GEI Consultants

Consulting
Engineers and
Scientists

Environmental Management Plan #3 (EMP 3)

West Water Loop North and South

Quantum Loophole, Frederick Maryland

Submitted to:
Quantum Maryland, LLC
500 E. 4th Street, Suite 333
Austin, Texas 78701

Submitted by:
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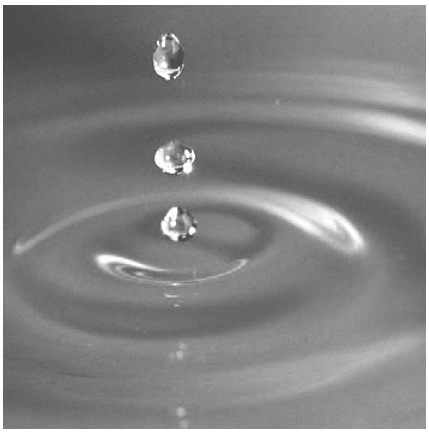

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ACM:lg

Document1

Transmittal

Quantum Maryland, LLC
500 E. 4th Street, Suite 333
Austin, Texas 78701

Attn: Mr. AD Robison

Re: Environmental Management Plan
West Water Loop North, West Water Loop South
Quantum Maryland, Inc.
Frederick County, Maryland

Dear Mr. Robison,

GEI Consultants, Inc. (GEI) has prepared this Environmental Management Plan (EMP) for utility construction work related to roadway and utility construction at the Quantum Maryland property (former Eastalco property) in Frederick, Maryland.

This EMP relates to disturbance of soil and groundwater within the limits of the area of the Environmental Covenant (EC) and/or the Soil Management Area (SMA) during the construction of:

- The West Water Loop North which consists of a 12-inch water line and a parallel 16-inch potable cooling water (PCW) line starting within the EC at the west end of QPS (connecting to the water lines in QPS) running to the south into the SMA (parallel to the B-sewer for part of the distance), then turning west and across the unnamed tributary to Tuscarora Creek (leaving the EC) then turning south to future Lot 400. These water lines cross the creek in parallel HDD borings; and

- The West Water Loop South which consists of a 12-inch water line and 16-inch PCW line installed via HDD across the south end of the site, from the north end of the Mountville Water Line near sewer manhole MH-401 east across the EC and Tuscarora Creek to the vicinity of the Pump Station. The LOD at both ends of this work segment are outside the EC; however the HDD crossing itself is primarily within/beneath the EC.

The portion of the water lines connecting these two segments (which is sometimes called HLR to 400) is a separate County contract located entirely outside the EC and is therefore not discussed in this EMP.

Details of the work, including the specific construction elements to be constructed under CHS oversight which are located within the SMA and/or within the EC, and those which are outside the EC are provided in the EMP.

We appreciate the continued opportunity to be of assistance on this project. Should you have any questions regarding this information, or should you require additional information, please contact the GEI office in Washington, D.C. at (202) 828-9510.

cc: Ms. Anuradha Mohanty / Maryland Department of the Environment Land and Materials Administration
Mr. Brian Dietz / MDE LMA
Ms. Kate Ansalvish / MDE Water and Science Administration

1. Introduction

1.1 Overview and Purpose

At the request of Quantum Maryland, LLC (QL), GEI Consultants, Inc. (GEI) has prepared this Environmental Management Plan #3 (EMP 3 or abbreviated in this document as EMP) for the construction of three portions of the development infrastructure for the Former Alcoa Eastalco Works project (the "Site"). The construction elements covered in this EMP correlate to two separate Improvement Plans submitted to Frederick County (and other agencies as described herein). These are:

- *Quantum Frederick, Water, Potable Cooling Water & Sewer, West Loop to Quantum Place South & Conn's to lots 100, 101 and 401 - Combined Stormwater Management Development and Improvement Plan*, Rodgers Consulting, Revised May 5, 2023, approved June 13, 2023 (this plan is being revised and will soon be resubmitted as described in detail in **Section 3.1** for the West Loop North construction element); and

- *Quantum Frederick, 12" Water and 16" Potable Cooling Water Crossing Tuscarora Creek at Happy Landing Rd - Combined Stormwater Management Development and Improvement Plan*, Rodgers Consulting, April 22, 2024 (this is a new plan submitted April 22, 2024 for the West Loop South construction element described in **Section 3.2**).

The overall Eastalco property ("overall property") comprises over 2,200 acres. The central portion of the overall property formerly contained the Eastalco Aluminum Works. The remaining portions of the overall property were primarily used for agricultural purposes. An MDE-approved Environmental Covenant (EC) was recorded by the previous owner in 2017. The EC provides restrictions to the land use, including restrictions to residential use and groundwater use, and the associated Soil Management Plan (SMP) describes requirements associated with construction disturbances to soil and groundwater within the EC. Within the EC is a Soil Management Area (SMA), which includes the central former plant area, two closed/permitted industrial landfills, former waste disposal sites (WDS), and other areas containing constituents of potential concern (COPCs).

The EC requires maintenance of the two closed landfills and several capped waste disposal sites (WDS), routine monitoring of groundwater and surface water, and special procedures and pre-approvals by MDE when soil disturbance is planned within the SMA. Future development of the overall property (by QL customers who purchase and develop individual lots) will include the construction of multiple data center buildings and associated infrastructure. The overall property is being developed in separate areas., utilizing multiple EMPs to cover individual work areas or construction elements.

The specific work elements covered by this EMP are described below and include construction of 12-inch water and 16-inch PCW lines in the two separate areas. Additionally, horizontal directional drilling (HDD) methods are proposed for use for certain portions of the utility installations (two parallel crossings in the North segment and two parallel crossings in the South portion).

This EMP applies only to specific identified work elements where located within the EC. A Site Location Map is presented as **Figure 1. Figure 1** shows the approximate boundary of the overall property and the proposed Limit of Disturbance (LOD) for the West Loop North and West Loop South water lines. The submittal to Frederick County and review/approval status of these plans and associated MDE construction stormwater permits (20-CP) are described in **Section 3.4**. Additional details of the work areas including an outline of the EMP Boundaries are shown in **Figure 2 (West Loop North) and Figure 3 (West Loop South)**. **Figures 2 and 3** show the individual LODs for each of the Improvement Plans and identifies the specific areas and construction elements included in the improvement plans that are subject to this EMP.

The majority of West Loop North is located within the EC area, and portions of the LOD are located within the SMA (**Figure 2**); the southern end of this segment (west of the creek) is outside the EC and not subject to CHS oversight.

The West Loop South water lines are installed via HDD fully across the EC, so that the LOD and drilling equipment is located outside the EC on both sides, but the HDD drilling is included in the EMP due to drilling through/beneath the EC.

In order to accommodate changes in construction technology, construction access, soil stockpile and staging areas, and water management, the LODs for West Loop North and South (as shown on **Figures 2 and 3**) have been modified from previous Frederick County approvals and require modification as part of the Frederick County and SCD drawing revision process.

Approximately one-third of the West Loop North follows the alignment of the north end of Sewer Line B (the subject of EMP-2); therefore **Figure 2** also shows the B-Sewer LOD for reference and **Figure 8** identifies B-Sewer (EMP-2) soil and water management areas which will be used during West Loop North construction. Similarly, the West Loop South HDD installation runs approximately parallel to the K-Line Sewer (the subject of EMP-1A) and shares the EMP-1A soil and water management area to the west and the EMP-1 soil and water management area to the east (See **Figure 9** and EMP-1A Figure 2).

Details of the proposed development and construction sequence are provided in **Section 3** (**Section 3.1** describes West Loop North and **Section 3.2** Describes West Loop South).

Construction related soil management is described in **Section 6.4**. Water testing and management is described in **Section 6.6** with reference to specific procedures in **Appendix G** and **Tables 6, 7, and 8.**

In 2021, the QL team requested that the Maryland Department of the Environment (MDE) Land and Materials Administration (LMA) participate in the review of the environmental conditions of the overall property and the proposed remedies. The proposed remedies included additional evaluation of the Site prior to the installation of roadways, utilities, and sediment erosion control basins; capping; general soil screening and management during excavation; removal of waste (if encountered); and the use of appropriate health and safety measures during construction. An expedited Inculpable Person (IP) status was requested and was received by Quantum Maryland, LLC on June 22, 2021. On behalf of Quantum Maryland, LLC, Geo Technology Associates, Inc. (GTA), the environmental consultant for QL at the time, submitted an application to the MDE Voluntary Cleanup Program (VCP) for the overall property on September 28, 2021. On May 4, 2022, QL withdrew the site from the VCP and remedial oversight was engaged with the MDE Controlled Hazardous Substances (CHS) Enforcement Division. On September 26, 2023 Quantum Maryland further removed areas outside the EC from CHS oversight. Construction activities within the EC area and/or SMA remain subject to CHS oversight and require preparation and approval of an EMP.

As part of the ongoing CHS oversight agreement between the project team and MDE, this EMP-3 was prepared to establish protocols for management of soils and groundwater when encountered during the planned installation of the West Loop North and West Loop South construction elements. All soil and water generated outside the EMP/EC area (the portion of the water lines west of the creek outside the EC) must be stored and managed outside the EMP/EC area.

2. Background

2.1 Site Description

The Site is located on a larger property ("overall property") that comprises over 2,200 acres and is located southeast of Ballenger Creek Pike, north and south of Manor Woods Road, west of New Design Road, northwest of Mountville Road, and north of Adamstown Road. The Site is being developed as a data center community, and near-term construction consists generally of construction of roads and utilities including water, sewer and cooling water.

The central portion of the overall property formerly contained the Eastalco Aluminum Works. The remaining portions of the overall property were primarily used for agricultural purposes. An MDE-approved Environmental Covenant (EC) was recorded by the previous owner in 2017. The EC provides restrictions to the land use, including restrictions to residential use and groundwater use, and the associated Soil Management Plan (SMP) describes requirements associated with construction disturbances to soil and groundwater within the EC. Within the EC is a Soil Management Area (SMA), which includes the central former plant area, two closed/permitted industrial landfills, former waste disposal sites (WDS), and other areas containing constituents of potential concern (COPCs).

This EMP applies only to specific identified work elements for construction of Frederick County approved Improvement Plans (design changes require additional approval) identified as West Loop South W/PCW, portions of which are located within/beneath the EC area and West Loop North W/PCW, portions of which are located in the EC, the SMA, and outside the EC. Each of these segments involves installation of a 12-inch water line and a parallel 16-inch potable cooling water (PCW) line. The West Loop North and West Loop Siuth each include a stream crossing which will be installed via Horizontal Directional Drilling (HDD). Because there are two parallel pipe crossings at each location, the scope of work under this EMP includes four HDD borings.

A Site Location Map is presented as **Figure 1**. **Figure 1** shows the approximate boundary of the overall property and the anticipated Limit of Disturbance (LOD) for the West Loop North and West Loop South water lines. **Figure 1** also shows the LOD for the QPS and Sewer Line B construction elements described in EMP-2 and the Pump Station/MH-3 described in EMP-1, and the K-Line Sewer Crossing described in EMP-1A as the West Loop water lines and associated LODs physically overlap each of these listed areas.

Additional detail of the two work areas including an outline of the EMP Boundary is shown in **Figure 2** (West Loop North) and **Figure 3** (West Loop South). **Figures 2 and 3** show the individual LODs for each of the two Improvement Plans (West Loop North and West Loop

South) and identifies the specific areas and construction elements included in the improvement plans that are subject to this EMP.

The specific work elements covered by this EMP are described below and include construction of public roadways (Quantum Place South and Clean Energy Lane), rough grading of the pad site for future electrical substation, sediment basins DA-2 and DA-11, storm drains, potable and cooling water utilities, and sewer utilities. Additionally, microtunneling and horizontal directional drilling (HDD) methods are proposed for use for certain portions of the utility installations that cross underneath Tuscarora Creek in lieu of the open trench and pump-around methods incorporated in the existing IP approvals. Some elements of these construction methods represent changes to the approved IP plans and are subject to final approval by Frederick County and MDE WSA. Details of the proposed development describing these changes are provided in **Section 3**. Required submittals/approvals are described in **Section 3.4**. These changes do include changes to the LODs, ESC plans, and JPA Permit. A preliminary plan/profile of the QPS HDD crossing (not yet submitted for County approval) is provided in **Appendix C2**. A preliminary plan/profile of the Outfall B crossing SOEs/microtunnel (not yet submitted for County approval) is provided in **Appendix D2**.

2.2 Environmental Site History

The central portion of the overall property was historically developed as an aluminum smelting plant (Alcoa Eastalco Works) that was in operation from 1969 through 2005, with formal closure in March 2010. The plant was demolished between 2011 and 2016. Since 2005, the plant area has undergone extensive environmental evaluation and is currently subject to an EC and MDE-approved Site Management Plan (SMP). The former plant area is subject to the EC due to environmental impacts associated with the historic use of the Site.

The EC provides restrictions to the land use, including restrictions to residential use and groundwater use, and the associated Soil Management Plan (SMP) describes requirements associated with construction disturbances to soil and groundwater within the EC. Within the EC is a Soil Management Area (SMA), which includes the central former plant area, two closed/permitted industrial landfills, former waste disposal sites (WDS), and other areas containing constituents of potential concern (COPCs). The boundaries of the EC and SMA are both depicted on **Figures 1 and 2**.

Historic plant operations resulted in impacts to groundwater, surface water, surface soils, and subsurface soils in the former plant area (now included within the entire EC area and a portion of the SMA). COPCs in the SMA primarily include fluoride in groundwater, cyanide in surface water, and polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) in soils. Total chromium in surface and subsurface soil has also exceeded total chromium standards, (which are actually based on hexavalent chromium

toxicity) and speciation for hexavalent chromium has generally not exceeded standards (see **Section 4.3.1** for more detail including samples collected and a single hexavalent chromium sample above the MDE standard of 6.3 mg/kg).

Prior sampling efforts have indicated that on-site lands surrounding the former plant area (within the EC boundary) have sustained limited impacts to soil by arsenic and several PAH compounds.

Requirements for work within the EC area (outside the SMA) include the following:

- Land use is limited to restricted commercial (Tier 2B) and restricted industrial (Tier 3B) land uses.
- Groundwater use is prohibited.
- A Health and Safety Plan (HASP) must be prepared in accordance with the SMP and maintained on-site during site work.
- A HASP must also address areas where groundwater is proposed to be encountered.
- Water encountered in/removed from excavations within the EC area must be containerized and tested before disposal or reuse as dust control.

With regard to water management, page 3 of the EC states:

> "**Excavation Encountering Groundwater**: When conducting any excavation activities on the Property extending to the ground water table, the Property Owner shall implement the requirements of a site-specific health and safety plan in accordance with the Site Management Plan to ensure that worker protection measures are met. The encountered ground water shall be containerized during all dewatering activities at the property and shall be analyzed before disposal. The analytical results shall be the basis for appropriate disposition of the ground water in accordance with applicable local, State and federal laws and regulations."

In addition to the requirements of the EC, work conducted within the scope of this EMP (and all construction within the EC area) is subject to CHS oversight and as such, requires approval of the MDE CHS case manager.

Additional land use restrictions and maintenance requirements specific to portions of the work within the SMA (i.e. engineered caps, fencing, 30-day notice of planned soil disturbance) include:

- On-site activities shall meet the requirements of the SMP.

- Incorporation of a presumptive soil remedy (an engineered cap consisting of the "placement of a marker barrier atop the contaminated area followed by the placement of buildings, parking areas, roadways in hardscape areas, and [2 feet of] clean cover soils over landscape or green-space areas") into the development strategy or conducting a Pre-Development Assessment (PDA) to confirm soils have not been impacted.

- Engineered caps in the SMA must be maintained, and notification/maintenance requirements exist for repairs and penetrations of engineered caps.

- A 6' chain link fence shall be maintained surrounding the entirety of the SMA.

- Landfill areas must be maintained in accordance with the 2015 Closure and Post Closure Plan.

- Long term groundwater monitoring and groundwater monitoring well maintenance is required.

- A 30-day notification to the MDE is required for planned soil disturbances within the SMA.

Remaining areas of the Site and overall property (outside the EC) consist of agricultural land and former farming operations. Railroad tracks were previously located in the eastern portion of the overall property (these tracks also led into the EC and SMA) and were recently removed.

GTA performed sampling in accordance with a Phase II ESA Work Plan – Initial Infrastructure Phase, as approved by MDE on September 28, 2022. This sampling plan was performed specifically to evaluate the proposed utility and roadway corridors and utility abandonment areas. Sampling was conducted within the SMA, EC, and former agricultural areas of the Site outside the EC. Additional information concerning these sampling activities in the vicinity of the work area covered by this EMP is presented in **Section 4.1** and **Appendix A**. During this investigation one surface sample was collected from 0-1 foot depth at each sample location. Sub-surface evaluation then consisted of the collection and analysis of one composite sample from 1 foot through up to 20 feet depth. Fill material was observed in all samples collected from within the SMA, but no biased samples were collected to characterize the fill since the excavated soil from the utility corridors is generally intended to be returned to the excavation pits as backfill, with the excess to be managed as described in **Section 6.4** and **Figures 8 and 9**. Phase II data specific to the construction elements covered by this EMP are described in **Section 4** and **Appendix A**. The proposed route of West Loop North changed after Phase II sampling was conducted, but only a slight realignment outside the EC west of the Creek moving the alignment off of Phase II samples SA-7F through SA-7H. Additional environmental sampling was also conducted in

coordination with the geotechnical borings in the portion of the West Loop within the SMA; this sampling is discussed in **Section 6.3**.

3. Proposed Development

3.1 Construction of West Water Loop North

The purpose of the West Water Loop is complete a site-wide looped water system running adjacent to the 400 Lots, across the unnamed tributary to Tuscarora Creek through the 100 Lots, tying into the and QPS water lines, crossing Tuscarora Creek, tying into the East Water Line, then connecting to Happy landing Road (HLR) water lines past the pump station back to the west side of Tuscarora Creek.

The portion called the West Loop North runs from the connector to Lot 401 up the west side of the creek, across the creek into the EC and SMA, east then north through the SMA, continuing through the EC to QPS as shown on **Figures 1 and 2**.

The majority of West Loop North is located within the EC area, and portions of the LOD are located within the SMA (**Figure 2**); the southern end of this segment (west of the creek) is outside the EC and not subject to CHS oversight.

The West Water Loop design as approved by Frederick County and described in the next section (*Quantum Frederick, Water, Potable Cooling Water & Sewer, West Loop to Quantum Place South & Conn's to lots 100, 101 and 401 - Combined Stormwater Management Development and Improvement Plan*, Rodgers Consulting, Revised May 5, 2023, approved June 13, 2023) is provided in **Appendix C1**. Proposed changes to the approved plans including use of HDD for water line crossing of the tributary of Tuscarora Creek (preliminary design is attached as **Appendix C2**), realigning a segment outside the EC, and other LOD changes related to construction and soil/water management are called out in the following paragraphs.

- Horizontal direction drilling (HDD) for installation of water utilities at the northern crossing underneath the tributary to Tuscarora Creek. Use of HDD and associated changes in pipe materials from those shown on the approved plans represents a change subject to approval by Frederick County. Frederick County has conceptually approved the changes in pipe materials associated with implementing HDD. Modification of the IP drawings is in process and is expected to be submitted at the end of May 2024.

- Realignment of the segment of water lines west of the creek moves them outside the EC and not subject to this EMP-3.

- Water lines south of the Lot 401 connector are being removed from this specific County contract and are contained in a separate “HLR to Lot 400” contract entirely outside the EC.

- Sewer lines are also removed from this contract.

The proposed location of the West Loop North water lines will cross underneath the unnamed tributary to Tuscarora Creek. Each line will be installed separately using HDD ensuring the portion of the bore beneath the actual creek crossing is fully embedded in the bedrock. HDD consists of a drill rig that can drill a borehole at low angles to the horizontal and has the ability to steer the drill head during the boring process. The drilling is advanced in a controlled manner using inert drilling mud to flush the drill cuttings back to the drill rod and to stabilize the borehole from collapse. The HDD bores will be approximately 600 feet in length, and are planned to be drilled from east (beginning inside the SMA) to west (outside the EC). The currently approved profile (shown for reference on the May 24, 2024 progress plan set in **Appendix C2**) shows the pipe inverts under the stream at approximate elevation +303 and El. +303.5 feet for the 12-inch and 16-inch lines, respectively. Embedding the HDD pipe in rock will reduce the potential for the drilling fluid to daylight at the ground surface (inadvertent fluid return or IFR). Therefore, the proposed profile in **Appendix C2** shows pipe inverts beneath the stream at approximately elevation +281.5 for the 12" W and +281.4 for the 16" PCW.

For the West Loop North water line construction, the proposed activities include the following (see **Figure 2** for the locations of noted features):

- Install erosion controls (primarily silt fence and associated stone construction entrance, etc) per approved erosion control drawings (to be revised and reapproved by Frederick County SCD prior to 20-CP permitting and construction).

- Grading of temporary access road from the LOD associated with the West Loop South work (this access is outside the EC).

- Preparation of drill pad on the east end of the HDD stream crossing and work pad on the west. These are anticipated to be modular wooden construction mats, which are different than the gravel work platform constructed for microtunnel SOE in EMP-1, EMP-1A, and EMP-2 and do not require cut/fill of a level pad. The work pad to the west is located outside the EC and floodplain. The drill pad to the east is located within the EC and the SMA (outside the floodplain).

- Mobilization of HDD rig and mud processing plant to the drill pad at east end of crossing.

- Drilling the (approximate 6-inch diameter) HDD pilot hole from east to west (with drill cuttings managed on the east, within the SMA, as SMA material).

- Reaming the boring to 24-inch diameter also from east to west (drill cuttings managed on the east within the SMA as SMA material)

- Assembling (heat welding) the HDPE pipe into a single long section (outside the EC to the west).

