIENTIST PRIOR TO ITS INSTALLATION.

2. SOD INSTALLATION

A. DURING PERIODS OF EXCESSIVELY HIGH TEMPERATURE OR IN AREAS HAVING DRY SUBSOIL, LIGHTLY IRRIGATE THE SUBSOIL IMMEDIATELY PRIOR TO LAYING THE SOD.

B. LAY THE FIRST ROW OF SOD IN A STRAIGHT LINE WITH SUBSEQUENT ROWS PLACED PARALLEL TO IT AND TIGHTLY WEDGED AGAINST EACH OTHER. STAGGER LATERAL JOINTS 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 WOULD CAUSE AIR DRYING OF THE ROOTS.

C. WHEREVER POSSIBLE, LAY SOD WITH THE LONG EDGES PARALLEL TO THE CONTOUR AND WITH STAGGERING JOINTS. ROLL AND TAMP, PEG OR OTHERWISE SECURE THE SOD TO PREVENT SLIPPAGE ON SLOPES. ENSURE SOLID CONTACT EXISTS BETWEEN SOD ROOTS AND THE UNDERLYING SOIL SURFACE.

D. WATER THE SOD IMMEDIATELY FOLLOWING ROLLING AND TAMPING UNTIL THE UNDERSIDE OF THE NEW SOD PAD AND SOIL SURFACE BELOW THE SOD ARE THOROUGHLY WET. COMPLETE THE OPERATIONS OF LAYING, TAMPING AND IRRIGATING FOR ANY PIECE OF SOD WITHIN EIGHT HOURS.

3. SOD MAINTENANCE

A. IN THE ABSENCE OF ADEQUATE RAINFALL, WATER DAILY DURING THE FIRST WEEK OR AS OFTEN AND SUFFICIENTLY AS NECESSARY TO MAINTAIN MOIST SOIL TO A DEPTH OF 4 INCHES. WATER SOD DURING THE HEAT OF THE DAY TO PREVENT WILTING.

B. AFTER THE FIRST WEEK, SOD WATERING IS REQUIRED AS NECESSARY TO MAINTAIN ADEQUATE MOISTURE CONTENT.

C. DO NOT MOW UNTIL THE SOD IS FIRMLY ROOTED. NO MORE THAN ⅓ OF THE GRASS LEAF MUST BE REMOVED BY THE INITIAL CUTTING OR SUBSEQUENT CUTTINGS. MAINTAIN A GRASS HEIGHT OF AT LEAST 3 INCHES UNLESS OTHERWISE SPECIFIED.

SEQUENCE OF CONSTRUCTION

1. NOTIFY MDE COMPLIANCE PROGRAM AT (410) 537-3510 A MINIMUM OF 7 CALENDAR DAYS IN ADVANCE OF ANY EARTH DISTURBANCE ACTIVITIES TO SCHEDULE A PRE-CONSTRUCTION MEETING.
2. PROVIDE SURVEY AND LAYOUT OF THE LIMIT OF DISTURBANCE (LOD) AND EROSION & SEDIMENT CONTROL (ESC) DEVICES. THE LOD MUST BE FIELD MARKED PRIOR TO AND INSPECTED AT THE PRE-CONSTRUCTION MEETING.
3. CONDUCT ON-SITE PRE-CONSTRUCTION MEETING WITH ALL PARTIES TO DISCUSS ISSUES INCLUDING, BUT NOT LIMITED TO MEANS AND METHODS, LIMITS OF WORK RESPONSIBILITIES, AND TO INSPECT THE SITE FOR ANY UNFORESEEN CONDITIONS.
4. PERFORM LIMITED DEMOLITION AND ROUGH GRADING TO FACILITATE THE INSTALLATION OF SILT FENCE (SF) AROUND PROPOSED RADIO TOWER AND PAVING.
5. INSTALL ELECTRICAL, FIBER OPTIC, AND GAS FACILITIES. DIRECTIONAL BORE AT LOCATIONS INDICATED ON PLANS.
6. INSTALL RADIO TOWER FOUNDATION. REMOVE ANY EARTH SPOILS FROM THE FOUNDATION EXCAVATION AT THE END OF THE WORKING DAY AND PLACE IN THE APPROVED STOCKPILE AREA OR HAUL OFF-SITE TO AN MDE APPROVED LOCATION.
7. INSTALL RADIO TOWER.
8. INSTALL PROPANE TANK, AND SHELTER.
9. REMOVE STOCKPILE MATERIAL OFF-SITE TO AN MDE APPROVED LOCATION .
10. INSTALL PROPOSED FULL DEPTH ASPHALT PAVING AND GRADING.
11. CONSTRUCT 8' CHAIN LINK FENCE AND GATES ACCORDING TO SITE PLAN.
12. ONCE ALL DISTURBED AREAS HAVE BEEN STABILIZED AND WITH THE APPROVAL OF THE MDE INSPECTOR, REMOVE SEDIMENT CONTROL DEVICES AND STABILIZE REMAINING DISTURBED AREAS.