- Pulling the HDPE pipe through from west to east.

- Repeat drilling, reaming, pipe install for the second (parallel) line at the same crossing.

- Installation of ductile iron pipe (DIP) water lines (part within the SMA and part within the EC on the east side of the crossing, and outside the EC on the west side); These parallel W/PCW lines will be installed by trenching and backfill (using imported quarry stone pipe bedding where required on approved drawings followed by soil excavated from the same trench the same day).The trenching and water line install outside the EC to the west is not within the scope of this EMP. Spoils and water from the trench installation east of the creek will be managed in the area it is generated (mostly in the SMA and the northern portion in the EC).

As described above the ends of the HDD crossing (and associated surface facilities) are within the SMA on the east side, and outside the EC on the west. The method of drilling east to west, then reaming east to west means that all drill cuttings are removed/managed on the east side within the SMA (and managed as SMA material because part of the boring is in the SMA and cuttings cannot be separated).

Drilled soil and rock cuttings from the HDD activities and any groundwater displaced during drilling or dewatering will be collected, containerized, and tested on-site in the same manner as excavated soil and containerized groundwater as described in **Sections 6.4 and 6.6.**

Because drill stem pipe which has passed through the boring will be managed on the work pad west of the crossing and some waste such as washwater or drilling mud in the exit pit may be generated there (and would be managed as SMA material), this area is included in the EMP boundary. However, all water line trenching west of the creek is outside the EC and not included in this EMP-3.

The portion of the West Loop Water line installation east of the crossing will be installed via trench methods through the SMA (2,300 feet), then outside the SMA still within the EC another 750 feet to the west end of the QPS water lines. Approximately half of this route (735 feet in the SMA plus the 750 feet in the EC) parallels the B-Outfall sewer line included in EMP-2.

The 12” water main will be installed with an invert elevation typically 4-9 feet below final grade, and the 16” potable cooling water line will be installed typically 7-10 feet below final grade.

The portion of the lines running east-west across the SMA are not anticipated to encounter groundwater based on the design depth. The northern portion of the line (parallel to Sewer Line B and within Clean Energy Lane) is anticipated to encounter groundwater in some areas and require groundwater management (dewatering, containerization, and testing). Management of groundwater is describe in **Section 6.6**, **Table 5**, and **Appendix G**.

In general, soil excavated from the water line trench installation will be staged along the side of the trench as excavated and then re-used as backfill at the point of generation (within reach of construction equipment without trucking and without crossing boundaries such as the EC/SMA boundary). However, installation of water lines always generates excess spoils due to the pipe volume and stone pipe bedding. Anticipated quantities of soil (excess spoils) to be generated are described in **Section 6.4** (Soil Management) and **Table 4**.

Because approximately half of the portion of the lines inside the EC and/or SMA is also within the B-Sewer LOD, separate stockpile and water management areas are not established for the West Loop North. Rather, spoils and water will be managed in the same areas designated in EMP-2 Figure 11 for the B-Sewer, including Stockpile Area B-2 and Tank Area B-2 (both within the SMA) and for the northern portion of the lines Stockpile Area B-1 and Tank Area B-1 (both in the EC outside the SMA).

The portion of the water lines installed via excavation in the SMA require restoration via capping with a geotextile marker and minimum of two feet of clean fill (**Section 6.7**).

3.2 Construction of West Water Loop South

West Water Loop South is the portion of the overall site water loop running approximately between the pump station (also the southwest terminus of water lines in Happy Landing Road) and sewer manhole 401 (also the location of the northern end of the Mountville Road water line). The 12” water line is 1253 feet in length and the 16” PCW line is 1233 feet long. Most of that distance (935 feet) is installed via HDD. See the *Quantum Frederick 12" Water and 16" Potable Cooling Water Crossing Tuscarora Creek at Happy Landing Rd. Combined Stormwater Management Development and Improvement Plan* in **Appendix D1** (submitted for County approval and under review).

The HDD bores will be approximately 1000 feet in length, and are planned to be drilled from west (beginning outside the EC) to east (also outside the EC) with the bore passing beneath the EC. The proposed profile in **Appendix D2** shows pipe inverts beneath the stream at approximately elevation +269.6 for the 12” W and +269.4 for the 16” PCW.

For the West Loop South water line construction, the proposed activities are very similar to West Loop North (with the exception there is no trench installation in the EC or SMA) and include the following (see **Figure 3** for identification of listed elements):

- Install erosion controls (primarily silt fence and associated stone construction entrance, etc) per approved erosion control drawings (to reviewed and approved by Frederick County SCD prior to 20-CP permitting and construction). Note that on the west side, the LOD is shared with (same perimeter as) other construction elements including the K-Line sewer (see EMP-1A), and on the east side much of the LOD is within the Pump Station LOD with an extension to the east for laydown/heat fusion of the HDPE pipe before pulling it through the boring.

- Preparation of drill pad on the west end of the HDD stream crossing and work pad on the east. These are anticipated to be modular wooden construction mats where needed (portions of the LOD on both sides will already support traffic due to previous work). Both drill pads are actually located outside the EC and outside the floodplain.

- Mobilization of HDD rig and mud processing plant to drill pad at west end of crossing.

- Drilling the (approximate 6-inch diameter) HDD pilot hole from west to east. Most of the drill route is within/under the EC although the HDD entry points are outside the west side of the EC and exit points are outside the east side of the EC. Drill cuttings will be removed/managed on the west - although these cuttings must be managed as EC material, the drilling mud processing/separation and management will necessarily be conducted within the LOD outside the EC to the west.

- Reaming the boring to 24-inch diameter from west to east (drill cuttings managed on the west – although these cuttings must be managed as EC material, the drilling mud processing/separation and management will necessarily be conducted within the LOD outside the EC to the west)

- Assembling (heat welding) the HDPE pipe into a single long section (outside the EC to the east).

- Pulling the HDPE pipe through from east to west.

- Repeat drilling, reaming, pipe install for the second (parallel) line at the same crossing.

- Trenching, installation and backfill (using imported quarry stone pipe bedding where required on approved drawings followed by soil excavated from the same trench the same day) for the installation of the very short sections of ductile iron pipe (DIP) water lines (outside the EC on both ends) as required to tie into water lines constructed under other contracts (outside the EC).

As described above both ends of the HDD crossing (and associated surface facilities) are outside the EC. The method of drilling west to east, then reaming west to east means that all drill cuttings are removed/managed on the west side. Drill cuttings/mud/water will be managed as EC material because most of the borepath is beneath the EC and cuttings cannot be separated).

- Drilled soil and rock cuttings from the HDD activities and any groundwater displaced during drilling or dewatering will be collected, containerized, and tested on-site in the same manner as excavated soil and containerized groundwater as described in **Sections 6.4 and 6.6**.

- Because drill stem pipe which has passed through the boring will be managed on the work pad east of the crossing and some waste such as washwater or drilling mud in the exit pit may be generated there (and would be managed as EC material), this area is included in the EMP boundary. However, the short distance of water line trenching on each end of the HDD segment is outside the EC and not included in this EMP-3.

- Because the east end of the HDD bores is within the pump station LOD (actually within the limits of the MH-3 work platform) and the west end where drill cuttings will be generated is within an LOD boundary shared by the K-Line work, separate stockpile and water management areas are not established for the West Loop South. Rather, spoils and water will be managed in the same areas designated in EMP-1 (any washwater or drilling mud generated on the east end) or designated in EMP-1A Figure 2 for material (cuttings, water, etc) generated on the west end.

Dewatering will be managed as described in **Section 6.6**, **Table 5** and **Appendix G**. Seepage analysis for this construction element is provided in **Appendix F2.**

3.3 Plans and Permits

Several permits have been submitted to various issuing authorities for aspects of the work subject to this EMP.

Frederick County Maryland permitting includes the following Site and Improvement Plans

- *Quantum Frederick, Water, Potable Cooling Water & Sewer, West Loop to Quantum Place South & Conn's to lots 100, 101 and 401 - Combined Stormwater Management Development and Improvement Plan*, Rodgers Consulting, Revised May 5, 2023, approved June 13, 2023 (this plan is being revised and will soon be resubmitted as described in detail in **Section 3.1** for the West Loop North construction element); and

- *Quantum Frederick, 12" Water and 16" Potable Cooling Water Crossing Tuscarora Creek at Happy Landing Rd - Combined Stormwater Management Development and*

Improvement Plan, Rodgers Consulting, April 22, 2024 (this is a new plan submitted April 22, 2024 for the West Loop South construction element described in **Section 3.2**).

The West Loop North and West Loop South Improvement Plans (named as noted above) are provided in **Appendices C1 and D1**, respectively. As described above, the upcoming revision to West Loop North plan and the recent submittal of the West Loop South plan incorporate HDD methods and materials changes, subject to approval by Frederick County. Frederick County has approved use of the pipe material changes associated with these techniques and will need to review design drawings incorporating the engineering revisions as well as LOD modifications into the plan sets listed above. Preliminary design of the HDD crossing north and south are provided in **Appendix C2** and **Appendix D2** respectively.

An application for Water Appropriation and Water Use for construction dewatering for the Pump Station was submitted on 10/17/2023 and based on discussion with MDE WSA, the WAP application was subsequently modified to incorporate phase 1 infrastructure including all dewatering elements described in this EMP. The Water Appropriation and Use Permit FR2023G001(01) was issued by WSA December 28, 2023 (effective December 29). Water management is further discussed in **Section 6.6** and **Table 5**.

Wetlands: No impacts to wetlands are authorized at this time. Identified wetlands are shown on **Figure 2** and are not located within the EMP boundary.

Temporary and permanent impacts to the 100-year Floodplain have been authorized by 202260706/ 22-NT-3094 and 20226097/ 22-NT-3124, respectively. For the West Loop North, the LOD on each side of the creek crossing is located outside the floodway (both the old floodway boundary forming the basis of the JPA and the new October 2023 floodway boundary). For the West Loop South, the west LOD is outside the old and new floodway boundaries; on the east site, the LOD is outside the new floodway boundary and extends within the old boundary; however this area is already an area of approved temporary or permanent impact under the existing JPA as modified. Both HDD crossings pass beneath the floodway. Temporary impact to the stream at the south crossing is also included in the JPA.

4. Recent Site Activities

4.1 Impacted Media Evaluations

GTA performed a Phase II ESA of the Site to provide project-specific data along utility and roadway alignments in order to determine the proper management of material that will be excavated during roadway installation and utility installation/abandonment. The Phase II ESA was also prepared in consideration of a Work Plan that was submitted to the MDE LMA for review and approval. The sampling locations and sampling parameters were determined on September 1, 2022. The Work Plan was approved with some alterations and additional sampling parameters on September 28, 2022. This section describes the Phase II ESA in general, followed by specific Phase II samples in the vicinity of the work subject to this EMP. **Section 4.3** further describes COPCs in soil and groundwater in the area subject to this EMP.

The Phase II ESA was conducted in September and August 2022 and consisted of sediment, surface water, groundwater, and soil sampling on the Site. Surface water samples were obtained from three stream crossing locations and from the former rainwater pond 102 located in the location of Sediment Basin DA-11. Groundwater samples were collected from two temporary groundwater monitoring wells that were installed near proposed stream crossings; one of these was located along the North Loop just south of the crossing (and just outside the EC). Soil samples were collected from 86 soil borings that were situated at approximate 300-foot intervals along the Site's roadway or utility alignments or within the Site's proposed sediment traps, sewage pumping station, and electrical sub-station. The approximate sample locations are depicted on **Figure 4**.

Section 4.3.1 describes the results of Phase II soil samples which are located closest to the areas subject to this EMP. The analytes that were requested for analysis for samples at these locations were either not detected above the laboratory reporting limits or the applicable comparison values. Please refer to the *Phase II Environmental Site Assessment, Initial Infrastructure Phase* (GTA, October 11, 2022) and *Phase II ESA Initial Infrastructure Phase Addendum* (GTA, November 2, 2022) for specific details regarding the Phase II ESA. Figure 4, Figure 8, and Table 2 of the Phase II ESA are reproduced in **Appendix A** of this EMP. EMP-3 **Figure 4** shows the Phase II sample locations with the West Water Loop superimposed.

In March 2024, Tetra Tech collected groundwater samples from several permanent wells and temporary piezometers installed as part of the GEI geotechnical investigation for stream crossings. This supplemental groundwater data (which also includes DA-2 and DA-11 surface water data) is provided in **Appendix B2**. Samples were collected from monitoring

wells MW-60, MW-52 (near the southern site boundary proximate to the West Water Loop South), piezometers GEI-07 (near the West Water Loop South), GEI-11, and GEI-14 (the two ends of the B-Outfall crossing). Some of these (GEI-11 and GEI-14 and the basins) are not near the EMP-3 work areas but they are on the same lab report.

4.2 Future Land Use

The West Water Loop is part of the overall utility installation required to allow future site development. On-site soil displaced by proposed utilities are anticipated to be reused on-site and placed as compacted fill as necessary and as approved by MDE based on testing results. Excess soils generated during utility excavation will be managed subject to respective "inside the SMA", "inside the EC" or "outside the EC" categories. Soils displaced within the SMA must remain in the SMA. Capping with clean fill above a marker barrier within the SMA will eliminate the exposure pathway soil and groundwater impacts at the Site during future developments.

For the construction activities located within the SMA, excavated soil will be stockpiled and managed as specified in **Section 6.4. Table 4** describes anticipated soil movements related to all aspects of the EMP including anticipated volumes (where estimable) of excess soil and imported fill. Excess SMA soils will be temporarily stockpiled as described in **Table 4** and shown on **Figures 8 and 9**. Excess SMA material which will remain on site will then be moved to a permanent location and capped as shown on EMP-2 Figure 14.

On-site soils displaced by construction of roughly one third of the West Water Loop (North) will be outside the EC west of the creek and are not subject to requirements of this EMP – and soils generated by or used to backfill that outside the EC construction will remain outside the EC. That work outside the EC is subject to the requirements of the 20-CP construction stormwater permits referenced in **Section 3.4** and the associated Stormwater Pollution Prevention Plan (SWPPP).

4.3 Contaminants of Potential Concern

4.3.1 Soil

Prior evaluations, as summarized in the Environmental Background Summary of the SMP, indicated PAHs (including benzo(a)anthrancene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthrancene, and indeno(1,2,3-c,d)pyrene) and PCB (Aroclor 1016, Aroclor 1242, and Aroclor 1248) concentrations exceed the NRCS in portions of the SMA. Prior evaluations also indicated that arsenic concentrations exceed the NRCS and the Anticipated Typical Concentration (ATCs) values in the SMA. However, these prior evaluations indicated the detections of arsenic are considered naturally occurring and do not

pose a risk. Additionally, GTA's 2022 Phase II ESA – Initial Infrastructure Phase, identified benzo(a)pyrene at concentrations that exceeded the NRCS in the SMA. See **Appendix A** for Phase II ESA – Initial Infrastructure Phase data tables. As such, PAHs, PCBs, and arsenic are considered COPCs in the SMA.

Outside the SMA, PAHs, PCBs, and arsenic are conservatively identified as COPCs in soil within EC areas; however, these COPCs were not detected above laboratory reporting limits and/or respective NRCS values outside the SMA at the locations sampled as part of GTA's 2022 Phase II ESA – Initial Infrastructure Phase. See **Appendix A** for Phase II ESA – Initial Infrastructure Phase data tables.

Areas Covered by this EMP

The majority of the work covered by this EMP will be located within the EC, and portions of that will be in the SMA. As shown on **Figure 4**, the SA-7 series of samples were collected along the utility alignments of work elements covered by this EMP (with slight realignments, some samples are off the utility centerline). **Section 6.3** describes additional proposed sampling to be performed; this section describes existing data to date.

Beginning at the pump station and following the West Water Loop clockwise the following Phase II samples approximately follow the pipe alignment: SA5-A (outside the EC); SA7-C (inside the EC); SA7-B, F, G and H (all outside the EC); SA7-F, SA7-J, SA10-A, SA7-K (all in the SMA); SA4-E and SA4-D (in the EC).

PAHs were detected at sample locations SA7-G 0-1 (outside EC) and SA7-K (shallow and deep, SMA). PAHs detected were below applicable MDE NCRS values. The PAHs detected included in one or more of the three samples include anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)Anthracene, fluoranthene, fluorene, indeno(1,2,3-c,d)pyrene, phenanthrene, and pyrene.

Metals were detected at all sample locations and included arsenic, beryllium, chromium, copper, lead, nickel, and zinc. With the exception of chromium, no metals were detected above MDE NRCS or the Anticipated Typical Concentrations (ATC) for soils in Eastern Maryland. Chromium (total) was detected in nine samples above the 30 mg/kg ATC. These samples (and others referenced in this section) were not speciated for hexavalent chromium. However, as described in the Phase II Addendum, 7 samples with total chromium over 30 mg/kg from across the site were analyzed for hexavalent chromium and (per the Phase II Addendum) "Hexavalent chromium was not detected above the laboratory's reporting limits in the submitted samples. As such, it appears that the chromium detection was associated with the more benign trivalent chromium." The non-residential trivalent chromium standard is 150,000 mg/kg. The seven specific samples that were speciated for hexavalent chromium, were collected outside the area covered by this EMP. Additional sampling for total

chromium and hexavalent chromium in soil has been conducted during 2023 and 2024 including the rail line crossing of Happy Landing Road (these data have been submitted to MDE) and implementation of approved sampling plans including the North Borrow Area Quantum Place South, and Stockpile 1 (these results are received and reports in preparation). While a number of samples exceed 30 mg/kg total chromium, only one sample [SB-HLR-RR-3-0-2 at 6.4 mg/kg] has exceeded the MDE hexavalent chromium standard of 6.3 mg/kg.

4.3.2 Surface Water

Prior evaluations, as summarized in the Environmental Background Summary of the SMP, indicated low-level detections of cyanide that slightly exceeded MDE's criteria for ambient surface waters of 0.0052 mg/L, set forth by an Administrative Consent Order between Eastalco Aluminum Company and the MDE. The USEPA maximum contaminant level (MCL) for cyanide is 0.2 mg/L and detections of cyanide in surface water at the site are orders of magnitude below that level. GTA's 2022 Phase II ESA – Initial Infrastructure Phase included surface water sampling in locations where utilities are proposed to cross surface waters and in the former rainwater pond 102 (now DA-11). Collected surface water samples did not identify cyanide concentrations above the USEPA MCL both within and outside of the SMA. See **Appendix A** for Phase II ESA – Initial Infrastructure Phase data tables. According to the SMP, "exposure by on-site workers and off-site receptors to surface water does not require mitigation." Conservatively, cyanide is considered a COPC in surface water at stream crossings and within the basins of the proposed development.

None of the proposed construction work covered by this EMP is proposed to discharge water directly into surface water.

4.3.3 Groundwater

Prior evaluations, as summarized in the Environmental Background Summary of the SMP, indicated that fluoride exceeded the USEPA MCL on portions of the Site, primarily within the SMA and EC.

Groundwater data in the vicinity of the areas covered by this EMP is available from several sources including current and historic sample results from the North and South Landfill monitoring programs (Tetra Tech 1988, 2005, 2022, 2023), and from supplemental groundwater sampling by Tetra Tech (**Appendix B2**) from existing monitoring wells 52 and 60 and piezometers installed by GEI as part of its geotechnical investigation.

The existing monitoring well network is generally located on the western and southern portions of the Site. Below is a table of current wells which are located near or within the area covered by this EMP, as well as a summary of the most recent analytical data (Tetra Tech, 2022/2023):

Well ID	Location	Fluoride (mg/L) (2022/2023)
MW-25	Within West Loop North LOD	**14/15**
MW-107		1.6/---
MW-108		**11/13**
MW-26	Within 170 feet North/West of North LOD	**4.3/5.5**
MW-29		**24/26**
MW-66		NA/NA
MW-67		NA/NA
MW-68		**20/16**
MW-6	Within 350 feet North/West of North LOD	2.6/1.1
MW-45		**26/24**
MW-46		NA/NA
MW-52	North of West Loop South Crossing	**5.2/5.6**
MW-60		2.5/2.6
MW-72	South of West Loop South Crossing	**5.3/5.7**
MW-73		**5.3/5.8**

Data presented in mg/L
Bolded results are above the fluoride MCL of 4.0 mg/L

Fluoride was detected above the applicable MCL at some but not all locations, near both the West Loop North and West Loop South alignments. It is anticipated that groundwater will be encountered during these construction activities.

As shown on **Figure 6**, several additional abandoned monitoring wells were formerly located near West Loop North (MWs 37, 38, 46, 97, 84, 96, 69, 32, 41, 31, 40, 50) and West Loop South (MWs 58, 59, 61). These wells were generally last sampled in 2005 and then abandoned in 2017 because groundwater fluoride concentrations were routinely non-detect or below standards.

The landfill monitoring network is no longer sampled for VOCs. VOC data was collected in selected wells between 1988 and 2016. When last tested, VOCs were either non-detect or were detected at levels below applicable MCLs.

In March 2024, Tetra Tech collected groundwater samples from several permanent wells and temporary piezometers installed as part of the GEI geotechnical investigation for stream crossings. This supplemental groundwater data (which also includes DA-2 and DA-11 surface water data) is provided in **Appendix B2**. Samples were collected from monitoring wells MW-52 and MW-60 (both near the southern site boundary north of the West Loop South crossing), piezometers GEI-07 (near the K-Line crossing), GEI-11, and GEI-14 (the north and south ends of the B-Outfall crossing). MW-52, MW-60, and GEI-07 are near the West Water Loop South crossing. Some of the other samples (wells and basins) are not near the EMP-3 boundary but they are on the same lab report. Samples were analyzed for

dissolved metals (including chromium VI), free cyanide, fluoride, TPH (DRO/GRO), total metals, PCBs, pesticides, VOCs, PAHs, corrosivity, and pH. The GEI-11 sample did not detect any analytes above groundwater screening criteria. The small number of analytes shaded gray on the table in **Appendix B2** are nondetects where reporting limit were higher than screening criteria.

Six groundwater samples were also collected within the portion of the site subject to this EMP (the 100 Lots) by a potential purchaser as part of due diligence under a workplan approved by MDE. However, there was one groundwater result in excess of the MDE groundwater standard for TPH (3,400 ug/l TPH-DRO at DU1-20) which was reportable (and reported) under MDE rules, one sample above the fluoride standard (7,700 ug/l at DU2-6), one sample above the Tetrachloethylene standard (DU1-20 at 6 ug/l), obe sample above the 1,4-dioxane standard (DU1-1 at 11 ug/l [other RLs were above the standard]), and one sample above the lead standard (DU1-25 at 16.6 ug/l). Therefore, these parameters are added to the COPC's in **Table 1** below.

4.4 Exposure Pathway Evaluation

Based on the Phase II ESA performed on the initial infrastructure phase of construction and the existing SMP, potential environmental exposure risks to future occupants and construction workers may exist at the Site. However, with institutional controls and the EC itself serving as deed notice and prohibiting use of groundwater, there is not a complete exposure pathway after construction activities.

Capping of areas of soil disturbance within the SMA (as required by the SMP) further reduces post-construction risk.

Specific to this EMP and the construction elements covered, potential soil exposure is described in **Section 4.4.1** and exposure to groundwater is described in **Section 4.4.2**.

The identified exposure pathways, potentially exposed populations, and COPCs are summarized in **Table 1** below. The list of groundwater COPCs is amended to include parameters which exceeded a standard during a limited groundwater sampling conducted January 2024 as part of due diligence sampling by a prospective purchaser in the area of the future 100 Lots.

Table 1: Potential Exposure Pathways

Media	Potential Exposed Population	Exposure Pathway	COPCs
Soil (SMA, Explicitly) EC Soils are assumed to have the potential to provide the same pathways	Adult On-Site Construction Worker Child Visitor Youth Visitor Adult Visitor Adult On-Site Worker	Dermal Exposure Incidental Ingestion Inhalation of Volatiles/TPH constituents and Fugitive Dust	PAHs (benzo(a)anthrancene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthrancene, and indeno(1,2,3-c,d)pyrene), PCBs (Aroclor 1016, Aroclor 1242, and Aroclor 1248), Arsenic, and TPH
Groundwater	Adult On-Site Construction Worker	Dermal Exposure Incidental Ingestion	Fluoride, PCE, 1,4-Dioxane, TPH, and lead
Surface Water	Adult On-Site Construction Worker	Dermal Exposure Incidental Ingestion	Cyanide

4.4.1 Direct Contact to Soil Contamination

There is a potential for site construction workers to come into contact with the COPCs during grading activities, HDD activities, excavation of soil and rock, and management of soil stockpiles including loading for disposal. Some of the site soil COPCs listed above (such as PCBs) are related to specific areas of the site and within the SMA. Soil COPCs were not detected above standards in the Phase II soil samples along the specific alignments of water utilities covered by this EMP (**Section 4.1**). However, for planning and safety purposes, the listed site soil COPCs are addressed in the HASP.

This contact will be limited by implementing a site-specific HASP. Future capping within the SMA will eliminate the direct contact exposure risk to construction worker and future adult, youth, and child populations. The proposed remedies for the soil contamination (HASP and capping) are protective of human health because they are designed to prevent exposure to contamination.

4.4.2 Exposure to Groundwater Contamination

Groundwater has generally been identified at elevations at the site ranging from 5 to 25 feet below ground surface (bgs), with some apparent perched water conditions present on portions of the Site. Groundwater at the site is not currently used for any purpose, and the EC prevents its use within the area encumbered by the EC. The groundwater at the Site will be prohibited from being used for any purpose via restrictions recorded in the property deeds for areas within the EC and SMA. There is a potential for site construction workers to come into contact with groundwater from within the area encumbered by the EC during the construction activities covered by this EMP.

Table 5 presents water management plans including groundwater dewatering needs and anticipated volumes. **Figure 7** provides a map outlining the areas where groundwater is expected to be encountered during construction.

Construction worker contact with groundwater will be limited by implementing the HDD installation at stream crossings (which will significantly limit the overall volume of water to be encountered/managed as compared to trenching methods), as well as water management actions including containerizing the groundwater for testing and proper disposal.

Based on the dewatering estimates conducted as part of the water appropriation permits (see **Table 5 and Appendix F1**), the estimated water generation rate at the North HDD crossing is 2,000 gallons per day (GPD) for 30 days, and the trenched portion of the lines from the crossing to the B-Alignment and up to QPS is 15,000 GPD for a total of 9 days for the three segments listed on **Table 5**. The estimate for the West Loop South crossing is 30 GPD for 40 days. These estimates total 196,200 gallons for the overall West Loop project. These dewatering estimates are included in the approved Water Appropriation Permit described in **Section 3.4**.

Groundwater encountered during HDD activities at the QPS stream crossing, as well as trenching for water and sewer line installation along QPS, the Sewer Line B and the East Water Line, will be dewatered as described in **Table 5** in areas shown on **Figure 7**. Dewatered groundwater generated in the trenched areas will be containerized and tested before it is reused for dust control or disposed of at a facility (based on testing results) in accordance with the procedures described in **Section 6.6** and **Appendix G**.

Groundwater generated during HDD installation will be limited through control of drilling mud pressure to balance groundwater seepage. The estimates provided assume water is recovered as makeup for drilling mud removed with cuttings and this mud will be managed as a waste for solidification and on-site placement or off-site disposal and will not be subject to **Appendix G** procedures or suitable for dust control.

The site-specific HASP will address worker contact with the groundwater.

4.4.3 Inhalation of Fugitive Dust

During construction activities, it is possible for soil impacted by COPCs to become airborne. There is a potential for site construction workers to breathe this fugitive dust. The inhalation of fugitive dust will be limited by implementing the site-specific HASP and construction practices that prevent dust generation (e.g., implementation of dust control methodologies), as well as air monitoring for dust concentrations to assure no hazardous exposure can occur for workers. Details of this monitoring is provided in **Section 6.2**.

The proposed remedy for inhalation of fugitive dust is protective of human health as exposure to contamination above regulatory limits will be prevented.

5. Cleanup Criteria

The cleanup criteria for the Site are summarized in the table below. The cleanup criteria for the Site soil COPCs generally reflect the MDE NRCS values, which are the generic risk-based guidance values in MDE's Cleanup Standards for Soil and Groundwater; October 2018; Interim Final Guidance (Update No. 3). MDE cleanup standards are derived from USEPA Region III Reginal Screening Levels (RSLs), which assume a 1E-6 cancer risk; generally speaking, MDE modifies these values to reflect a 1E-5 cancer risk in the NRCS values. The cleanup criteria for fluoride and cyanide are derived from the USEPA National Primary Drinking Water Regulations (NPWDR); May 2009.

Table 2: Cleanup Criteria

Media	COPC	Cleanup Criteria	Basis
Soil	Benzo(a)anthracene	21 mg/kg	NRCS
	Benzo(a)pyrene	2.1 mg/kg	NRCS
	Benzo(b)fluoranthene	21 mg/kg	NRCS
	Benzo(k)fluoranthene	210 mg/kg	NRCS
	Dibenz(a,h)anthrancene	2.1 mg/kg	NRCS
	Ideno(1,2,3-c,d)pyrene	21 mg/kg	NRCS
	Aroclor 1016	5.1 mg/kg	NRCS
	Aroclor 1242	0.95 mg/kg	NRCS
	Aroclor 1248	0.95 mg/kg	NRCS
	Arsenic	26.8 mg/kg	RCV
Groundwater	Fluoride	4.0 mg/L	NPWDR
Surface Water	Cyanide	0.2 mg/L	NPWDR

Notes:
Arsenic is proposed to be compared to the MDE risk-based comparison value (RCV) of 26.8 mg/kg for commercial properties.
Cyanide value listed above is based on NPWDR (human health). MDE's ambient surface water criteria for cyanide in fresh water (aquatic life, chronic) based on (COMAR 26.08.02.03-2) is 0.0052 mg/l.

If other COPCs are identified, the cleanup criteria will be re-evaluated. Generally, the cleanup criteria that will be applied to any additional COPCs will be the published MDE NRCS values, or site-specific values calculated using the appropriate frequency exposure parameters, as the need arises.

6. Remedies and Institutional Controls

This EMP-3 presents proposed actions to protect against exposure to potentially contaminated soil and groundwater in conjunction with construction and improvement on the Site. Potentially complete exposure pathways have been identified between contaminated soil and groundwater and construction worker and future on-site worker and visitor populations at the Site. These potential exposure pathways will be eliminated through preparation and implementation of a site-specific HASP by each contractor/subcontractor, construction observation for health and safety measures, proper management of impacted materials encountered during construction activities, and engineering and land use controls (deed restrictions on use of groundwater in the EC). **Appendix H** provides the STO Site HASP Guidance. Each contractor/subcontractor will submit a HASP following this guidance and addressing COPCs and requirements of the EC and SMP at the time of submittal of their EMP Certification per **Section 9** of this EMP.

During the work under this EMP, there will be an environmental professional familiar with the authorized scope of work on-site during working hours. Typically, there are two - an employee of GEI Consultants, Inc. under contract to STO and an employee of Tetra Tech under contract directly to QL. These inspectors are responsible to be familiar with approved environmental plans and scopes of work (including this EMP) and have the authority to stop work if necessary or otherwise direct concerns to appropriate client or contractor personnel.

The environmental professionals are notified by the contractor each morning (via Smartsheets) of the activities for the next day, including specific information as to whether work is in the EC, whether any movement of soil or water is planned (including location/estimated quantity) etc. Both environmental professionals separately review the submittal to verify compliance with plans, add conditions if needed, and prepare for the next day. These sheets are retained. Armed with that advance information, specific elements which will be observed and documented by the environmental professionals or delegates include:

- Daily beginning of each work element (to verify equipment/work areas), including site prep, first trench excavation, first trench dewatering, HDD and drilling mud processing setup;
- Start and completion daily of any water movement (log source, destination, label the tank, and once moved the amount);
- Start, periodically during work and at completion of any soil movement daily for work area prep, HDD drilling, excavation, backfill (log source, destination, and quantity). If an import, document quarry fill cert or reference to MDE approval;

- As needed to verify continued EMP compliance and document daily water/soil/fill volumes for items which continue more than one day; and
- All environmental samples collected (water sampled for disposal or dust control, soil sampled for disposal or reuse).

In addition, the EMP will be distributed to and signed by representatives of QL, STO, Petillo and their subcontractors, and the GEI and Tetra Tech representatives (see **Section 8.2**).

6.1 Site Security

The SMA portions of the Site are currently secured with fencing to prevent trespassing during non-working hours. Excavations in the SMA resulting from redevelopment work must be secured with perimeter fencing if they are to be left open for more than one workday. The existing fence is proposed to remain in place. Breaches to the fence required by construction activities must be re-secured at the close of each workday.

The points where the West Water Loop LODs cross the EC and SMA boundaries will be clearly marked in the field using segments of temporary/construction fence and temporary signage to ensure that workers/equipment performing construction work not subject to this EMP do not cross into the EMP area prior to approval of this EMP, and so that after approval of this EMP it remains clear to workers when they enter the EMP area.

6.2 Health and Safety Measures

Site-specific HASP guidance has been prepared on behalf of STO and is included in **Appendix H**. The primary action taken to mitigate potential exposures to construction workers will be the avoidance of direct contact with potentially impacted soil and groundwater, and the appropriate use of personal protective equipment (PPE) during construction activities. All contractors/subcontractors will also produce a HASP that provides the administrative and engineering controls and PPE that will be used to confirm workers are protected.

HASPs will be provided by the contractors covering the work of that company's workers involved in construction activities potentially encountering impacted media, for their information. The contractors should independently assess the available information and implement appropriate measures to protect the health and safety of their employees and subcontractors. Information and recommendations contained in STO HASP guidance should not in any way be construed as relieving its subcontractors of their responsibilities for site health and safety. Each contractor/subcontractor will submit its HASP at the time of signing the EMP Certification.

6.2.1 Dust Control

The potential for worker exposure to site contaminants is primarily via direct contact, ingestion, or inhalation of nuisance dust. The primary action taken to mitigate potential exposures to construction workers will be the avoidance of direct contact with potentially impacted soil and the appropriate use of standard construction site personal protective equipment (work gloves, safety glasses, etc.) during construction activities.

Using the maximum detected on-site concentrations of COPCs in soil, the OSHA Permissible Exposure Limits (PELs) for the individual COPCs could only be exceeded if the nuisance dust PEL is exceeded by several to many orders of magnitude. Therefore, airborne dust will be used as a real-time surrogate to prevent potential exposure to contaminant; with nuisance dust controlled to below the worker protection limits, construction workers are protected from COPCs.

Accordingly, the nuisance dust PEL of 15 mg/m^3 can be used as a conservative guideline for air monitoring. The nuisance dust concentration of 15 mg/m^3 can be visually identified without active dust monitoring equipment. If airborne dust is visually observed during activities involving known or potentially contaminated soils, dust suppression measures (e.g., wetting, misting, etc.) will be implemented. If such efforts do not effectively suppress visible dust, then dust monitoring will be initiated to confirm nuisance dust does not exceed the OSHA PEL of 15 mg/m^3. The nuisance dust PEL of 15 mg/m^3 will be used as a stop work action level, and earthwork will cease until dust is no longer visible and dust concentrations are below the 15 mg/m^3 stop work action level.

Visual indications of dust will be observed and recorded, and dust suppression activities will be implemented during earth moving activities at the Site.

In addition to routine visual observation by contractor staff and the on-site environmental professionals, the environmental professional(s) will implement a portable dust monitor screening protocol involving periodic visits to the work area during the workday to document weather, prevailing wind direction (if any), and airborne dust level at the work area, upwind, and downwind. The specific monitoring locations will vary based on the portion of the work being performed that day (this EMP-3 incorporates work areas from the north end of the site to the south end of the site). The same procedure will be implemented in the case of visual observation of dust described above. Action levels will be as described above.

A water truck is routinely present on-site during construction activities and available for use. Hydroseed equipment can also be used to spray water as a backup or where more appropriate to reach a particular area. Potable water is used for dust control. During dry periods, site contractors have reported using approximately 12,000 gallons per day of potable water. This value is more than the average amount of water anticipated to be collected/containerized/tested for construction dewatering based on calculations supporting

the Water Appropriation Permit. Where water collected through site dewatering (after containerization and testing) meets parameters suitable for on-site dust control following the procedures described in **Appendix G**, QL may request MDE approval of use of such water for dust control as an alternate to potable water.

6.2.2 Volatile Organic Vapors

This work elements described within this EMP are located within the EC area as well as within the SMA, which represents the area of the site with the greatest extent of industrial activity and a known source of historic VOC contamination. Although VOC remediation of groundwater was conducted, recent due diligence sampling by a prospective purchaser has also shown presence of VOCs and TPH in groundwater. In areas of the site where VOC impact may be observed (the north portion of the West Loop North from the creek crossing through the SMA up to Quantum Place South), the on-site environmental professionals(s) will take PID readings periodically during the day and focusing on activities such as opening of new trenches and excavation into the water table. Results will be recorded. If organic odors or field organic vapor readings are detected in borings or excavations during the work above screening levels in contractor HASPs, QL will stop work, notify MDE, and will direct an investigation of the presumed impacts. This EMP will be amended to describe the risks present and protections to enact if this situation occurs.

6.3 Additional Proposed Sampling

Additional soil sampling of areas covered by this EMP will be conducted to determine soil re-use or disposal specifics. Below is a list of sampling plans that have been previously submitted which are relevant in conjunction with this EMP.

- North Borrow Area 1A – This sampling plan for an expansion of the North Borrow Area was prepared by Tetra Tech. The additional material will be used as fill in completion of QPS, Clean Energy Lane, and the substation pad if the material meets MDE fill guidelines (after approval by MDE). North Borrow Area 1A work Plan-Rev 2 (March 15, 2024) was approved by MDE March 19, 2024. Samples were collected April 5, 2024 and a report is being prepared for MDE review. A copy of the sampling plan is included in EMP-2 Appendix K and is not reproduced here. Once the borrow area results are reviewed and approved by MDE, specific locations of proposed use will be communicated.

- Substation and Clean Energy Lane – Tetra Tech has prepared this sampling plan for the substation and Clean Energy Lane because soil from the North Borrow was used as a veneer of fill in these areas without prior sampling. The plan was originally submitted to MDE in January 2024. The plan was revised and resubmitted on April 16, 2024 and May 5, 2024 (Rev 2) and was approved by MDE May 16, 2024. A copy of the sampling plan is included in EMP-2 Appendix K and is not reproduced here.

Sampling is to confirm that the material meets MDE fill guidelines. Data will be relevant to EMP-3 as the West Loop North water lines will be installed in part along Clean Energy Lane.

- Sewer Line B – Tetra Tech has prepared this soil sampling plan for samples along the revised Sewer Line B route as the GTA Phase II sampling was conducted along the previous route. The sampling includes specific railroad buffer sampling in the vicinity of the former railroad that crosses the Sewer Line B route at the location called out on Figure 4 of EMP-2. The plan has been reviewed by MDE (March 20, 2024), then revised/resubmitted by Tetra Tech (April 11, 2024). The plan was then revised/resubmitted May 20, 2024 based on MDE review comments dated May 11, 2024. A copy of the May 20 plan is provided in EMP-2 Appendix K7 and was approved as part of EMP-2. A portion of the date collected will be relevant to EMP-3 as the West Loop North water lines will be installed in part along the B-Outfall alignment.

- Two Geotechnical Sampling Workplans relevant to the West Water Loop were prepared by GEI and approved by MDE.

    - The Stream Crossings Geotechnical Workplan last revised 1/3/2024 and approved 1/8/2024 authorized borings GEI-3 through GEI-10. Borings GEI-3 through GEI-6 relate to the West Loop North HDD crossing and logs are provided on sheet 5 (Boring Logs) of the preliminary HDD design in **Appendix D2**. Borings are located in plan and profile view on sheet 4 (Proposed Plan and Profile of Water Lines) of the same drawing set. Those sheets also show boring GEI-23 to the east (part of the next workplan below) and GEI-25 to the west (located outside the EC west of the creek and part of a plan submitted for information only for borings GEI-25 to GEI-38).

    - The K-Line West Water Loop Geotech Workplan, revised 2/13/2024 and 4/4/2024 was approved 2/20/2024, authorizing borings GEI-18 through GEI-23 in the portion of the West Loop within the SMA, between the HDD crossing and the B-Sewer alignment. Boring logs for GEI-04 (the last boring under the Stream Crossings Workplan) and GEI-18 through GEI-23 are provided in **Appendix E**. Environmental samples were also collected during the GEI-18 through GEI-23 drilling event and results are awaited from the laboratory.

Sampling of excess soil generated during construction will at a minimum meet the requirements of a potential disposal facility. If observed soil quality (lack of visible contamination/waste/debris) and/or disposal sample results suggest the material may be considered for reuse, QL may elect to sample the material in accordance with the MDE Fill Material and Soil Management in Maryland fact sheet and related regulation. If sampled

soils meet criteria for Category 1 – Residential Unrestricted Use Soil and Fill Material or Category 2 – Non-Residential Restricted Use Soil and Fill Material, QL may request authorization for reuse of the material as site backfill, capping materials or other use.

6.4 Construction-Related Soil Management

The current scope of work represents an interim use of the property. Soils excavated within the EC area are subject to the requirements spelled out in the recorded EC and MDE-approved SMP. Construction activities associated with the West Loop North are located within the SMA (2300 feet of parallel water line trenches), within the EC outside the SMA (750 feet of parallel water line trenches), and outside the EC to the west of the Creek (that portion is not part of this EMP-3). In addition, the West Loop North HDD crossing starts in the SMA, passes through the EC, and ends outside the EC (so this crossing is managed as SMA). The West Loop South HDD crossing is outside the EC on both ends but the bore path is primarily within the EC so this crossing is managed as inside the EC.

Soil generated during construction will be tracked and managed based on the source as "inside the SMA," or "inside the EC," materials and the results of laboratory testing. For example, soil generated within the SMA will be stockpiled in the SMA, soil generated within the EC but outside the SMA will be stockpiled at an area inside the EC but outside the SMA. Soil which exhibits evidence of contamination/waste such as visible waste material, staining, or odor, and soil in specified locations such as track crossings may be segregated into smaller piles for testing and management. An example Stockpile Tracking Log is provided as **Table 6**.

A full description of soil management information is located in **Section 6.4,** Soil/water management **Figures 8 and 9,** Soil Management **Table 4**, Soil Tracking Log **Table 6**. Soil and generated outside the EC area (including the Segment of West Loop North west of the creek) are not the subject of this EMP (not subject to CHS oversight) and will be subject to management under associated 20-CP construction stormwater permitting at locations outside the EC.

Table 4 and **Figures 8 and 9** present an overview of soil movement and management plans for this EMP (including estimated quantities and locations). The table and figures also reference EMP-2 Figure 11 and EMP-1A Figure 2 as soil staging areas are shared with those scopes of work.

To the extent practicable, soils excavated from utility trenches will be placed back in the trench within the vicinity of the point of excavation[1]. However, due to the volume of soil d

[1] Within the vicinity of the point of excavation generally means within the reach of excavation equipment without trucking, and without crossing identified boundaries such as EC/non-EC, EC/SMA, and other specific

isplaced by the pipe and select backfill (clean stone) or removal of geotechnically unsuitable materials (organic topsoil, rock) excess material must be managed in most areas. The soil and rock from the excavations within the SMA, the EC, and outside the EC will be stockpiled separately. Stockpiles will be labeled with information regarding their source/contents (such as Stockpile B-2-xx, West Loop North trench SMA soil) and recorded on the EMP-3 Soil Tracking Log (**Table 6**).