MDE # 19-SF-0008

JMT

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · HIGHLAND ZACHARY HESS · NO. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY: EBB	APPROVED BY: NZF
DRAWN BY: EBB	
CHECKED BY: NZF	DATE: SEPT. 2018

EROSION AND SEDIMENT CONTROL GENERAL NOTES

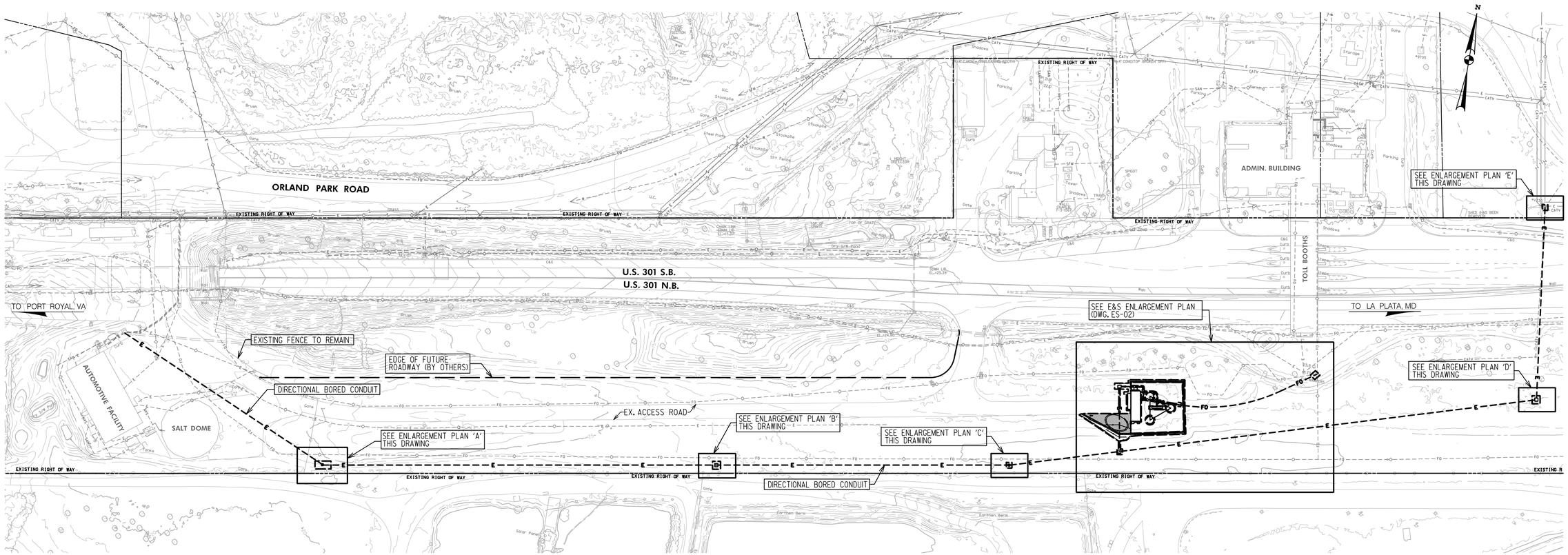
SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