Figure 8 describes temporary stockpile locations for soils managed during construction of the West Loop North Improvement Plan (with reference to shared staging areas along the B-Outfall in EMP-2 Figure 11); **Figure 9** provides the soil stockpile locations for the West Loop South Improvement Plan (with reference to shared staging areas to the west in EMP-1A Figure 2. Stockpile locations shown on these figures are temporary locations during construction. Ultimately, materials not needed for backfill at the point of generation, and not used for fill in other locations with MDE approval, will be used to construct visual screening berms in areas consistent with future site uses. In order to avoid future building sites and ecologically protected areas (wetlands, flood plain, FRO), permanent locations for excess soils are proposed as follows:

- EC soil – Future lot 111 along the northwest EC boundary
- SMA soil – On top of WDS 4 on future Lot 102 (with a cap as required by the SMP and described below)

Placement of soil in these permanent locations will require redline modification of Frederick County/SCD plans prior to movement of soil to these locations. Soil movements from temporary stockpiles to these locations also require MDE approval. These permanent soil locations are shown on Figure 13 (EC) and Figure 14 (SMA) of EMP-2 and will be managed as part of that EMP-2.

Per the EC/SMP, SMA soil requires capping after permanent placement. This requirement will be applicable to the SMA soil proposed for placement on future Lot 102/WDS 4. Capping of that area is described on EMP-2 Figure 14 and will be managed as part of EMP-2.

Much of the West Loop North installation is within the SMA. Soils from the SMA portion of the excavation will be re-used to backfill the same section of the excavation where generated or will be stockpiled within the SMA. The soils will be used to backfill the trench after installation of the water lines and then capped with clean fill. Excess SMA soils will be stockpiled within the SMA at stockpile locations shown on **Figure 8**. Where West Loop

locations/distances identified in the EMP-2 text (within specified distances of railroad tracks, trench segments passing WDS, etc.).

North crosses the former railroad, within 10 feet of the track center-line, soil will be piled on the side of the specific railroad crossing portion of the trench and used to backfill the trench where it was generated within one day. Data from implementation of the B-Outfall sampling plan includes sampling in this area; QL will share the data with MDE and confirm in advance this specific soil use in the specific area. Excess soil from this track crossing location will be separately stockpiled in the stockpile area on **Figure 8** and sampled prior to re-use or disposal. As discussed in **Section 6.3**, a soil sampling plan for the new Sewer Line B route is provided which includes sampling in the 10-foot buffer of the railroad. This sampling will be conducted and data received, analyzed and shared with MDE prior to reuse of any excess soil from this railroad area.

Most excess soil generated on-site is intended to remain on-site. Materials which are intended to be disposed off-site include asphalt, HDD drilling mud, or any grossly contaminated (visual or odor) soils. For materials slated for disposal, soil sampling will at a minimum meet the requirements of the selected disposal facility. If observed soil quality (lack of visible contamination/waste/debris) and/or disposal sample results suggest the material may be considered for reuse, QL may elect to sample the material in accordance with the MDE Fill Material and Soil Management in Maryland fact sheet and related regulations. If sampled soils meet criteria for Category 1 – Residential Unrestricted Use Soil and Fill Material or Category 2 – Non-Residential Restricted Use Soil and Fill Material, QL may request authorization for use of the material as backfill.

All excess materials intended to remain on-site (if not directly reused as backfill where generated) will also be tested per the Fill Material guidance listed above, with the results submitted to and approved by MDE prior to movement to the final location. Depending on the results, material will be classified as Category 1 or Category 2 fill available for construction use or cap construction, or soils subject to further review based on COPCs detected.

If field observations, field screening, unusual odors, odd coloration, or other factors indicate environmental impacts in significant quantities, the suspect impacted soils will be segregated from non-impacted soils so that additional characterization can be performed. MDE will be notified per the requirements of the SMP. This soil will be placed on and covered with plastic sheeting. Soil samples will be collected from the suspect impacted materials to evaluate whether it should be classified as regulated and requiring off-site disposal. MDE will be notified and this will be recorded in the EMP Completion Report.

Impacted soil/waste (as determined by sampling results) may be disposed at an appropriate disposal facility. The potential disposal facilities will be contacted to establish the necessary sampling and analysis requirements. The likely facilities for disposal of soil include:

Soil Safe, Inc. (Soil Safe)	or	Clean Earth Inc. (Clean Earth)
16001 Mattawoman Drive		1469 Oak Ridge Place

Brandywine, Maryland 20613-3027 Hagerstown, Maryland 21740
(301) 782-3036 (215) 734-1400

6.5 Clean Fill Materials

Materials such as open-graded aggregate to be used within the construction (such as road base, utility bedding, or basin liner ballast will be documented to be clean, either through certification from the supplier (for quarry stone) or by testing and approval by MDE prior to use. Additionally, clean structural fill will be obtained from the North Borrow Area (subject to testing and approval by MDE in accordance with MDE clean fill guidelines). An eastern expansion of the North Borrow Area will be sampled in-situ to determine suitability as fill as described in Section 6.3.

Existing Stockpile 3 has also been authorized by MDE for use as clean fill on-site only. This material may be used in capping water line trenches within the SMA upon notice to MDE of the material to be used.

6.6 Groundwater Management

6.6.1 Source, Quantity and General Description

A groundwater use restriction is recorded in the property deeds by way of the existing EC. As such, the use of public water utilities is planned. It is anticipated that groundwater will be encountered during construction of basin DA-11, the QPS and Sewer Line B stream crossings, and installation of portions of Sewer Line B and the northern portion of the East Water Line. **Figure 7** show the locations where the base elevation of water lines is expected to encounter groundwater. **Table 5** lists the specific segments/construction elements where groundwater is anticipated and lists the associated construction duration and estimated groundwater seepage/removal rate. Alternate means of construction have been evaluated in all areas listed on **Table 5** in order to reduce potential dewatering quantities and to avoid the need for open cut through diverted surface water for stream crossings. As described below, selected methods include HDD at the West Loop North and West Loop South water line crossings, and modified trenching methods using sheet pile, grouted base, and/or ground improvement for remaining open cut trench installation.

Groundwater and any stormwater removed from open construction elements within the EC or SMA will be containerized and tested prior to disposal or reuse as dust control (all subject to results of the testing and MDE approval). A full description of groundwater management information is located in **Section 6.6, Table 5** (Water Management Table)**,** soil/water management **Figures 8 and 9,** and the water management/testing procedures in **Appendix G**. **Tables 7, 8, and 9** present example Tank Tracking Summary, Tank Volume Log, and Tank Testing Log. Groundwater generated outside the EC area (including the western portion of

West Loop North) are not the subject of this EMP (not subject to CHS oversight) and will be subject to management under associated 20-CP construction stormwater permitting at locations outside the EC.

The following sections describe 1) the water management requirements of the EC, 2) quantities and locations of groundwater anticipated, 3) details of construction methods, and 4) disposition of water.

Water Management Requirements of the EC

With regard to water management, page 3 of the EC states:

> *"Excavation Encountering Groundwater: When conducting any excavation activities on the Property extending to the ground water table, the Property Owner shall implement the requirements of a site-specific health and safety plan in accordance with the Site Management Plan to ensure that worker protection measures are met. The encountered ground water shall be containerized during all dewatering activities at the property and shall be analyzed before disposal. The analytical results shall be the basis for appropriate disposition of the ground water in accordance with applicable local, State and federal laws and regulations."*

Since the areas of work covered by this EMP are within or abut/cross into the EC and site construction workers may come in contact with groundwater during the work, contractors are required to assure appropriate health and safety precautions presented in the contractors' HASPs are followed.

All water collected will be containerized and tested prior to disposition which may include off-site disposal or on-site dust control. Water will either be determined through testing to be appropriate for on-site dust control or will be disposed at a commercial off-site facility. The specific water and sediment sampling and management procedures to be followed are described after this introductory section.

Quantities and Locations of Groundwater Anticipated

Water is expected to be managed at the following locations:

- Groundwater encountered within West Loop North trenches in the three separate segments identified on Table 5
    - From the HDD crossing across the SMA to the location of B-outfall manhole MH-94 (SMA)
    - Along the B-alignment from MH-94 to MH-96 (SMA)

  - Along the B-alignment from MH-96 to MH-99 (the tie-in to QPS water lines)

- West Loop North HDD crossing (the groundwater estimate on **Table 5** will be managed in the form of increased drilling mud volume rather than as pumped water).

- West Loop South HDD crossing (the groundwater estimate on **Table 5** will be managed in the form of increased drilling mud volume rather than as pumped water).

Figure 7 show the locations where the base elevation of water lines is expected to encounter groundwater. **Table 5** lists the specific segments/construction elements where groundwater is anticipated and lists the associated construction duration and estimated groundwater seepage/removal rate.

The **Table 5** estimates are taken from Table 1 of the December 27, 2023 revised application for the MDE Water Appropriation and Use Authorization. Numbers in column 1 of **Table 5** refer to line items in WAP Table 1. Some of the values presented are estimates subject to completion of detail engineering of alternate means of construction and seepage calculations. Detailed seepage modeling has been completed for the trench portion of the B-Outfall using alternate trench methods and is provided in EMP-2 Appendix F2. This estimated served as a portion of the basis for West Water Loop dewatering estimates in the same alignment and extrapolated to nearby areas.

Disposition of Water

The water extracted during construction activities covered by this EMP will be containerized and tested for COPCs to assure proper handling and disposal. Frac tanks will be staged outside the floodplain in areas designated on the figures. For trenches (where the dewatering location frequently moves), water may be collected in a water truck and transported to a centrally located frac tank storage area. Proposed tank locations/areas are shown on **Figure 8** (West Loop North) and **Figure 9** (West Loop South) and as referenced on EMP-2 Figure 11 and EMP-1A Figure 2 for areas shared with other EMPs. Frac tanks to collect water from the construction of West Loop North (part in the EC, part in the SMA) will follow the plan set for Sewer Line B in EMP-2 and will be located in locations inside the SMA (Area B-2) and inside the EC (Area B-1), as shown on EMP-2 Figure 11.

Water from the SMA and from the EC will be collected in separate tanks. All tanks will be labelled as to their contents (e.g. EC water from West Water Loop North trench), frac tank unique number, position as described in the **Appendix G** Process Flow Diagram (e.g. “Frac Tank #1 Separator Tank” or “Frac Tank 3 Secondary Tank”) and status (e.g. Empty, Filling, Full Awaiting Approval, Approved for Dust Control, Approved for Disposal, Empty/Hold for Reuse Approval). Any tank containing any EC or SMA water will be so labelled. The status of each tank will be recorded on an EMP-3 Tank Status Log following the example in **Table 7**.

When the first tank is close to full, the water will be sampled for the full list of COPCs identified in **Section 5 Table 2** plus any additional requirements of the disposal facility in the case that water is expected to be disposed off-site (such as based on historic data). Containerized water will be disposed at an appropriate disposal facility or used on-site for dust control as determined by sampling results. The potential disposal facilities will be contacted to establish the necessary sampling and analysis requirements.

When results are received from the laboratory, they will be provided to the disposal facility (if slated for disposal) for waste acceptance approval and will be sent to MDE for information. Where water data is suitable for on-site dust control (meeting MDE surface water discharge criteria), MDE will be notified and results will be sent to MDE for approval. The tank status (sampled and awaiting approval) will be recorded on the Tank Status Log (**Table 7**) and the water will not be used for any purpose until the disposition (dust control or disposal) is determined and updated on the log.

As described above, typical water consumption for dust control during dry periods has been reported to consume up to 12,000 gallons per day, which may be adequate to manage the majority of groundwater extracted under the Water Appropriation Permit.

For any water not suitable for on-site reuse, potential disposal facilities will be contacted to establish the necessary sampling and analysis requirements. Water recently collected from manhole MH-4 (groundwater seepage into a partially constructed sewer line) was tested and shipped to Valicor Environmental Services under contract to Capitol Environmental Services, Inc. Some water from Pump Station construction (outside the EC) has been shipped to VLS Recovery Services, Baltimore MD. Water with a heavier sediment load has been transported to VLS in Lancaster PA. It is anticipated that any water not approved for on-site dust control will go to the same facilities if acceptable based on sample results:

Valicor Environmental Services
17551 Power House Road
Williamsport, MD 21795
(410) 463-7662

Capitol Environmental Services, Inc.
PO Box 37143
Baltimore, MD 21297-3143
Attn: Ben Sisti
(732) 672-9476

VLS Recovery Services
3300 Childs St, Baltimore, MD 21226
(833) 342-5372

6.6.2 Specific Testing/Management Procedures

All water generated during the work (collected stormwater, groundwater, seepage water, , and grout/cement contact water) is intended to be pumped via temporary surface lines (or trucked as needed) to a commercial rental solids separator tank (Separator Tank #1). From there, water will be pumped to the first of several 20,000-gallon frac tanks staged adjacent to the separator (Frac Tanks 2, 3,4, etc.). The tank in the separator "Tank #1" position is intended to accumulate sediment. Water from "Tank #1" will then be decanted to subsequent frac tanks #2 (or 3, 4, etc) to be held for testing and MDE approval prior to use for dust control or off-site disposal. A detailed water Process Flow Diagram and associated notes regarding water and sediment management, neutralization (if needed) testing and decision-making is provided in **Appendix G**.

Used drilling mud displaced through pipe installation and grouting of HDD bores, as well as heavy mud carrying through the HDD mud/cuttings separator will be directly disposed off-site or solidified in rolloff boxes as generated. These materials do not follow the **Appendix G** water process and will be subject to the Appendix G sediment management procedures.

The **Appendix G** procedure is briefly described below.

1. As water is placed in the first frac tank (identified by its unique ID number and its position as "Separator Tank #1"), it will be labelled as to contents (e.g. EC water from QPS), position as described in the **Appendix G** Process Flow Diagram (e.g. Separator Tank #1") and status (e.g. Accumulation) and tank logs with the frac tank number and water addition records (as well as volume measurements, sediment measurements and field water quality measurements of pH) will be initiated. Example water tracking logs are provided in **Table 7** (Tank Status Log)**, Table 8** (Tank Volume Log), and **Table 9** (Tank Testing Log).

2. After settling of any sediment (on a flow-through basis in the separator tank or taking advantage of periods of low/no water generation including overnight), water will be decanted to a subsequent frac tank #2 (or 3, 4, etc.), which will be labelled as to contents (e.g. SMA water from West Water Loop North trench), position as described in the **Appendix G** Process Flow Diagram (e.g. "Frac Tank 3 Secondary Tank") and status (e.g. Empty, Filling, Full Awaiting Approval, Approved for Dust Control, Approved for Disposal, Empty/Hold for Reuse Approval.

3. When each of these tanks #2, 3, 4 is full, it will be tagged as full and subsequent water will go to the next tank. The full tank will be sampled by the environmental team and submitted for laboratory analysis for a "worst-case" parameter list based on site COCs listed in **Table 1** and **Table 2** plus additional parameters which have been

identified as by LRP. These parameters include: pH, fluoride, free cyanide, priority pollutant (PP) metals (dissolved), VOCs, PAHs, PCBs, and TPH (DRO/GRO).

4. Sample results will be tabulated and be compared to drinking water standards and provided to MDE for review with a recommendation as to whether the water is suitable for use for on-site dust control.

5. If approved for use, no additional water will be added to the same (tested) frac tank until the tested water has been used (or in the alternative disposed off-site).

6. The second tank filled will follow the same process and parameter list.

7. Prior to sampling the third tank, QL will propose a shorter parameter list based on the first two results and COCs associated with the specific vicinity of the work. At a minimum, pH and fluoride will be retained in any proposed shortened list.

In addition to potential groundwater COCs, it is known from current construction at MH-2/pump station that contact with grout/cement has the potential to generate either water or solids with an elevated pH. It is also important that the sample is representative of the tank contents in order to avoid collecting a low-solids sample from a settled tank and then having sediment stirred up during water removal (such as for dust control use). Therefore, with appropriate tracking entries on frac tank logs, the contractor may elect to decant water from a tank with significant solids accumulation into a clean tank prior to testing and holding for approval.

Sediment will be generated in the separator tank, and it is possible that finer material may also carry over into frac tanks. The amount of sediment generated will vary throughout the construction. It is up to the contractor to determine when to remove sediment to maintain tank capacity or when to rent an additional tank (so water can be tested in a relatively sediment-free state per the requirements of **Appendix G**).

The selected management method for sediment removal is to vacuum/pump sediment-laden water from the base of the tank for off-site shipment to a facility that accepts high-solids aqueous streams such as VLS Lancaster, PA. Solidification in a rolloff as generated is an acceptable alternate. Removal of sediment from a frac tank (or drilling mud processor) will be logged in the same way as addition or removal of water. Any water or (aqueous) sediment loads shipped off-site will be tested for pH prior to leaving the Site. Any water or sediment that has an elevated pH can be placed back into the tank and neutralized (under MDE hazardous waste rules elementary neutralization treatment exemption) using citric acid. If neutralization is done, it is important to circulate the water or sediment for thorough mixing and re-test pH to confirm reagent is not consumed by alkalinity of contained sediment. The neutralization procedure is described in **Appendix G**.

Appendix G also describes sediment testing and management (also applicable to waste drilling mud).

6.7 Capping

The SMP dictates capping requirements for development activities conducted within the SMA. Utility corridors located within the SMA will be capped with 2 feet of MDE-approved clean fill and marker fabric. Landscape and hardscape caps are not proposed in association with the utility corridors. Within the scope of this EMP-2, this statement relates to the West Water Loop (North) within the limits of the SMA. Additionally, excess excavated SMA soils will be stockpiled and capped as depicted in **Table 4** and EMP-2 Figure 14.

As described above, temporary stockpiles associated with segments of work are shown on the soil movement plans in **Figures 8 and 9.** Permanent placement of excess soils is described in **Section 6.4** and EMP-2 Figure 13 (EC) and EMP-2 Figure 14 (SMA). Per the EC/SMP, SMA soil requires capping after permanent placement. This requirement will be applicable to the SMA soil proposed for placement on future Lot 102. Permanent soil placement and capping per EMP-2 Figure 14 will be managed under that EMP.

6.8 Land Use Controls

Land use controls currently exist in the form of an EC that includes the majority of the West Loop North and West Loop South limits of disturbance, excluding the western portion of the West loop North outside the EC. Closure documentation issued by the MDE LMA for the successful completion of EMP activities will also list land use controls. The existing land use controls for the area within the EC include but are not limited to the soil excavation controls and restrictions, as well as restrictions on the use of groundwater beneath the property. These land use controls are recorded in the local land records.

7. Contingencies

If site conditions observed during construction and/or remediation differ substantially from those described herein, modifications to this EMP may be necessary. Such differing conditions may warrant an adjustment of sampling procedures, analytical methods, remedial activities, etc. and such modifications will be addressed in an addendum or revision to this EMP. MDE will be notified of any newly discovered contamination, proposed changes to this EMP, or citations from other regulatory agencies.

Specifically, if newly discovered contamination is identified during site development, the following contingency measures will be taken:

- Notify MDE within 24 hours (verbally and written/email);
- Postpone implementation of the EMP;
- Evaluate new site conditions identified; and
- Amend EMP to address new site conditions identified.

Any amendments to the EMP must be approved by MDE prior to implementation. Notified departments will include:

MDE Land Restoration Program
Land and Materials Administration
1800 Washington Boulevard
Baltimore, Maryland 21230
(410) 537-3466
Attention: Anuradha Mohanty

In addition to the above, if there is evidence of an oil discharge at the Site in violations of applicable regulations, it must be reported within two hours as specified in COMAR 26.10.08.01, to the OCP (410-537-3442) or, if after normal business hours, to the 24-hour Spill Reporting Hotline (1-866-633-4646). The MDE will be verbally notified within 48 hours (72 hours in writing /email) of changes (planned or emergency) to the EMP implementation schedule, previously undiscovered contamination, and citations from regulatory entities related to health and safety practices. Notifications shall be made to the MDE project manager at 410-537-3466.

Any violations of State or Local permit requirements during implementation of the EMP in the EMP area must be reported to the CHS project manager by email within 24 hours of receipt of the violation notification.

Because the HDD pipe crossing bore path geometry (shown in HDD designs in **Appendices C2 and D2**) is significantly deeper than the streambed, the HDD crossings themselves do not comprise a temporary stream disturbance as defined. In addition, HDD drilling mud downhole pressures and other operating parameters will be carefully maintained to balance groundwater pressure without causing loss of drilling mud return or inadvertent fluid return (IFR). However, the drilling contractor will prepare a project-specific streambed protection plan and IFR plan prior to initiating work to prevent inadvertent return grout or drilling fluid to the land surface or any waterway. An example streambed protection plan incorporating temporary in-stream pipes and ballast is provided in **Appendix J**. The contractor will also prepare a contingency plan for inadvertent fluid loss similar to the example also provided in **Appendix J**.

8. Administrative

8.1 Schedule

The preliminary schedule to implement the EMP is presented below. Note that this preliminary schedule is subject to change based on unforeseen conditions that are beyond the development team's control. Deviations from this proposed schedule will be communicated to MDE.

Table 3: Estimated Construction Schedule Relevant to EMP-3

Milestone	Estimated Schedule
EMP Review/Approval	5/28/2024 to 6/25/2024
Submission of Weekly EMP Progress Reports	Weekly following initiation of work (due Tuesday of the following week)
Construction Activities	
West Loop North HDD Crossing	2 months (estimated start September 2024)
West Loop North Trench Installation	1 month
West Loop South HDD Crossing	3 months (estimated start August 2024)
EMP Completion Report Submittal	November 2024
MDE review completed	December 2024

Per the EC, any activity within the EC/SMP requires 30 day prior notification. This allows MDE to review the work elements and ask questions as needed prior to the beginning of field work. MDE is provided notice of these activities via submittal of the draft EMP-3 in May 2024, as well as prior submittals. The MDE project manager will be additionally notified in writing within five calendar days prior to the beginning of EMP field implementation activities via the EMP Progress Report process. Schedule updates will be provided when needed, during preparation of the progress reports discussed in **Section 8.2**.