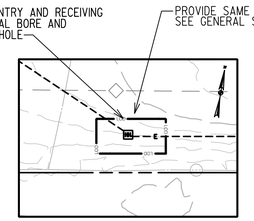
JMT PROJECT NO. 14-0790-001

DRAWING NO. EN–04

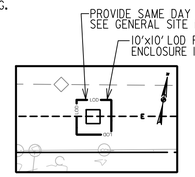
SET SHEET 8 OF 11



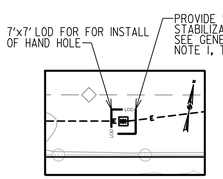
60′ 0 60′ 120′
SCALE: 1"=60′



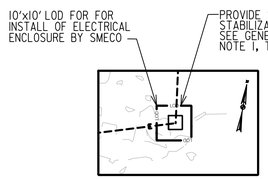
ENLARGEMENT PLAN 'A'
20′ 0 20′
SCALE: 1"=20′



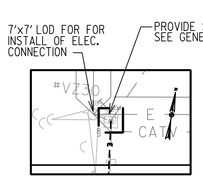
ENLARGEMENT PLAN 'B'
20′ 0 20′
SCALE: 1"=20′



ENLARGEMENT PLAN 'C'
20′ 0 20′
SCALE: 1"=20′



ENLARGEMENT PLAN 'D'
20′ 0 20′
SCALE: 1"=20′



ENLARGEMENT PLAN 'E'
20′ 0 20′
SCALE: 1"=20′

GENERAL SITE NOTES:

1. NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS RUNOFF IS DIRECTED TO AN MDE APPROVED SEDIMENT CONTROL DEVICE.
2. TRACKING OF SEDIMENT ONTO ROADS IS NOT PERMITTED. IF SEDIMENT IS TRACKED ONTO ROADS IT SHOULD BE CLEARED IMMEDIATELY AND HAULED TO THE APPROVED STOCKPILE AREA OR HAULED OFF-SITE TO AN MDE APPROVED LOCATION.
3. ANY SEDIMENT LADEN WATER ENCOUNTERED SHOULD BE PUMPED TO A PORTABLE SEDIMENT TANK AND DISCHARGED TO A STABLE OUTFALL.
4. EXISTING TURF AREAS DISTURBED SHALL BE STABILIZED IMMEDIATELY WITH 4 INCHES OF TOPSOIL, SEED AND MULCH.

MDE # 19-SF-0008

JMT®

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · MICHELLE ZACHARY FRITZ · No. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