Based on the information provided herein, no EMP Addenda will be required. If site conditions or other factors lead to a change in the scope of work or procedures, MDE will be notified and an EMP modification will be provided to MDE. Some soil movements and groundwater management decisions will be based on data collected during the work, in consultation with MDE.

8.2 Documentation

After approval of the EMP and prior to the start of work under this EMP, QL and all site contractors working under this EMP (including the on-site environmental professionals) will review the EMP and sign the certification (**Section 9** of this EMP) stating that they have received and read the EMP. No work within the scope of this EMP will be conducted until the EMP is approved and referenced permits are obtained.

During implementation of this EMP, QL will prepare weekly progress reports summarizing the remedial activities occurring during that week. These weekly progress reports will be submitted to the Client and to MDE by the Tuesday of the following week, to demonstrate implementation of this EMP. At the conclusion of EMP implementation, QL will prepare an EMP Completion Report.

8.3 Maintenance

Soil capping of excess SMA soils excavated within the SMA will require periodic maintenance activities. **Table 4** includes information regarding planned location/s of excess SMA soil with caps. The maintenance plan that will be implemented by future owners or occupants of the site is presented below.

Physical maintenance requirements will include maintenance of the capped areas to prevent degradation of the cap and unacceptable exposure to the underlying soil. Yearly inspections of the cap will be conducted. The property owner will be responsible to direct an Environmental Consultant to perform an annual inspection of the onsite cap, performing maintenance to the cap, and maintaining all cap inspection records. Maintenance records will include, at a minimum, the date of the inspection, name of the inspector, any noted issues, and subsequent resolution of the issues. A Cap Inspection Form is attached in **Appendix I**.

If construction or excavation is planned that will breach the cap within the SMA, the Site owner shall submit written notification to the MDE LRP at least 30 calendar days prior to any planned future excavation or intrusive activities on the Site. Such activities include any activity that breaches cap, including, but not limited to, borings for the purposes of geotechnical, soil, or groundwater sampling; landscaping activities; and utility installation or maintenance activities. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation(s), health and safety protocols (as required), MDE certified clean fill source and documentation (as required), and proposed characterization and disposal requirements (as required).

In the event of an unplanned emergency excavation on the Site, the Site owner shall follow all procedures set forth in this EMP and verbally or electronically notify the MDE within 24

hours following initiation of the emergency excavation activities. Within 10 calendar days following completion of an unplanned emergency excavation, the Site owner shall submit a detailed written report to the MDE.

9. West Water Loop North and South, EMP-3 Certification

By signing below, I certify that I have read and understand the terms and conditions of the EMP for the above designated project and agree to follow the practices described in the EMP.

Name	Company	Signature

Tables

Table 4. Soil Management

Construction Elements	Within EC?	Within SMA?	Other Soil Conditions	Soil Movement Plan [1]	Approximate Volume - Spoils (yd^3)	Planned Fill Material Source	Approximate Volume - Fill (yd^3)	Permanent End Location for Excess Soil
West Loop North HDD (600 feet)	Partially	Partially	HDD bore through rock (2 bores, 24" diameter, 600 feet long)	Cuttings/mud managed as SMA material. Solidify in rolloff as generated and stockpile within SMA (EMP-2 Figure 11)	140 CY cuttings, 50 CY drilling mud	NA	NA	SMA Soil location: On top of WDS-4 on future Lot 102 (EMP-2 Figure 14)
West Loop North Trench - Crossing to B-Alignment (1565 feet)	Yes	Yes	Two parallel trenches	Stockpile in B-Sewer Stockpile Area B-2 (EMP-2 Figure 11)	0.5 CY/foot x 1565 feet = 780 CY	Fill with excavated material. Cap with Stockpile 3 material	Fill with excavated material. 1159 CY for cap (1565 feet x 10 feet x 2 feet)	SMA Soil location: On top of WDS-4 on future Lot 102 (EMP-2 Figure 14)
West Loop North Trench - Along B-Alignment in SMA (735 feet)	Yes	Yes	Two parallel trenches. Within backfill of B-Sewer	Stockpile in B-Sewer Stockpile Area B-2 (EMP-2 Figure 11)	0.5 CY/foot x 735 feet = 368 CY	Fill with excavated material. Cap with Stockpile 3 material	Fill with excavated material. 544 CY for cap (735 feet x 10 feet x 2 feet)	SMA Soil location: On top of WDS-4 on future Lot 102 (EMP-2 Figure 14)
West Loop North Trench - Along B-Alignment in EC (750 feet)	Yes	No	Two parallel trenches. Within backfill of B-Sewer	Stockpile in B-Sewer Stockpile Area B-1 (EMP-2 Figure 11)	0.5 CY/foot x 750 feet = 350 CY	Fill with excavated material.	Fill with excavated material.	Within EC Soil location: Future Lot 111 along the northwest EC boundary (EMP-2 Figure 13)
West Loop North Trench - Outside EC west of creek	No	No	Soil associated with the portion of the line outside the EC is not manageged under this EMP-3 and will remain outside the EC	Stockpile in B-Sewer Stockpile Area B-1 (EMP-2 Figure 11)	0.5 CY/foot x 750 feet = 350 CY	Fill with excavated material.	Fill with excavated material.	Within EC Soil location: Future Lot 111 along the northwest EC boundary (EMP-2 Figure 13)
West Loop South HDD (1,000 feet)	Yes	No	HDD bore through rock (2 bores, 24" diameter, 1,000 feet long)	Cuttings/mud managed as EC material. Solidify in rolloff as generated and stockpile in EMP-1A Stockpile Area (Shared LOD with EMP-3)	235 CY cuttings, 85 CY drilling mud	NA	NA	EC Soil location: Future Lot 111 along the northwest EC boundary (EMP-2 Figure 13)

Notes:

[1] Refer to EMP-3 Figures 8 and 9 and EMP-2 Figures 11, 13, 14 and EMP-1A Figure 2.

Acronyms:

EC = Environmental Covenant
SMA = Soil Management Area
yd = yards
MH = Manhole
ND = Not determined
TBD = To be determined
PCW = Potable Cooling Water line

Quantum Maryland
EMP-3

Table 5. Water Management

Item # [1]	Construction Elements	Within EC?	Within SMA?	Expect to encounter GW?	GW or SW de-watering anticipated?	Estimated GW dewatering flowrate (GPD)	Estimated GW dewatering duration (days)	Estimated GW volume (gallons)	Containerize and test[2]	Proposed disposal facility[3,4]
West Loop North Improvement Plan										
1.5C	Water Lines - MH 96 to MH 99 [5]	Yes	No	Yes	GW	15,000	2	30,000	Yes	TBD
1.5C	Water Lines - MH 94 to MH 96 [5]	Yes	Yes	Yes	GW	15,000	2	30,000	Yes	TBD
3.2B	Water Lines - From crossing to MH-94	Yes	Yes	Yes?	Yes?	15,000	5	75,000	Yes	TBD
3.2A	West Loop North HDD Crossing	Partial	Partial	Yes	GW	2,000	30	60,000	Yes	TBD
West Loop South Improvement Plan										
2.2B	West Loop South HDD Crossing [6]	Yes	No	Yes	GW	30	40	1,200	Yes	TBD

Notes:

[1] Item number from Table 1 of the Water Appropriation Permit

[2] Testing will be conducted in accordance with MDE and proposed disposal facility requirements.

[3] Water will be used for on-site dust control if it meets testing requirements per Appendix G.

[4] Water will be disposed at the appropriate disposal facility if discharge requirements are not met. Test results will be used to determine suitable disposal facility based on facility requirements.

[5] Duration of dewatering and volume is based on the portion of Item 1.5C from Table 1 of the WAP that is relevant to this EMP.

[6] Duration of Item 2.2B adjusted from 10 days on WAP Table 1 due to current estimated schedule.

[7] Construction elements in this table are based on the line items in Table 1 of the WAP.

Acronyms:

GPD = Gallons per day
GW = Groundwater
SW = Surface water
EC = Environmental Covenant
SMA = Soil Management Area
QPS = Quantum Place South
MH = Manhole
TBD = To be determined
WAP = Water Appropriation Permit

Table 6

EMP-3 Stockpile Tracking

Stockpile Number: B1-A
Location: Lot 112C
Contents: Spoils from EC portion of West Loop North Trench

Date & Time	Volume added (CY)	Source	Sample Number(s)	Approval	Volume Reused (CY) or Disposed (tons)	Comments
1/1/2024 16:00	600	West Loop North trench				
1/2/2024 16:45	400	West Loop North trench				
2/5/2024 8:00			S-B1-A-Comp-20240205			
2/10/2024 15:00				Approved for reuse SMA trench cap		
2/15/2024 0:00					200 CY	SMA trench cap
2/16/2024 0:00					300 CY	SMA trench cap

Notes: Each soil movement will be recorded at completion or minimum daily.
Maintan copy with associated docuentation including stockpile location map, sample data, disposal tickets

Table 7

EMP-3 Tank Status Log

Location: Lot 112D SMA (B-Outfall)

Tank ID	Tank Type	Date On-Site	Tank Position (per Flow Diagram)	Contents	Sample Number(s) (includes date)	Approval (include date)	Status	Comments
XXXX456	20K Separator Tank	1/5/2024	Tank #1 - Feeder Tank	West Loop North SMA water/sediment			In Service	
XXXX789	20K Frac Tank	1/5/2024	Tank #2 - Secondary	West Loop North SMA water	W-XXXX789-20240205	Approved Dust Control 20240210	Approved Dust Control	
XXXX135	20K Frac Tank	1/10/2024	Tank #3 - Secondary	West Loop North SMA water	W-XXXX135-20240205		Hold for Analysis	
XXXX246	20K Frac Tank	1/15/2024	Tank #4 - Secondary	West Loop North SMA water			Filling	
XXXX357	20K Frac Tank	1/20/2024	Tank #5 - Secondary	Empty/Clean			Empty/Clean	

Notes: Status may include Empty/Clean, In Service, Filling, Full Awaiting Approval, Approved for Dust Control, Approved for Disposal, Empty/Hold for Reuse Approval
Refer to Table 8 Tank Volume Log and Table 9 Tank Testing Log

Table 8

EMP-3 Tank Volume Log

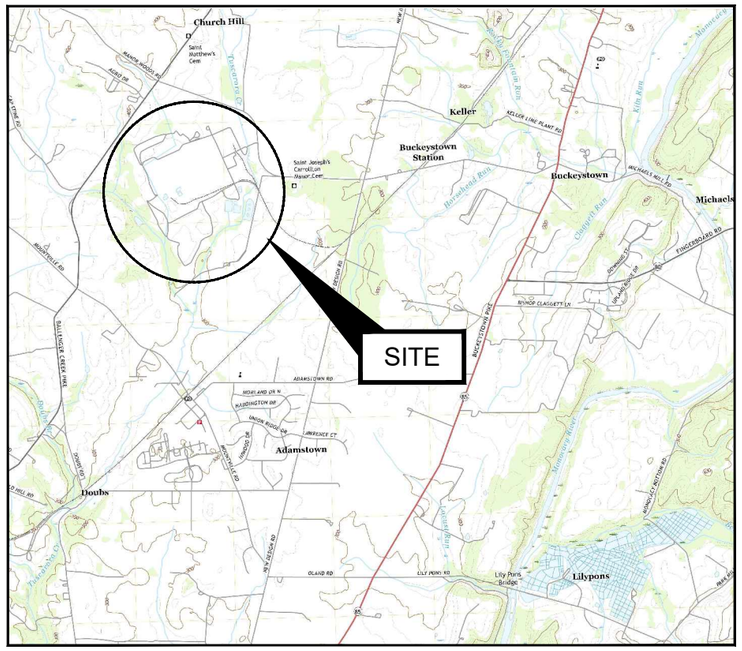
Frac Tank Volume Tracking																		
	Related EMP	EMP-3																
	Related SWPPP	TBD																
	vessel type	Separator tanks					Secondary tanks											
	Vessel name	Separator Tank 1			Water Influent		Frac Tank 2		Frac Tank 3		Frac Tank 4		Water Destination					
	Tank ID	TBD					TBD		TBD		TBD		Total Volume since last reading used as dust control	Total Volume since last reading disposed off-site	Incremental Volume for 20CP permit	***Discharge Total for 20CP permit***		
	Tank Location	SMA Lot 112D					SMA Lot 112D		SMA Lot 112D		SMA Lot 112D							
	Water Source Area	SMA West Loop North		Sediment Volume (Gal)	Incremental Vol Generated for WAP permit	***WAP permit running total***	SMA West Loop North		SMA West Loop North		SMA West Loop North							
	Water Source Location	TBD	Notes				TBD	Notes	TBD	Notes	TBD	Notes						
Date and Time	**Event Description**																	
1/27/24 7:00	Total Volume measurement	5000	GW	0	5,000	5,000	0				0		0	0	0	-		
1/27/24 13:00	Total Volume measurement	9000	GW+STW	500	4,000	9,000	0				0		0	0	0	-		
1/27/24 16:00	Total Volume measurement	16000	STW	600	7,000	16,000	0				0		0	0	0	-		
1/28/24 7:00	Total Volume measurement	18000	STW	1000	2,000	18,000	0				0		0	0	0	-		
1/28/24 13:00	Total Volume measurement	4000	xfer 14000 to #2	1000	-	18,000	14000	xfer 14000 from #1A			0		0	0	0	-		
1/28/24 16:00	Total Volume measurement	5000	GW	1100	1,000	19,000	14000				0		0	0	0	-		
1/29/24 16:00	Total Volume measurement	7000	GW	1500	2,000	21,000	14000				0		0	0	0	-		
1/29/24 16:00	Total Volume measurement	10000	GW+STW	2000	3,000	24,000	14000				0		0	0	0	-		
1/30/24 14:00	Total Volume measurement	3000	xfer 7000 to #2	2000		24,000	21000	xfer 7000 from #1A			0		0	0	0	-		
1/30/24 16:00	Total Volume measurement						15000	5000 gal disposed per Ticket ID #			0		0	5000	5000	5,000		

Table 9

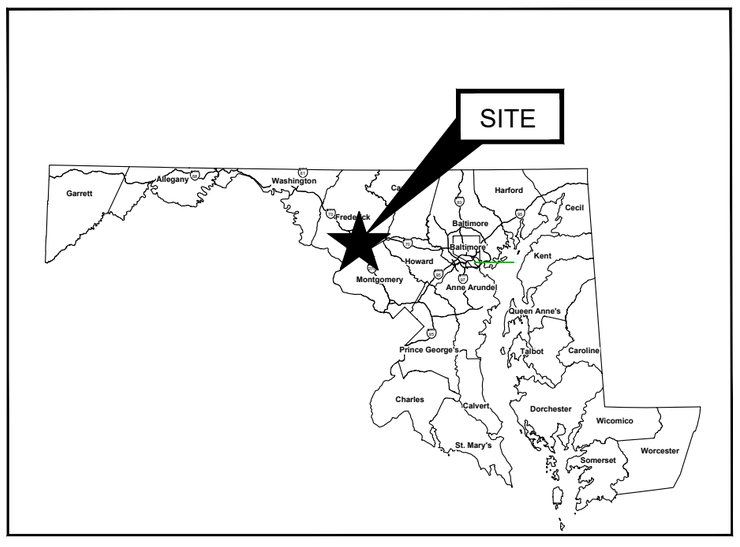
EMP-3 Tank Testing Log

Process, Field Testing, Lab Testing Tracking Table					
	Related EMP	EMP-3			
	Related SWPPP	TBD			
	vessel type	Separator tank	Secondary tank		
	Vessel name	Separator Tank 1	Frac Tank 2	Frac Tank 3	Frac Tank 4
	Tank ID	TBD	TBD	TBD	TBD
	Tank Location	SMA Lot 112D	SMA Lot 112D	SMA Lot 112D	SMA Lot 112D
	Water Source Area	SMA West Loop North	SMA West Loop North	SMA West Loop North	SMA West Loop North
	Water Source Location	TBD	TBD	TBD	TBD
Date and Time	**Event Description**				
1/27/24 7:00	pH measurement	7.2	Empty		
1/27/24 13:00	pH measurement	7.5	7.5		
1/27/24 16:00	pH measurement	8.0	8.1		
1/28/24 7:00	pH measurement	10.0	9.5		
1/28/24 13:00	pH measurement	9.8	8.5		
1/28/24 16:00	pH measurement	11.3			
1/28/24 16:00	Alk measurement	250.0			
1/29/24 16:00	Date and amount for N-1 (lbs)	20.0	--	Empty	
1/29/24 16:00	pH measurement	7.5	--	7.5	
1/30/24 16:00	W-1 Lab samples submitted	--	W-XXXX456-20240205		
2/4/24 13:00	pH measurement	8.2		8.2	
2/3/24 16:00	***Date and use MDE approved W-1***	--	***Dust Control***	--	
2/10/24 16:00	pH measurement	7.2	8.3	8.4	
2/11/24 16:00	pH measurement	8.5	8.5	8.7	
2/4/24 16:00	sediment depth (inches)	5	Empty	--	
2/4/24 16:00	S-2 Lab samples submitted	2/4/2024	--	--	
2/9/24 16:00	**Date and use MDE approved for S-2**	**disposal**	--	--	
2/10/24 16:00	pH measurement	7.2		7.8	
2/11/24 16:00	pH measurement	8.5		8.2	

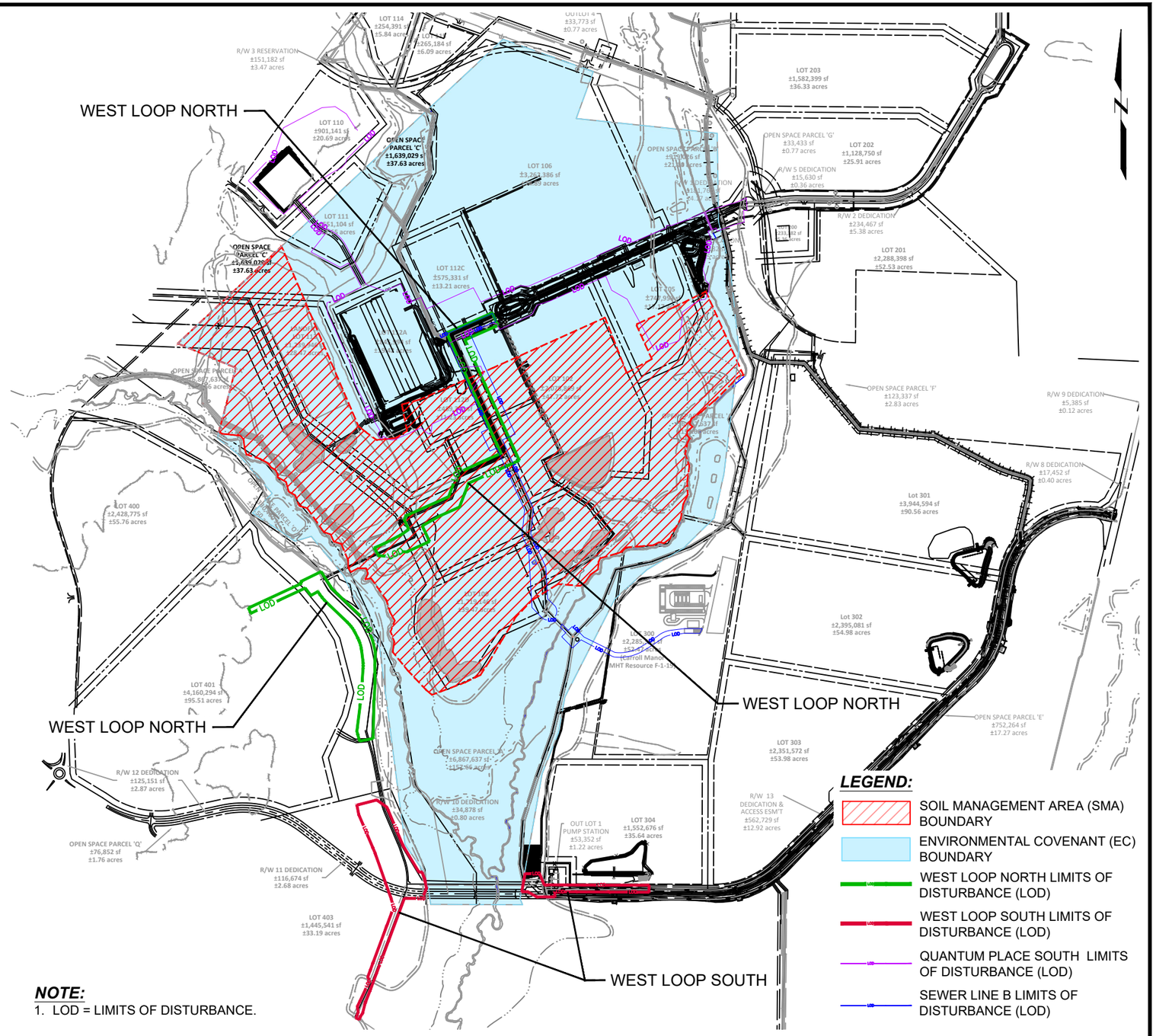
Figures



SOURCE:
MAP TAKEN FROM USGS.GOV.



STATE or COUNTY MAP
(NOT TO SCALE)



LEGEND:
- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- WEST LOOP NORTH LIMITS OF DISTURBANCE (LOD)
- WEST LOOP SOUTH LIMITS OF DISTURBANCE (LOD)
- QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE (LOD)
- SEWER LINE B LIMITS OF DISTURBANCE (LOD)

NOTE:
1. LOD = LIMITS OF DISTURBANCE.

0 1000 2000
SCALE, FEET

Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

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ENVIRONMENTAL MANAGEMENT PLAN WEST LOOP WATER NORTH AND SOUTH

Project 2302756 | May 2024 | Fig. 1

MAGENTA HIGHLIGHTED AREA 12"W AND 24"PCW INSTALLED THROUGH EC VIA TRENCH

EC STAGING AREA, STOCKPILE AREA, WATER MANAGEMENT AREA SHARED WITH B SEWER (EMP-2)

SMA STAGING AREA, STOCKPILE AREA, WATER MANAGEMENT AREA SHARED WITH B SEWER (EMP-2)

B SEWER LINE - SUBJECT OF EMP-2

RED HIGHLIGHTED AREA 12"W AND 24"PCW INSTALLED THROUGH SMA VIA TRENCH (REQUIRES CAP)

EMP-3 BOUNDARY (PORTION OF WATER LINE TRENCH EXCAVATION WITHIN EC OR SMA. PRIMARY DRILLING, CUTTINGS AND MUD MANAGEMENT THIS SIDE OF HDD)

BLUE HIGHLIGHTED AREA FOR PIPE STAGING/ASSEMBLY ONLY

MUD PROCESSING UNIT AND CUTTINGS ROLLOFFS

HDD RIG LOCATION(S)

HDD ENTRY POINTS AND ENTRY PITS

HDD EXIT POINTS AND EXIT PITS

EMP-3 BOUNDARY (EXIT PIT, DRILL ROD HANDLING, AND INCIDENTAL MUD HANDLING - DRILLING AND PRIMARY CUTTINGS/MUD MANAGEMENT AT OTHER END)

GREEN HIGHLIGHTED AREA WATER LINE TRENCH IS OUTSIDE EC

ACCESS FROM WEST LOOP SOUTH LOD VIA HLR TO 400 LOD

CLEAN ENERGY LANE
NORTH LANDFILL
STOCKPILE 2
BASIN DA-11
SUBSTATION PAD
WEST LOOP NORTH LOD
RAILROAD CROSSING AREA
SEWER LINE B (OR OUTFALL B)
WDS-4
WDS-6N
SOUTH LANDFILL EASEMENT BOUNDARY
WDS-5
SOUTH LANDFILL COVER BOUNDARY
WDS-7
WDS-6S
SEWER LINE B STREAM CROSSING
EC
SMA

LEGEND:

- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- WEST LOOP NORTH LIMITS OF DISTURBANCE
- QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE (LOD)
- SEWER LINE B LIMITS OF DISTURBANCE (LOD)
- FORMER RAILROAD
- WETLAND BOUNDARY
- 100 YEAR FLOOD BOUNDARY
- TUSCARORA CREEK
- MH MANHOLE

NOTE:

1. LOD = LIMITS OF DISTURBANCE.
2. WDS = WASTE DISPOSAL SITE.

0 400 800
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Austin, TX

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WEST LOOP LOD
NORTH FEATURES

Project 2302756 | May 2024 | Fig. 2

MORTON, TIMOTHY B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Figures\Environmental Management Plans - EMP\EMP-3_West Loop Water\Fig 2_EMP-3 - West Water Loop North Features.dwg - 5/28/2024

STAGING AREA, STOCKPILE AREA, WATER MANAGEMENT AREA SHARED WITH MOUTVILLE ROAD WATER (OUTSIDE EC), HLR TO 400 WATER/SEWER (OUTSIDE EC), K-LINE SEWER (EMP-1A)

K-LINE SEWER - SUBJECT OF EMP-1A

HDD ENTRY POINTS AND ENTRY PITS

BLUE HIGHLIGHTED AREA FOR PIPE STAGING/ASSEMBLY ONLY

END OF WEST LOOP SOUTH 16" PCW

END OF WEST LOOP SOUTH 12" W

WEST LOOP SOUTH LOD

ACCESS SHARED WITH MOUTVILLE ROAD WATER (OUTSIDE EC), HLR TO 400 WATER/SEWER (OUTSIDE EC), K-LINE SEWER (EMP-1A)

WEST LOOP SOUTH LOD

HDD EXIT POINTS AND EXIT PITS

MANHOLE MH-3 - SUBJECT OF EMP-1

HDD RIG LOCATION(S)

MUD PROCESSING UNIT AND CUTTINGS ROLLOFFS

YELLOW HIGHLIGHTED AREA 12"W AND 24"PCW INSTALLED THROUGH EC VIA HDD

EMP-3 BOUNDARY (ALL PIPE INSTALLATION IN EC IS VIA HDD) - EMP BOUNDARY INCLUDES ENTRY AND EXIT PITS. DRILLING AND PRIMARY CUTTINGS/MUD MANAGEMENT AT WEST END. EXIT PIT, DRILL ROD HANDLING, AND INCIDENTAL MUD HANDLING AT EAST END.

LEGEND:

- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- WEST LOOP SOUTH LIMITS OF DISTURBANCE (LOD)
- FORMER RAILROAD
- WETLAND BOUNDARY
- 100 YEAR FLOOD BOUNDARY
- TUSCARORA CREEK
- MH — MANHOLE

NOTE:

1. LOD = LIMITS OF DISTURBANCE.
2. WDS = WASTE DISPOSAL SITE.

0 300 600

SCALE, FEET

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Austin, TX

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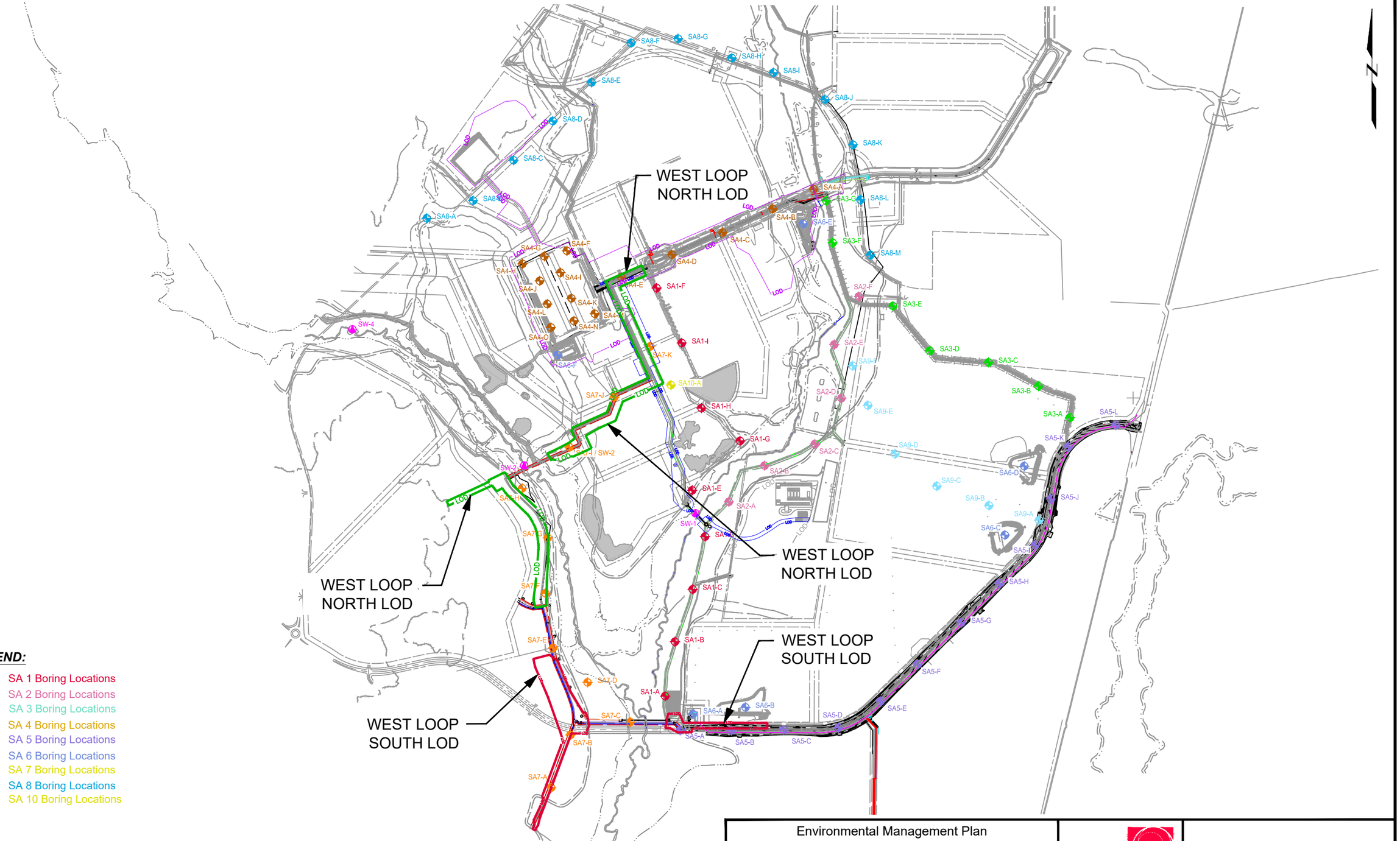
WEST LOOP LOD
SOUTH FEATURES

Project 2302756 | May 2024 | Fig. 3

MORTON, TIMOTHY B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Figures\Environmental Management Plans - EMP\EMP-3_West Loop Water\Fig 3_EMP-3 - West Water Loop South Features.dwg - 5/25/2024



LEGEND:

- SA 1 Boring Locations
- SA 2 Boring Locations
- SA 3 Boring Locations
- SA 4 Boring Locations
- SA 5 Boring Locations
- SA 6 Boring Locations
- SA 7 Boring Locations
- SA 8 Boring Locations
- SA 10 Boring Locations

SOURCE:

1. BORING LOCATION PLAN BASED ON 2022 PHASE II DRAWING PROVIDED BY GEO-TECHNOLOGY ASSOCIATES, INC., DATED OCTOBER 2022.

Environmental Management Plan
Quantum Loophole
Frederick, MD

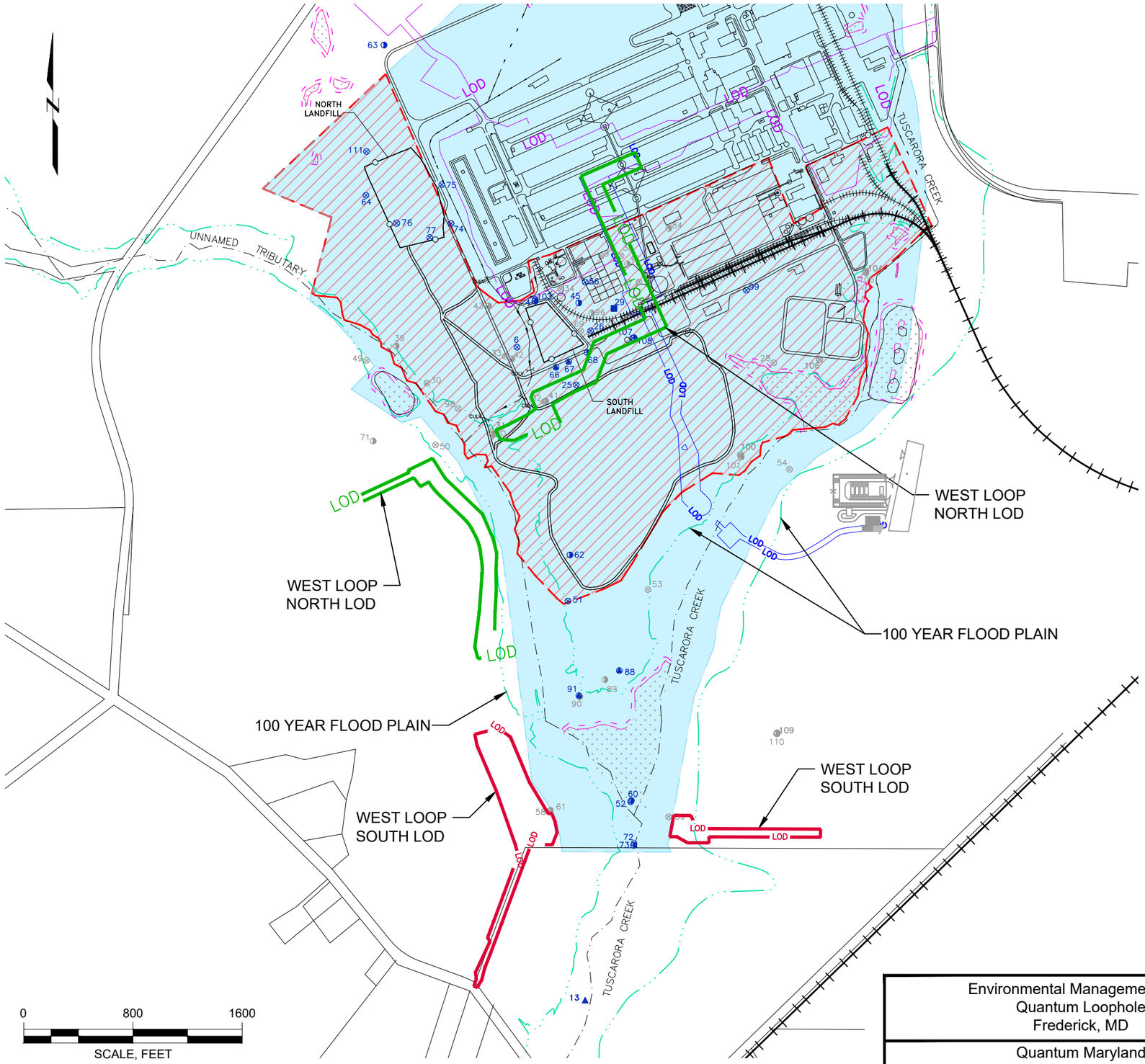
Quantum Maryland
Austin, TX

GEI Consultants

Project 2302756

SAMPLE LOCATIONS FROM THE PHASE II ESA

May 2024 Fig. 4



LEGEND:

- ABANDONED OVERBURDEN MONITORING WELL
- ABANDONED OVERBURDEN / BEDROCK MONITORING WELL
- ABANDONED BEDROCK MONITORING WELL
- OVERBURDEN MONITORING WELL LOCATION (MAINTAINED FOR MONITORING)
- OVERBURDEN / BEDROCK MONITORING WELL LOCATION (MAINTAINED FOR MONITORING)
- BEDROCK MONITORING WELL (MAINTAINED FOR MONITORING)
- OFF-PROPERTY / BEDROCK MONITORING WELL LOCATION (NOT OWNED BY QL)
- RECOVERY WELL
- PROPERTY LINE
- STREAM COURSE
- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVEANT (EC) BOUNDARY
- WETLAND
- WETLAND BUFFER
- WEST LOOP NORTH LIMITS OF DISTURBANCE (LOD)
- WEST LOOP SOUTH LIMITS OF DISTURBANCE (LOD)
- QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE (LOD)
- SEWER LINE B LIMITS OF DISTURBANCE (LOD)

NOTES:

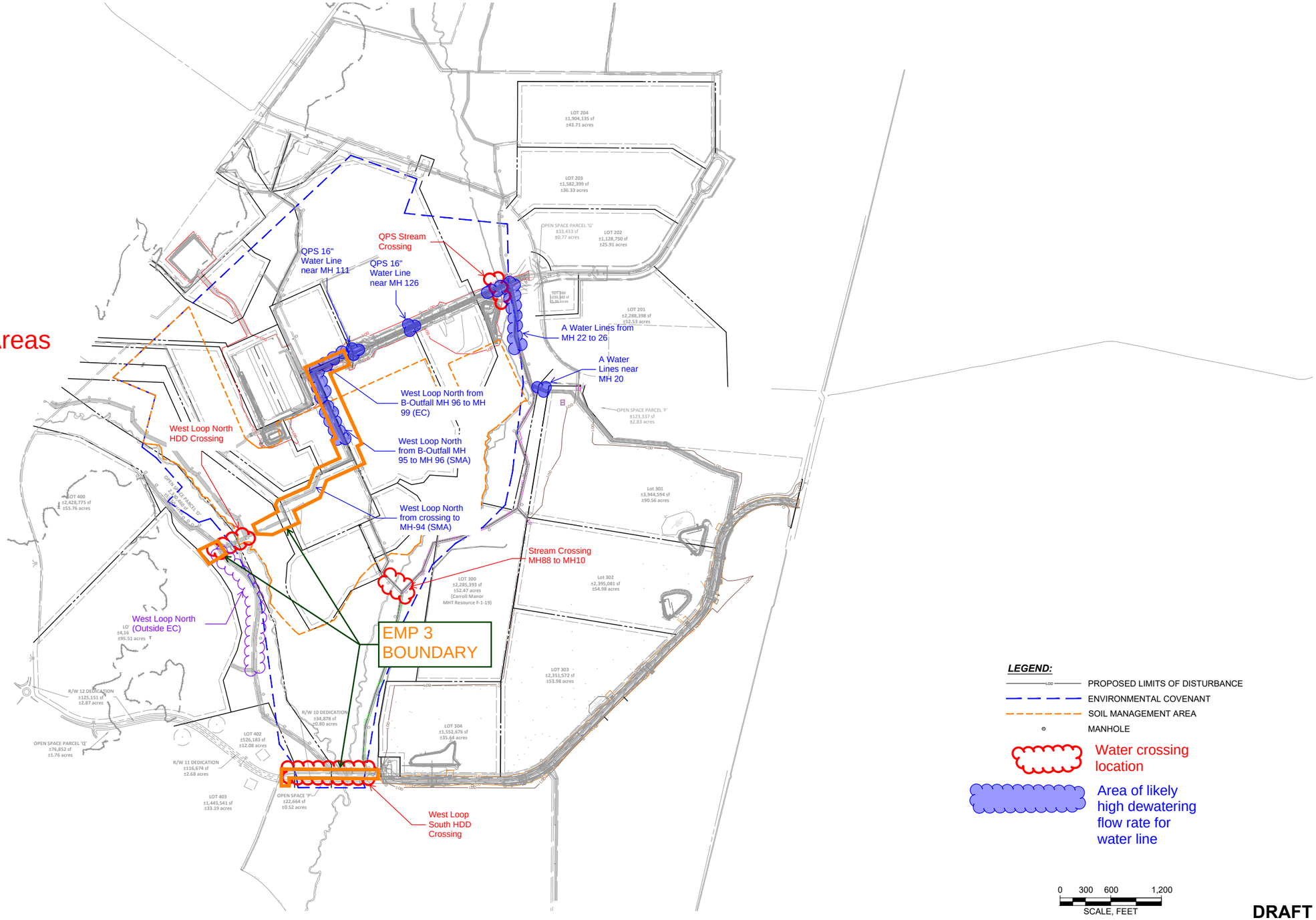
1. THE SITE FEATURES ARE BASED ON PRE-DEMOLITION/CURTAILMENT PLANT CONDITIONS.
2. MONITORING WELL STATUS BASED ON THE 2018 TETRA TECH WELL ABANDONMENT REPORT AND THE 2023 CLOSED NORTH INDUSTRIAL LANDFILL SEMIANNUAL WATER QUALITY REPORT.

SOURCE:

BASE MAP TAKEN FROM THE DRAWING, FIGURE 1 PLANNED MONITORING WELL ABANDONMENT LOCATIONS, PROVIDED BY TETRA TECH, DATED AUGUST 2017.