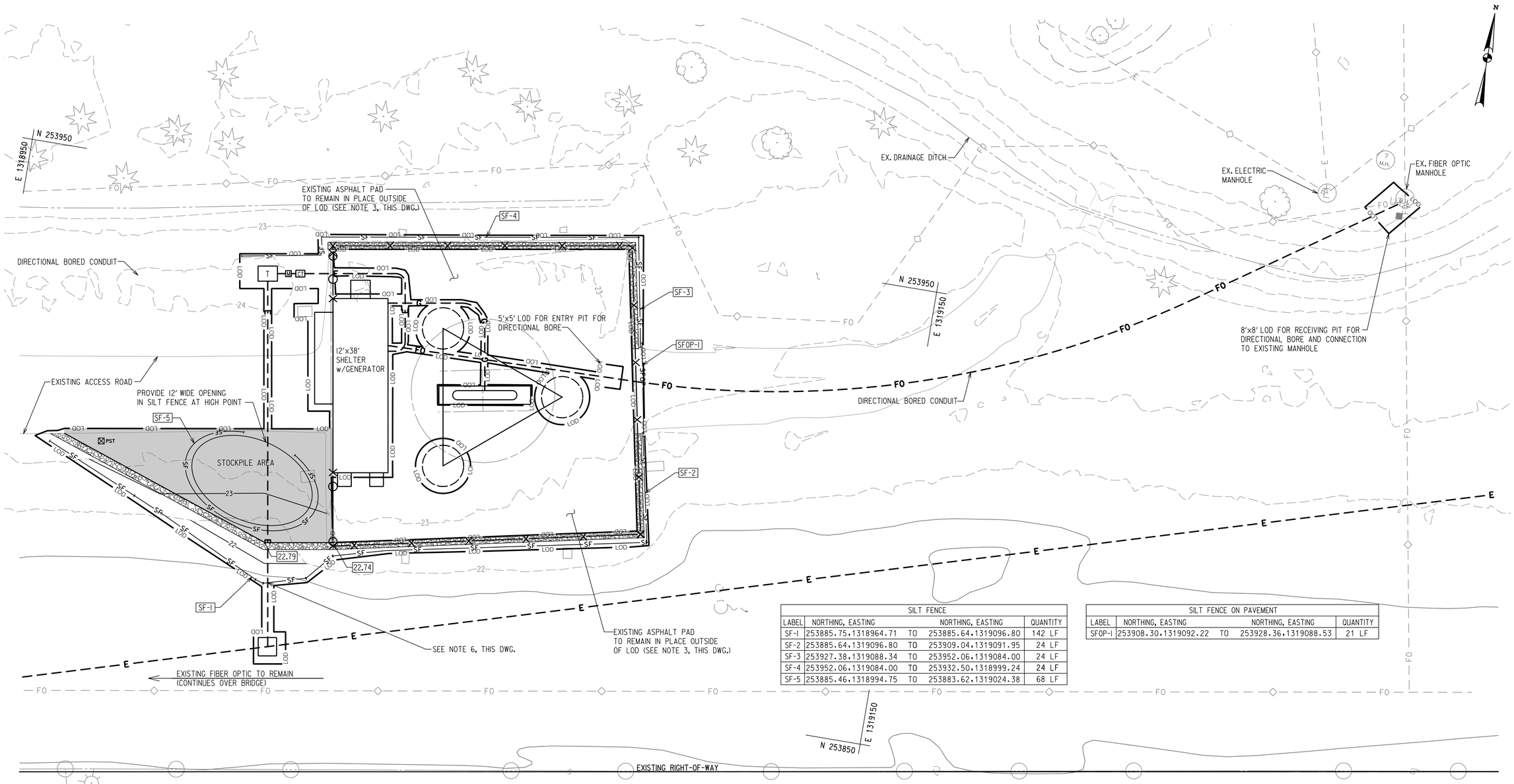
DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	NOV. 2018

EROSION AND SEDIMENT CONTROL OVERALL SITE PLAN

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001
DRAWING NO. ES-01
SET SHEET 9 OF 11



SILT FENCE					
LABEL	NORTHING, EASTING		NORTHING, EASTING		QUANTITY
SF-1	253885.75,1318964.71	TO	253885.64,1319096.80		142 LF
SF-2	253885.64,1319096.80	TO	253909.04,1319091.95		24 LF
SF-3	253927.38,1319088.34	TO	253952.06,1319084.00		24 LF
SF-4	253952.06,1319084.00	TO	253932.50,1318999.24		24 LF
SF-5	253885.46,1318994.75	TO	253883.62,1319024.38		68 LF

SILT FENCE ON PAVEMENT					
LABEL	NORTHING, EASTING		NORTHING, EASTING		QUANTITY
SFOP-1	253908.30,1319092.22	TO	253928.36,1319088.53		21 LF

GENERAL SITE NOTES:

1. NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT UNLESS RUNOFF IS DIRECTED TO AN MDE APPROVED SEDIMENT CONTROL DEVICE.
2. TRACKING OF SEDIMENT ONTO ROADS IS NOT PERMITTED. IF SEDIMENT IS TRACKED ONTO ROADS IT SHOULD BE CLEARED IMMEDIATELY AND HAULED TO THE APPROVED STOCKPILE AREA OR HAULED OFF-SITE TO AN MDE APPROVED LOCATION.
3. ANY SEDIMENT AND EARTHEN MATERIAL FROM THE EXCAVATION AREAS SHALL NOT BE LEFT OVERNIGHT ON THE EXISTING ASPHALT PAD TO REMAIN. IT SHOULD BE CLEARED BY THE END OF THE WORKING DAY AND HAULED TO THE APPROVED STOCKPILE AREA OR HAULED OFF-SITE TO AN MDE APPROVED LOCATION.
4. ANY SEDIMENT LADEN WATER ENCOUNTERED SHOULD BE PUMPED TO A PORTABLE SEDIMENT TANK AND DISCHARGED TO A STABLE OUTFALL.
5. EXISTING TURF AREAS DISTURBED SHALL BE STABILIZED IMMEDIATELY WITH 4 INCHES OF TOPSOIL, SEED AND MULCH.
6. REMOVE SILT FENCE AS REQUIRED TO INSTALL ELECTRICAL CONDUIT. IMMEDIATELY REPAIR SILT FENCE UPON COMPLETION OF ELECTRICAL CONDUIT INSTALL. DO NOT LEAVE UNREPAIRED OVERNIGHT.

MDE # 19-SF-0008

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND — NICHOLAS ZACHARY FRIEDEL — NO. 29684 — PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	NOV. 2018

EROSION AND SEDIMENT CONTROL ENLARGEMENT PLAN

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

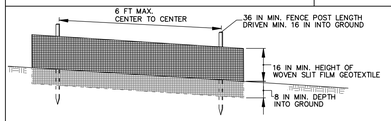
JMT PROJECT NO. 14-0790-001

DRAWING NO. ES-02

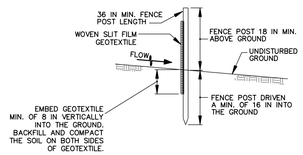
SET SHEET 10 OF 11

DETAIL E-1 SILT FENCE

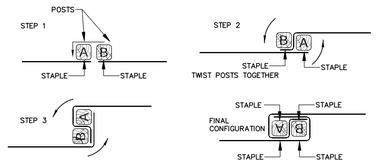
STANDARD SYMBOL: SF



ELEVATION



CROSS SECTION



JOINING TWO ADJACENT SILT FENCE SECTIONS (TOP VIEW)

1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-1 SILT FENCE

STANDARD SYMBOL: SF

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± 1/8 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "I" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

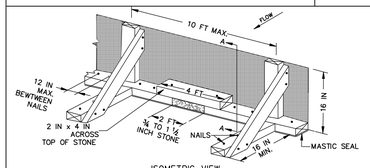
2 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

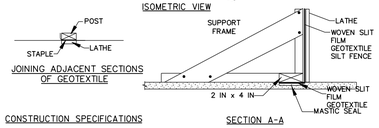
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-2 SILT FENCE ON PAVEMENT

STANDARD SYMBOL: SFOP



ISOMETRIC VIEW



JOINING ADJACENT SECTIONS OF GEOTEXTILE

SECTION A-A

CONSTRUCTION SPECIFICATIONS

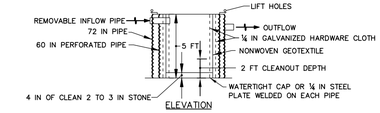
1. USE NOMINAL 2 INCH X 4 INCH LUMBER.
2. USE WOVEN SLIT FILM GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS.
3. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
4. SPACE UPRIGHT SUPPORTS NO MORE THAN 10 FEET APART.
5. PROVIDE A TWO FOOT OPENING BETWEEN EVERY SET OF SUPPORTS AND PLACE STONE IN THE OPENING OVER GEOTEXTILE.
6. KEEP SILT FENCE TAUT AND SECURELY STAPLE TO THE UPSLOPE SIDE OF UPRIGHT SUPPORTS. EXTEND GEOTEXTILE UNDER 2x4.
7. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, FOLD, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL. ATTACH LATHE.
8. PROVIDE A MASTIC SEAL BETWEEN PAVEMENT, GEOTEXTILE, AND 2x4 TO PREVENT SEDIMENT-LADEN WATER FROM ESCAPING BENEATH SILT FENCE INSTALLATION.
9. SECURE BOARDS TO PAVEMENT WITH 40D 5 INCH MINIMUM LENGTH NAILS.
10. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. MAINTAIN WATER TIGHT SEAL ALONG BOTTOM. REPLACE STONE IF DISPLACED.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