Environmental Management Plan Quantum Loophole Frederick, MD	GEI Consultants	MONITORING WELL LOCATIONS
Quantum Maryland Austin, TX	Project 2302756	May 2024 Fig. 6

Water Line Dewatering Areas for EMP 3



LEGEND:

- PROPOSED LIMITS OF DISTURBANCE
- ENVIRONMENTAL COVENANT
- SOIL MANAGEMENT AREA
- MANHOLE
- Water crossing location
- Area of likely high dewatering flow rate for water line

0 300 600 1,200

SCALE, FEET

DRAFT

Figure 7: Water Line Dewatering Areas

STOCKPILE AREA B-1 (EC)

MAGENTA HIGHLIGHTED AREA 12"W AND 24"PCW INSTALLED THROUGH EC VIA TRENCH

TANK AREA B-1

RED HIGHLIGHTED AREA 12"W AND 24"PCW INSTALLED THROUGH SMA VIA TRENCH (REQUIRES CAP)

STOCKPILE AREA B-2 (SMA)

TANK AREA B-2

BLUE HIGHLIGHTED AREA FOR PIPE STAGING/ASSEMBLY ONLY

HDD EXIT POINTS AND EXIT PITS

EMP-3 BOUNDARY (EXIT PIT, DRILL ROD HANDLING, AND INCIDENTAL MUD HANDLING - DRILLING AND PRIMARY CUTTINGS/MUD MANAGEMENT AT OTHER END)

GREEN HIGHLIGHTED AREA WATER LINE TRENCH IS OUTSIDE EC

ACCESS FROM WEST LOOP SOUTH LOD VIA HLR TO 400 LOD

EC STAGING AREA, STOCKPILE AREA, WATER MANAGEMENT AREA SHARED WITH B SEWER (EMP-2)

SMA STAGING AREA, STOCKPILE AREA, WATER MANAGEMENT AREA SHARED WITH B SEWER (EMP-2)

B SEWER LINE - SUBJECT OF EMP-2

MUD PROCESSING UNIT AND CUTTINGS ROLLOFFS

HDD RIG LOCATION(S)

HDD ENTRY POINTS AND ENTRY PITS

EMP-3 BOUNDARY (PORTION OF WATER LINE TRENCH EXCAVATION WITHIN EC OR SMA. PRIMARY DRILLING, CUTTINGS AND MUD MANAGEMENT THIS SIDE OF HDD)

CLEAN ENERGY LANE

NORTH LANDFILL

STOCKPILE 2

BASIN DA-11

WEST LOOP NORTH LOD

RAILROAD CROSSING AREA

SEWER LINE B (OR OUTFALL B)

SUBSTATION PAD

WDS-4

WDS-6N

SOUTH LANDFILL EASEMENT BOUNDARY

WDS-5

SOUTH LANDFILL COVER BOUNDARY

WDS-7

WDS-6S

SEWER LINE B STREAM CROSSING

EC

SMA

West Loop North EC Estimated Spoils
(Staged in B-Sewer Stockpile Area B-1 - See EMP-2 Figure 11)
-350 CY of trenchspoils

West Loop North SMA Estimated Spoils
(Staged in B-Sewer Stockpile Area B-2 - See EMP-2 Figure 11)
-1150 CY of trench spoils
-140 CY HDD cuttings
- 50 CY drilling mud
-1700 CY of clean fill to cap trench

LEGEND:

- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- WEST LOOP NORTH LIMITS OF DISTURBANCE
- QUANTUM PLACE SOUTH LIMITS OF DISTURBANCE (LOD)
- SEWER LINE B LIMITS OF DISTURBANCE (LOD)
- FORMER RAILROAD
- WETLAND BOUNDARY
- 100 YEAR FLOOD BOUNDARY
- TUSCARORA CREEK
- MH MANHOLE

NOTE:

1. LOD = LIMITS OF DISTURBANCE.
2. WDS = WASTE DISPOSAL SITE.

0 400 800

SCALE, FEET

Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

GEI Consultants

WEST LOOP NORTH SOIL AND WATER MANAGEMENT PLAN

Project 2302756 | May 2024 | Fig. 8

STAGING AREA, STOCKPILE AREA, WATER MANAGEMENT AREA SHARED WITH MOUTVILLE ROAD WATER (OUTSIDE EC), HLR TO 400 WATER/SEWER (OUTSIDE EC), K-LINE SEWER (EMP-1A)

ADDITIONAL STOCKPILE AREA AVAILABLE FOR EMP-3

STOCKPILE AREA EMP-1A (SOME MATERIAL IS EC) SEE EMP-1A FIGURE 2

ACCESS SHARED WITH MOUTVILLE ROAD WATER (OUTSIDE EC), HLR TO 400 WATER/SEWER (OUTSIDE EC), K-LINE SEWER (EMP-1A)

K-LINE SEWER - SUBJECT OF EMP-1A

HDD ENTRY POINTS AND ENTRY PITS

West Loop South EC Estimated Spoils (Staged in EMP-1A Stockpile Area) See EMP-1A Figure 2)
-235 CY HDD cuttings
-85 CY Drilling Mud

BLUE HIGHLIGHTED AREA FOR PIPE STAGING/ASSEMBLY ONLY

WEST LOOP SOUTH LOD

WEST LOOP SOUTH LOD

HDD EXIT POINTS AND EXIT PITS

MANHOLE MH-3 - SUBJECT OF EMP-1

HDD RIG LOCATION(S)

MUD PROCESSING UNIT AND CUTTINGS ROLLOFFS

YELLOW HIGHLIGHTED AREA 12"W AND 24"PCW INSTALLED THROUGH EC VIA HDD

EMP-3 BOUNDARY (ALL PIPE INSTALLATION IN EC IS VIA HDD) - EMP BOUNDARY INCLUDES ENTRY AND EXIT PITS. DRILLING AND PRIMARY CUTTINGS/MUD MANAGEMENT AT WEST END. EXIT PIT, DRILL ROD HANDLING, AND INCIDENTAL MUD HANDLING AT EAST END.

LEGEND:

- SOIL MANAGEMENT AREA (SMA) BOUNDARY
- ENVIRONMENTAL COVENANT (EC) BOUNDARY
- WEST LOOP SOUTH LIMITS OF DISTURBANCE (LOD)
- FORMER RAILROAD
- WETLAND BOUNDARY
- 100 YEAR FLOOD BOUNDARY
- TUSCARORA CREEK
- MH — MANHOLE

NOTE:

1. LOD = LIMITS OF DISTURBANCE.
2. WDS = WASTE DISPOSAL SITE.

0 300 600

SCALE, FEET

Environmental Management Plan
Quantum Loophole
Frederick, MD

Quantum Maryland
Austin, TX

GEI Consultants

WEST LOOP SOUTH SOIL AND WATER MANAGEMENT PLAN

Project 2302756 | May 2024 | Fig. 9

MORTON, TIMOTHY B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Figures\Environmental Management Plans - EMP\EMP-3_West Loop Water\Fig 3_EMP-3 - West Water Loop South Features.dwg - 5/25/2024

Figure 11
Sewer Line B
Soil and Water Management Plan
Proposed Soil Stockpiles and Frac Tanks

B Line SMA Estimated Spoils
-5700 yards of spoils
-2800 yards of clean fill to cap trench
-2900 yards to cap spoils pile

B Line outside SMA Estimated Spoils
-860 yards of spoils
Microtunnel MH-89 west of Creek
-270 CY topsoil strip/save
-990 CY MH-10 SOE spoils
-365 Tunnel
Microtunnel MH-10 east of Creek
-350 CY topsoil strip/save
-350 CY MH-10 SOE spoils

LEGEND
- EXISTING TREE
- EXISTING TREE - TO BE REMOVED
- TREE PROTECTION (ARMOR)
- EXISTING TREELINE
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- FORMER FEMA 100 YEAR FLOODPLAIN IN EFFECT FOR JPA
- EXISTING 100 YEAR FLOODPLAIN
- EXISTING STREAM VALLEY BUFFER
- EXISTING TOPO w/ CONTOUR LABEL
- SOILS LINES
- GdB SOIL TYPE
- EXISTING DRAINAGE DIVIDE
- LOD LIMIT OF DISTURBANCE
- SSF SUPER SILT FENCE
- SF SILT FENCE
- SCE STABILIZED CONSTRUCTION ENTRANCE
- FOREST CONSERVATION EASEMENT
- FOREST PLANTING AREA
- ENVIRONMENTAL COVENANT BOUNDARY L.12205 F.001
- WDS-7 WASTE DISPOSAL SITE LIMITS
- SOIL MANAGEMENT AREA L.12205 F.001

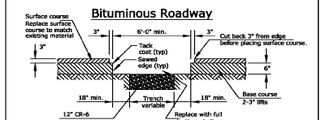
HYDROLOGIC SOIL GROUPS

SOIL NAME	DESCRIPTION	HSG
AfB	Adamstown-Funkstown complex (0-8% slopes)	C
BtC	Buckeystown loam (3-8% slopes)	B
DtB	Duffield-Ryder silt loam (3-8% slopes)	B
HcB	Hagerstown-Opequon silty clay loams (3-8% slopes)rocky	B
LsA	Lindside silt loam (0-3% slopes)	C
MaA	Melvin-Lindside silt loam (0-3% slopes)	B/D
UdB	Udorthents, smooth, (0-8% slopes)	C
UrC	Urban Land (3-15% slopes)	D

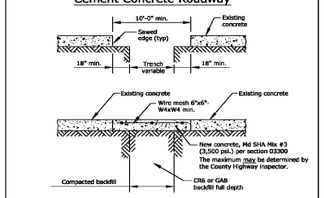
NOTE:
Sediment control measures shown as existing are approved under Frederick Co. plans PW271142, PW271145, PW273380 & PW276148

NOTES:
- Place all excavated material on high side of trench.
- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

Bituminous Roadway



Cement Concrete Roadway



1: County roads shall be repaired as above unless the County Road crossing permit requires other repairs - then perform the work in accordance with the permit.
2: Measurement and payment for these items shall be the number of square yards of surface course materials furnished and installed in-place and in accordance with the project specific details (note any variations) and to the limits as shown on the drawings.

Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	County Road Repair Over Water and Sewer Trenches	Detail No. 3.1 Date: 03-24-2023

Frederick County Soil Conservation District
Erosion and Sediment Control Plan Approval
BY _____ District Manager or Designee
DATE _____ Plan is valid for 2 years from date of approval
2
SCD approval for sediment and erosion control is in accordance with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control and is contingent upon issuance of all applicable regulatory permits.

FREDERICK SOIL CONSERVATION DISTRICT
APPROVED BY _____ DISTRICT MANAGER
DATE 3-15-23
SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".
STATE OF MARYLAND — THOMAS PHILLIP WAGNER — 29782 — PROFESSIONAL ENGINEER
10/10/2022

EMP-2 FIGURE 11

CALL "MISS UTILITY" AT 1-800-257-7777 72 Hours Before Start Of Construction

REVISION	DATE
1 Revise 15" Sewer to reflect Preliminary Plan revision PP273774. Revised alignment, plan, profile and sediment control	2023/02/17
2 Revise 15" Sewer alignment, plan & profile between Ex MH10 and MH9z. Add info for Microtunneling and Casing Pipe. Revise sediment control LOD and devices.	2024/04/23

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON
EMAIL: AD@QL.EMAIL

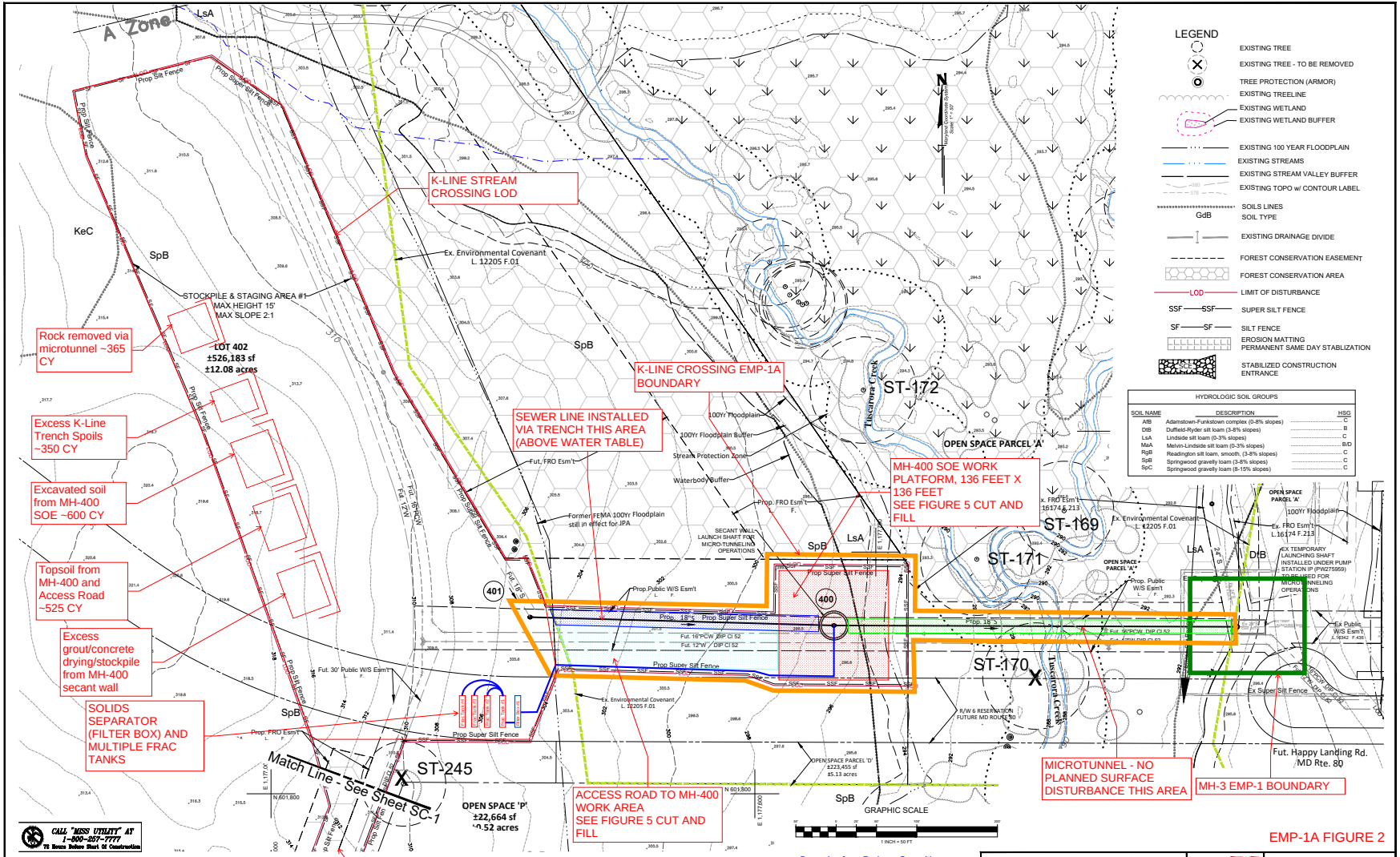
Overall
Sediment Control Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

15"SEWER OUTFALL
Quantum Place South to MH10 (Line B)
& Conn. to Lots ~~103 & 104~~ 100, 101 & 102
QUANTUM FREDERICK
LIBER 15038 FOLIO 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=300'
JOB No.	1339A2
	June, 2022
INDEX No.	SC-1B
SHEET No.	2B OF 9

2/17/2023



Base plan from Rodgers Consulting, Combined Stormwater Management Development and Improvement Plan, K Line Sewer at Stream Crossing, Sediment Control Plan, Sheet SC-2

EMP-1A FIGURE 2

Environmental Management Plan Quantum Loophole Frederick, MD	GEI Consultants	EMP-1A LAYOUT	
Quantum Maryland Austin, TX	Project 2302756	March 2024	Fig. 2

Appendix A

Phase II Environmental Site Assessment – Initial Infrastructure Phase – Figures 4 and 8 and Table 2

Appendix B

Analytical Data for Groundwater

1. **Landfill Groundwater Monitoring (2023)** See EMP-2 Appendix B-1
2. **Supplemental Groundwater and Basin Data (2024)**

GW-SW Sampling To Support EMPs Data vs MD LRP GW Screening Criteria
Quantum Loophole
Frederick, Maryland

Client Name: Tetra Tech, Inc. - Germantown Lab: Eurofins Lancaster																								
Specific Method	CAS#	Matrix	Analyte	Results Basis	MD LRP Cleanup Stds_Tbl 1_GWs Aquifers_Oct2018	410-165229-1 QL-DA11-SW-20240325			410-165229-2 QL-DA2-SW-20240325			410-165398-1 QL-MW-60-GW-032624			410-165398-2 QL-MW-52-GW-032624			410-165398-3 QL-GEI-07-20240326			410-165398-4 QL-GEI-11-20240326			410-165398-5 QL-GEI-14-20240326		
						Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier
218.6_Pres_O	18540-29-9	Water	**Cr (VI)**	Dissolved	**0.035**	**<5.0**	ug/L		**<5.0**	ug/L		**<5.0**	ug/L		**<5.0**	ug/L		**<5.0**	ug/L		**<5.0**	ug/L		**<5.0**	ug/L	
6020B	7429-90-5	Water	Aluminum	Dissolved	2000	**13**	ug/L	J	**23**	ug/L	J	<12	ug/L		<12	ug/L		<12	ug/L		<12	ug/L		<12	ug/L	
6020B	7439-89-6	Water	Iron	Dissolved	1400	**45**	ug/L	J	**59**	ug/L		**25**	ug/L	J	**40**	ug/L	J	**26**	ug/L	J	**22**	ug/L	J	<20	ug/L	
6020B	7439-92-1	Water	Lead	Dissolved	15	**0.14**	ug/L	J	**0.20**	ug/L	J	<0.12	ug/L		<0.12	ug/L		**0.14**	ug/L	J	**0.14**	ug/L	J	**0.19**	ug/L	J
6020B	7439-95-4	Water	Magnesium	Dissolved		**2500**	ug/L		**6400**	ug/L		**16000**	ug/L		**7900**	ug/L		**12000**	ug/L		**9800**	ug/L		**5600**	ug/L	
6020B	7439-96-5	Water	**Manganese**	Dissolved	**43**	**3.6**	ug/L		**7.1**	ug/L		<0.95	ug/L		<0.95	ug/L		**7.3**	ug/L		**12**	ug/L		**410**	ug/L	
6020B	7440-02-0	Water	Nickel	Dissolved	39	**0.43**	ug/L	J	<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		**1.2**	ug/L		**0.62**	ug/L	J	<0.40	ug/L	
6020B	7440-09-7	Water	Potassium	Dissolved		**1800**	ug/L		**2200**	ug/L		**1200**	ug/L		**1600**	ug/L		**1900**	ug/L		**1900**	ug/L		**1400**	ug/L	
6020B	7440-22-4	Water	Silver	Dissolved	9.4	<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
6020B	7440-23-5	Water	Sodium	Dissolved		**3200**	ug/L	^2	**10000**	ug/L	^2	**79000**	ug/L		**94000**	ug/L		**13000**	ug/L		**9400**	ug/L		**9700**	ug/L	
6020B	7440-28-0	Water	Thallium	Dissolved	2	<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L	
6020B	7440-36-0	Water	Antimony	Dissolved	6	<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		**0.39**	ug/L	J	<0.20	ug/L		<0.20	ug/L	
6020B	7440-38-2	Water	Arsenic	Dissolved	10	<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L	
6020B	7440-39-3	Water	Barium	Dissolved	2000	**9.4**	ug/L		**19**	ug/L		**43**	ug/L		**36**	ug/L		**39**	ug/L		**50**	ug/L		**22**	ug/L	
6020B	7440-41-7	Water	Beryllium	Dissolved	4	<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L	
6020B	7440-43-9	Water	Cadmium	Dissolved	5	<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L	
6020B	7440-47-3	Water	Chromium	Dissolved	100	<0.55	ug/L		<0.55	ug/L		<0.55	ug/L		**1.1**	ug/L	J	<0.55	ug/L		<0.55	ug/L		<0.55	ug/L	
6020B	7440-48-4	Water	Cobalt	Dissolved		<0.16	ug/L		**0.18**	ug/L	J	**0.30**	ug/L	J	**0.40**	ug/L	J	<0.16	ug/L		**0.33**	ug/L	J	**0.77**	ug/L	
6020B	7440-50-8	Water	Copper	Dissolved	1300	**1.8**	ug/L		**2.8**	ug/L		<0.36	ug/L		<0.36	ug/L		**2.1**	ug/L		**2.0**	ug/L		**1.1**	ug/L	
6020B	7440-62-2	Water	Vanadium	Dissolved	8.6	<0.79	ug/L		<0.79	ug/L		<0.79	ug/L		<0.79	ug/L		<0.79	ug/L		<0.79	ug/L		<0.79	ug/L	
6020B	7440-66-6	Water	Zinc	Dissolved	600	**7.1**	ug/L	J B	**7.6**	ug/L	J B	<4.0	ug/L		<4.0	ug/L		**5.0**	ug/L	J	**4.1**	ug/L	J	<4.0	ug/L	
6020B	7440-70-2	Water	Calcium	Dissolved		**22000**	ug/L	^2	**38000**	ug/L	^2	**72000**	ug/L		**70000**	ug/L		**87000**	ug/L		**91000**	ug/L		**64000**	ug/L	^3+
6020B	7782-49-2	Water	Selenium	Dissolved	50	<0.28	ug/L		<0.28	ug/L		**0.47**	ug/L	J	**0.72**	ug/L	J	**0.30**	ug/L	J	<0.28	ug/L		<0.28	ug/L	
7470A	7439-97-6	Water	Mercury	Dissolved	2	<0.079	ug/L		**0.10**	ug/L	J	<0.079	ug/L		<0.079	ug/L		<0.079	ug/L		<0.079	ug/L		<0.079	ug/L	
1677_Free	N/A	Water	Cyanide, Free	Total		<0.0050	mg/L	F1	<0.0050	mg/L		<0.0050	mg/L		**0.010**	mg/L		<0.0050	mg/L		<0.0050	mg/L		<0.0050	mg/L	
300_ORGFM_	16984-48-8	Water	Fluoride	Total		**0.58**	mg/L	J	**0.68**	mg/L	J	**2.4**	mg/L		<0.45	mg/L	F1	**0.23**	mg/L		**0.30**	mg/L		**0.18**	mg/L	J
7470A	7439-97-6	Water	Mercury	Total	2	<0.079	ug/L		<0.079	ug/L		<0.079	ug/L		<0.079	ug/L		<0.079	ug/L		<0.079	ug/L		<0.079	ug/L	
8015D_DRO	N/A	Water	DRO (C10-C28)	Total	47	<46	ug/L		<46	ug/L		<45	ug/L	*+ *1	<45	ug/L	*+ *1	<47	ug/L	*+ *1	<46	ug/L	*+ *1	<47	ug/L	*+ *1
8015D_GRO	N/A	Water	GRO	Total	47	<23	ug/L		<23	ug/L		<23	ug/L		<23	ug/L		<23	ug/L		<23	ug/L		<23	ug/L	
8081B	1024-57-3	Water	Heptachlor epoxide	Total	0.2	<0.0024	ug/L		<0.0024	ug/L		<0.0023	ug/L		<0.0023	ug/L		<0.0023	ug/L		<0.0024	ug/L		<0.0024	ug/L	
8081B	1031-07-8	Water	Endosulfan sulfate	Total		<0.0061	ug/L		<0.0060	ug/L		<0.0059	ug/L		<0.0059	ug/L		<0.0059	ug/L		<0.0061	ug/L		<0.0060	ug/L	
8081B	309-00-2	Water	**Aldrin**	Total	**0.00092**	**<0.0021**	ug/L		**<0.0021**	ug/L		**<0.0020**	ug/L		**<0.0020**	ug/L		**<0.0020**	ug/L		**<0.0021**	ug/L		**<0.0021**	ug/L	
8081B	319-84-6	Water	alpha-BHC	Total	0.0072	<0.0031	ug/L		<0.0031	ug/L		<0.0031	ug/L		<0.0030	ug/L		<0.0030	ug/L		<0.0032	ug/L		<0.0031	ug/L	
8081B	319-85-7	Water	beta-BHC	Total	0.025	<0.012	ug/L		<0.011	ug/L		<0.011	ug/L		<0.011	ug/L		<0.011	ug/L		<0.012	ug/L		<0.011	ug/L	
8081B	319-86-8	Water	delta-BHC	Total		<0.0036	ug/L		<0.0035	ug/L		<0.0035	ug/L		<0.0034	ug/L		<0.0035	ug/L		<0.0036	ug/L		<0.0035	ug/L	
8081B	33213-65-9	Water	Endosulfan II	Total		<0.016	ug/L		<0.016	ug/L		<0.015	ug/L		<0.015	ug/L		<0.015	ug/L		<0.016	ug/L		<0.015	ug/L	
8081B	50-29-3	Water	p,p'-DDT	Total	0.23	<0.0054	ug/L		<0.0054	ug/L		<0.0053	ug/L		<0.0053	ug/L		<0.0053	ug/L		<0.0055	ug/L		<0.0054	ug/L	
8081B	5103-71-9	Water	alpha-Chlordane	Total		<0.0031	ug/L		<0.0031	ug/L		<0.0031	ug/L		<0.0030	ug/L		<0.0030	ug/L		<0.0032	ug/L		<0.0031	ug/L	
8081B	5103-74-2	Water	gamma-Chlordane	Total		<0.0073	ug/L		<0.0072	ug/L		<0.0071	ug/L		<0.0071	ug/L		<0.0071	ug/L		<0.0074	ug/L		<0.0072	ug/L	
8081B	53494-70-5	Water	Endrin ketone	Total		<0.0052	ug/L		<0.0052	ug/L		<0.0051	ug/L		<0.0051	ug/L		<0.0051	ug/L		<0.0053	ug/L		<0.0052	ug/L	
8081B	58-89-9	Water	gamma-BHC (Lindane)	Total	0.2	<0.0021	ug/L		<0.0021	ug/L		<0.0020	ug/L		<0.0020	ug/L		<0.0020	ug/L		<0.0021	ug/L		<0.0021	ug/L	
8081B	60-57-1	Water	**Dieldrin**	Total	**0.0018**	**<0.0055**	ug/L		**<0.0055**	ug/L		**<0.0054**	ug/L		**<0.0054**	ug/L		**<0.0054**	ug/L		**<0.0056**	ug/L		**<0.0055**	ug/L	
8081B	72-20-8	Water	Endrin	Total	2	<0.0085	ug/L		<0.0084	ug/L		<0.0083	ug/L		<0.0082	ug/L		<0.0082	ug/L		<0.0085	ug/L		<0.0084	ug/L	
8081B	72-43-5	Water	Methoxychlor	Total	40	<0.031	ug/L		<0.031	ug/L		<0.031	ug/L		<0.030	ug/L		<0.030	ug/L		<0.032	ug/L		<0.031	ug/L	
8081B	72-54-8	Water	p,p'-DDD	Total	0.0063	<0.0052	ug/L		<0.0052	ug/L		<0.0051	ug/L		<0.0051	ug/L		<0.0051	ug/L		<0.0053	ug/L		<0.0052	ug/L	
8081B	72-55-9	Water	p,p'-DDE	Total	0.046	<0.0052	ug/L		<0.0052	ug/L		<0.0051	ug/L		<0.0051	ug/L		<0.0051	ug/L		<0.0053	ug/L		<0.0052	ug/L	
8081B	7421-93-4	Water	Endrin aldehyde	Total		<0.021	ug/L		<0.021	ug/L		<0.020	ug/L		<0.020	ug/L		<0.020	ug/L		<0.021	ug/L		<0.021	ug/L	
8081B	76-44-8	Water	Heptachlor	Total	0.4	<0.0021	ug/L		<0.0021	ug/L		<0.0020	ug/L		<0.0020	ug/L		<0.0020	ug/L		<0.0021	ug/L		<0.0021	ug/L	
8081B	8001-35-2	Water	Toxaphene	Total	3	<0.31	ug/L		<0.31	ug/L		<0.31	ug/L		<0.30	ug/L		<0.30	ug/L		<0.32	ug/L		<0.31	ug/L	
8081B	959-98-8	Water	Endosulfan I	Total		<0.0045	ug/L		<0.0045	ug/L		<0.0044	ug/L		<0.0043	ug/L		<0.0044	ug/L		<0.0045	ug/L		<0.0044	ug/L	