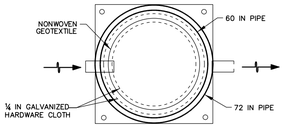
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL F-3 PORTABLE SEDIMENT TANK

STANDARD SYMBOL: ☒PST



ELEVATION



PLAN VIEW

CONSTRUCTION SPECIFICATIONS

1. PROVIDE 1 CUBIC FOOT OF STORAGE FOR EACH GALLON PER MINUTE OF PUMP CAPACITY. REQUIRED STORAGE VOLUME MAY BE ATTAINED BY PLACEMENT OF TANKS IN PARALLEL WITH INFLOW EVENLY DISTRIBUTED AMONG TANKS. OVERTOPPING OF TANKS IS NOT PERMITTED.
2. USE 60 INCH CORRUGATED METAL OR PLASTIC PIPE WITH 1 INCH DIAMETER PERFORATIONS, 6 INCHES ON CENTER FOR THE INNER PIPE. LINE PIPE WITH NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, SANDWICHED BETWEEN, AND ATTACHED TO, ¼ INCH HARDWARE CLOTH.
3. OVERLAP GEOTEXTILE 8 INCHES MINIMUM AT VERTICAL SEAM AND AT THE BOTTOM PLATE.
4. ANCHOR GEOTEXTILE AT BOTTOM OF TANK WITH 4 INCHES OF 2 TO 3 INCH CLEAN STONE OR EQUIVALENT RECYCLED CONCRETE.
5. USE 72 INCH CORRUGATED METAL OR PLASTIC OUTER PIPE WITH PERMANENT OUTFLOW PIPE WITH INVERT LOWER THAN INFLOW PIPE
6. INFLOW PIPE MUST DISCHARGE INTO INNER PIPE AND BE REMOVABLE.
7. PLACE TANK ON LEVEL SURFACE AND DISCHARGE TO A STABLE AREA AT A NONEROSIVE RATE.
8. A PORTABLE SEDIMENT TANK REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT FROM INNER PIPE WHEN IT REACHES TWO FEET IN DEPTH. IF SYSTEM CLOGS, PULL OUT INNER PIPE, REMOVE ACCUMULATED SEDIMENT, AND REPLACE GEOTEXTILE. KEEP POINT OF DISCHARGE FREE OF EROSION.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

MDE # 19-SF-0008

JMT

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. 29684 EXPIRATION DATE: 01-25-2020."

STATE OF MARYLAND · NICHOLAS ZACHARY FISHER · No. 29684 · PROFESSIONAL ENGINEER

DEPARTMENT OF INFORMATION TECHNOLOGY

Department of INFORMATION TECHNOLOGY

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED BY	APPROVED BY
EBB	NZF
DRAWN BY	
EBB	
CHECKED BY	DATE
NZF	SEPT. 2018

EROSION AND SEDIMENT CONTROL DETAILS

SITE DEVELOPMENT ENGINEERING
NICE BRIDGE COMMUNICATIONS TOWER
NICE BRIDGE TOWER SITE (MDTA)
301 SOUTH CRAIN HIGHWAY, NEWBURG, MD 20664

DATE: SEPTEMBER 2018 | SCALE: AS SHOWN

JMT PROJECT NO. 14-0790-001

DRAWING NO. ED–01

SET SHEET II OF II