GW-SW Sampling To Support EMPs Data vs MD LRP GW Screening Criteria
Quantum Loophole
Frederick, Maryland

Client Name: Tetra Tech, Inc. - Germantown Lab: Eurofins Lancaster																								
Specific Method	CAS#	Matrix	Analyte	Results Basis	MD LRP Cleanup Stds_Tbl 1_GWs Aquifers_Oct2018	410-165229-1 QL-DA11-SW-20240325			410-165229-2 QL-DA2-SW-20240325			410-165398-1 QL-MW-60-GW-032624			410-165398-2 QL-MW-52-GW-032624			410-165398-3 QL-GEI-07-20240326			410-165398-4 QL-GEI-11-20240326			410-165398-5 QL-GEI-14-20240326		
						Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier
8082A	11096-82-5	Water	**PCB-1260**	Total	**0.0078**	**<0.082**	ug/L		**<0.081**	ug/L		**<0.080**	ug/L		**<0.079**	ug/L		**<0.079**	ug/L		**<0.082**	ug/L		**<0.080**	ug/L	
8082A	11097-69-1	Water	**PCB-1254**	Total	**0.0078**	**<0.082**	ug/L		**<0.081**	ug/L		**<0.080**	ug/L		**<0.079**	ug/L		**<0.079**	ug/L		**<0.082**	ug/L		**<0.080**	ug/L	
8082A	11104-28-2	Water	**PCB-1221**	Total	**0.0047**	**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.11**	ug/L		**<0.10**	ug/L	
8082A	11141-16-5	Water	**PCB-1232**	Total	**0.0047**	**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.11**	ug/L		**<0.10**	ug/L	
8082A	12672-29-6	Water	**PCB-1248**	Total	**0.0078**	**<0.082**	ug/L		**<0.081**	ug/L		**<0.080**	ug/L		**<0.079**	ug/L		**<0.079**	ug/L		**<0.082**	ug/L		**<0.080**	ug/L	
8082A	12674-11-2	Water	PCB-1016	Total	0.14	<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.11	ug/L		<0.10	ug/L	
8082A	53469-21-9	Water	**PCB-1242**	Total	**0.0078**	**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.11**	ug/L		**<0.10**	ug/L	
8151A	120-36-5	Water	Dichlorprop	Total		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.16	ug/L		<0.15	ug/L	
8151A	1918-00-9	Water	Dicamba	Total		<0.26	ug/L		<0.25	ug/L		<0.26	ug/L		<0.26	ug/L		<0.26	ug/L		<0.27	ug/L		<0.26	ug/L	
8151A	75-99-0	Water	Dalapon	Total	200	<5.4	ug/L		<5.4	ug/L		<5.5	ug/L		<5.4	ug/L		<5.5	ug/L		<5.7	ug/L		<5.5	ug/L	
8151A	87-86-5	Water	Pentachlorophenol	Total	1	<0.026	ug/L		<0.025	ug/L		<0.026	ug/L		<0.026	ug/L		<0.026	ug/L		<0.027	ug/L		<0.026	ug/L	
8151A	88-85-7	Water	Dinoseb	Total	7	<0.27	ug/L		<0.26	ug/L		<0.27	ug/L	*1	<0.26	ug/L	*1	<0.27	ug/L	*1	<0.28	ug/L	*1	<0.27	ug/L	*1
8151A	93-65-2	Water	MCPP	Total		<48	ug/L		<47	ug/L		<48	ug/L		<47	ug/L		<48	ug/L		<50	ug/L		<48	ug/L	
8151A	93-72-1	Water	Silvex (2,4,5-TP)	Total	50	<0.021	ug/L		<0.021	ug/L		<0.021	ug/L		<0.021	ug/L		<0.021	ug/L		<0.022	ug/L		<0.021	ug/L	
8151A	93-76-5	Water	2,4,5-T	Total		<0.062	ug/L		<0.061	ug/L		<0.063	ug/L		<0.061	ug/L		<0.063	ug/L		<0.065	ug/L		<0.062	ug/L	
8151A	94-74-6	Water	MCPA	Total		<48	ug/L		<47	ug/L		<48	ug/L		<47	ug/L		<48	ug/L		<50	ug/L		<48	ug/L	
8151A	94-75-7	Water	2,4-D	Total	70	<0.24	ug/L		<0.24	ug/L		<0.24	ug/L		<0.24	ug/L		<0.24	ug/L		<0.25	ug/L		<0.24	ug/L	
8151A	94-82-6	Water	2,4-DB	Total		<0.60	ug/L		<0.59	ug/L		<0.61	ug/L		<0.60	ug/L		<0.61	ug/L		<0.63	ug/L		<0.60	ug/L	
8260D	100-41-4	Water	Ethylbenzene	Total	700	<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L	
8260D	100-42-5	Water	Styrene	Total	100	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	10061-01-5	Water	cis-1,3-Dichloropropene	Total		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L	
8260D	10061-02-6	Water	trans-1,3-Dichloropropene	Total		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L	
8260D	106-46-7	Water	1,4-Dichlorobenzene	Total	75	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	106-93-4	Water	**1,2-Dibromoethane**	Total	**0.05**	**<0.20**	ug/L		**<0.20**	ug/L		**<0.20**	ug/L		**<0.20**	ug/L		**<0.20**	ug/L		**<0.20**	ug/L		**<0.20**	ug/L	
8260D	107-06-2	Water	1,2-Dichloroethane	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	108-10-1	Water	4-Methyl-2-pentanone	Total	630	<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L	
8260D	108-87-2	Water	Methylcyclohexane	Total		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L	
8260D	108-88-3	Water	Toluene	Total	1000	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	108-90-7	Water	Chlorobenzene	Total	100	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	110-82-7	Water	Cyclohexane	Total		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L	
8260D	120-82-1	Water	1,2,4-Trichlorobenzene	Total	70	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	124-48-1	Water	Dibromochloromethane	Total	80	<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		**0.77**	ug/L	J	<0.20	ug/L		<0.20	ug/L	
8260D	127-18-4	Water	Tetrachloroethene	Total	5	<0.30	ug/L		<0.30	ug/L		**1.9**	ug/L		**2.8**	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	1330-20-7	Water	Xylenes, Total	Total	10000	<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		<0.40	ug/L	
8260D	156-59-2	Water	cis-1,2-Dichloroethene	Total	70	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	156-60-5	Water	trans-1,2-Dichloroethene	Total	100	<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L	
8260D	1634-04-4	Water	Methyl tertiary butyl ether	Total	20	<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L	
8260D	541-73-1	Water	1,3-Dichlorobenzene	Total		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L	
8260D	56-23-5	Water	Carbon tetrachloride	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	591-78-6	Water	2-Hexanone	Total		<0.85	ug/L		<0.85	ug/L		<0.85	ug/L		<0.85	ug/L		<0.85	ug/L		<0.85	ug/L		<0.85	ug/L	
8260D	67-64-1	Water	Acetone	Total	1400	<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L		<0.70	ug/L	
8260D	67-66-3	Water	Chloroform	Total	80	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		**6.7**	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	71-43-2	Water	Benzene	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	71-55-6	Water	1,1,1-Trichloroethane	Total	200	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	74-83-9	Water	Bromomethane	Total	0.75	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	74-87-3	Water	Chloromethane	Total	19	<0.55	ug/L		<0.55	ug/L		<0.55	ug/L		<0.55	ug/L		<0.55	ug/L		<0.55	ug/L		<0.55	ug/L	
8260D	75-00-3	Water	Chloroethane	Total	2100	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-01-4	Water	Vinyl chloride	Total	2	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-09-2	Water	Methylene Chloride	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-15-0	Water	Carbon disulfide	Total	81	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-25-2	Water	Bromoform	Total	80	<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L		<1.0	ug/L	
8260D	75-27-4	Water	Bromodichloromethane	Total	80	<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		**2.2**	ug/L		<0.20	ug/L		<0.20	ug/L	
8260D	75-34-3	Water	1,1-Dichloroethane	Total	2.8	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-35-4	Water	1,1-Dichloroethene	Total	7	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-69-4	Water	Trichlorofluoromethane	Total		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	75-71-8	Water	Dichlorodifluoromethane	Total		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	76-13-1	Water	Freon 113	Total		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	

GW-SW Sampling To Support EMPs Data vs MD LRP GW Screening Criteria
Quantum Loophole
Frederick, Maryland

Client Name: Tetra Tech, Inc. - Germantown
Lab: Eurofins Lancaster

Specific Method	CAS#	Matrix	Analyte	Results Basis	MD LRP Cleanup Stds_Tbl 1_GWs Aquifers_Oct2018	410-165229-1 QL-DA11-SW-20240325			410-165229-2 QL-DA2-SW-20240325			410-165398-1 QL-MW-60-GW-032624			410-165398-2 QL-MW-52-GW-032624			410-165398-3 QL-GEI-07-20240326			410-165398-4 QL-GEI-11-20240326			410-165398-5 QL-GEI-14-20240326		
						Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier	Result	Units	Qualifier
8260D	78-87-5	Water	1,2-Dichloropropane	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	78-93-3	Water	2-Butanone	Total	560	<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L		<0.50	ug/L	
8260D	79-00-5	Water	1,1,2-Trichloroethane	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	79-01-6	Water	Trichloroethene	Total	5	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	79-20-9	Water	Methyl acetate	Total		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8260D	79-34-5	Water	**1,1,2,2-Tetrachloroethane**	Total	**0.076**	**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L	
8260D	95-50-1	Water	1,2-Dichlorobenzene	Total	600	<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L	
8260D	96-12-8	Water	**1,2-Dibromo-3-Chloropropane**	Total	**0.2**	**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L		**<0.30**	ug/L	
8260D	98-82-8	Water	Isopropylbenzene	Total	45	<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L		<0.30	ug/L	
8270E	120-12-7	Water	Anthracene	Total	180	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	129-00-0	Water	Pyrene	Total	12	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	191-24-2	Water	Benzo[g,h,i]perylene	Total		<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	193-39-5	Water	Indeno[1,2,3-cd]pyrene	Total	0.25	<0.12	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L	
8270E	205-99-2	Water	Benzo[b]fluoranthene	Total	0.25	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	206-44-0	Water	Fluoranthene	Total	80	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	207-08-9	Water	Benzo[k]fluoranthene	Total	2.5	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	208-96-8	Water	Acenaphthylene	Total		<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	218-01-9	Water	Chrysene	Total	25	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	50-32-8	Water	Benzo[a]pyrene	Total	0.2	<0.12	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L	
8270E	53-70-3	Water	**Dibenz(a,h)anthracene**	Total	**0.025**	**<0.11**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L	
8270E	56-55-3	Water	**Benzo[a]anthracene**	Total	**0.03**	**<0.11**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L		**<0.10**	ug/L	
8270E	83-32-9	Water	Acenaphthene	Total	53	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
8270E	85-01-8	Water	Phenanthrene	Total	12	<0.12	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L		<0.11	ug/L	
8270E	86-73-7	Water	Fluorene	Total	29	<0.13	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L	
8270E	91-20-3	Water	Naphthalene	Total	0.17	<0.11	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
9040C	N/A	Water	Corrosivity	Total		**no**	NONE	HF	**no**	NONE	HF	**no**	NONE	HF	**no**	NONE	HF	**no**	NONE	HF	**no**	NONE	HF	**no**	NONE	HF
9040C	N/A	Water	pH	Total		**7.4**	S.U.	HF	**7.8**	S.U.	HF	**7.4**	S.U.	HF	**7.3**	S.U.	HF	**7.5**	S.U.	HF	**7.4**	S.U.	HF	**7.3**	S.U.	HF
9040C	N/A	Water	Temperature	Total		**20.4**	Degrees C	HF	**20.4**	Degrees C	HF	**20.3**	Degrees C	HF	**20.2**	Degrees C	HF	**20.1**	Degrees C	HF	**20.3**	Degrees C	HF	**20.2**	Degrees C	HF
6020B	7429-90-5	Water	**Aluminum**	Total Recoverable	**2000**	**720**	ug/L		**280**	ug/L		**16**	ug/L	J	**14**	ug/L	J	**960**	ug/L		**53**	ug/L		**16000**	ug/L	
6020B	7439-89-6	Water	**Iron**	Total Recoverable	**1400**	**670**	ug/L		**390**	ug/L		**24**	ug/L	J	**51**	ug/L		**740**	ug/L		**85**	ug/L		**28000**	ug/L	
6020B	7439-92-1	Water	Lead	Total Recoverable	15	**0.35**	ug/L	J	**0.32**	ug/L	J	<0.12	ug/L		<0.12	ug/L		**0.35**	ug/L	J	<0.12	ug/L		**10**	ug/L	
6020B	7439-95-4	Water	Magnesium	Total Recoverable		**2500**	ug/L	^2	**6100**	ug/L	^2	**16000**	ug/L		**8000**	ug/L		**12000**	ug/L		**9400**	ug/L		**13000**	ug/L	
6020B	7439-96-5	Water	**Manganese**	Total Recoverable	**43**	**13**	ug/L		**21**	ug/L		<0.95	ug/L		**2.5**	ug/L		**20**	ug/L		**13**	ug/L		**910**	ug/L	
6020B	7440-02-0	Water	Nickel	Total Recoverable	39	**0.78**	ug/L	J	<0.40	ug/L		<0.40	ug/L		<0.40	ug/L		**1.5**	ug/L		**1.1**	ug/L		**24**	ug/L	
6020B	7440-09-7	Water	Potassium	Total Recoverable		**1800**	ug/L		**2200**	ug/L		**1200**	ug/L		**1600**	ug/L		**2000**	ug/L		**1900**	ug/L		**3100**	ug/L	
6020B	7440-22-4	Water	Silver	Total Recoverable	9.4	<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L		<0.10	ug/L	
6020B	7440-23-5	Water	Sodium	Total Recoverable		**3400**	ug/L		**10000**	ug/L		**77000**	ug/L		**92000**	ug/L		**13000**	ug/L		**9300**	ug/L		**11000**	ug/L	
6020B	7440-28-0	Water	Thallium	Total Recoverable	2	<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L		<0.13	ug/L	
6020B	7440-36-0	Water	Antimony	Total Recoverable	6	<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		<0.20	ug/L		**0.32**	ug/L	J	<0.20	ug/L		**0.33**	ug/L	J
6020B	7440-38-2	Water	Arsenic	Total Recoverable	10	<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		<0.68	ug/L		**5.6**	ug/L	
6020B	7440-39-3	Water	Barium	Total Recoverable	2000	**12**	ug/L		**19**	ug/L		**44**	ug/L		**36**	ug/L		**43**	ug/L		**50**	ug/L		**87**	ug/L	
6020B	7440-41-7	Water	Beryllium	Total Recoverable	4	<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		<0.12	ug/L		**0.79**	ug/L	
6020B	7440-43-9	Water	Cadmium	Total Recoverable	5	<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L		<0.15	ug/L	
6020B	7440-47-3	Water	Chromium	Total Recoverable	100	**0.60**	ug/L	J	<0.55	ug/L		<0.55	ug/L		**0.85**	ug/L	J	<0.55	ug/L		<0.55	ug/L		**21**	ug/L	
6020B	7440-48-4	Water	Cobalt	Total Recoverable		**0.34**	ug/L	J	**0.26**	ug/L	J	**0.20**	ug/L	J	**0.39**	ug/L	J	**0.27**	ug/L	J	**0.22**	ug/L	J	**10**	ug/L	^2
6020B	7440-50-8	Water	Copper	Total Recoverable	1300	**1.1**	ug/L		**1.6**	ug/L		**0.67**	ug/L	J	<0.36	ug/L		**1.1**	ug/L		**0.53**	ug/L	J	**17**	ug/L	
6020B	7440-62-2	Water	**Vanadium**	Total Recoverable	**8.6**	**1.1**	ug/L	J	<0.79	ug/L		<0.79	ug/L		<0.79	ug/L		**1.4**	ug/L	J	<0.79	ug/L		**23**	ug/L	
6020B	7440-66-6	Water	Zinc	Total Recoverable	600	<4.0	ug/L		<4.0	ug/L		<4.0	ug/L		**4.5**	ug/L	J B	**4.2**	ug/L	J B	**5.3**	ug/L	J B	**43**	ug/L	
6020B	7440-70-2	Water	Calcium	Total Recoverable		**21000**	ug/L		**36000**	ug/L		**70000**	ug/L		**70000**	ug/L		**86000**	ug/L		**88000**	ug/L		**110000**	ug/L	^3+
6020B	7782-49-2	Water	Selenium	Total Recoverable	50	<0.28	ug/L		<0.28	ug/L		**0.50**	ug/L	J	**0.64**	ug/L	J	<0.28	ug/L		<0.28	ug/L		<0.28	ug/L	

Values highlighted gray were not detected at the laboratory method detection limit, but the MDL is higher than MD GW Cleanup Standard

Values highlighted magenta were detected above the MD GW Cleanup Standard

Bold values indicate the analyte was detected

Qualifier Definitions

^2 - Calibration Blank (ICB and/or CCB) is outside acceptance limits

B - Compound was found in the blank and the sample

J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

HF - Parameter with a holding time of 15 minutes. Test performed by the laboratory at client's request. Sample was analyzed outside of hold time.

p - The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

F1 - MS and/or MSD recovery exceeds control limits.

*1 - LCS/LCSD RPD exceeds control limits

*+ - LCS and./or LCSD is outside acceptance limits, high biased

^+ - Continuing Calibration Verification (CCV) is outside acceptance limits, high biased

^3+ - Reporting Limit Check Standard is outside acceptance limits, high biased

^5- Linear Range Check (LRC) is outside acceptance limits, low biased

Appendix C

West Loop Water North Improvement Plan Drawings

1. Approved Drawing Set (5/5/2023)
2. HDD Crossing Preliminary Design

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

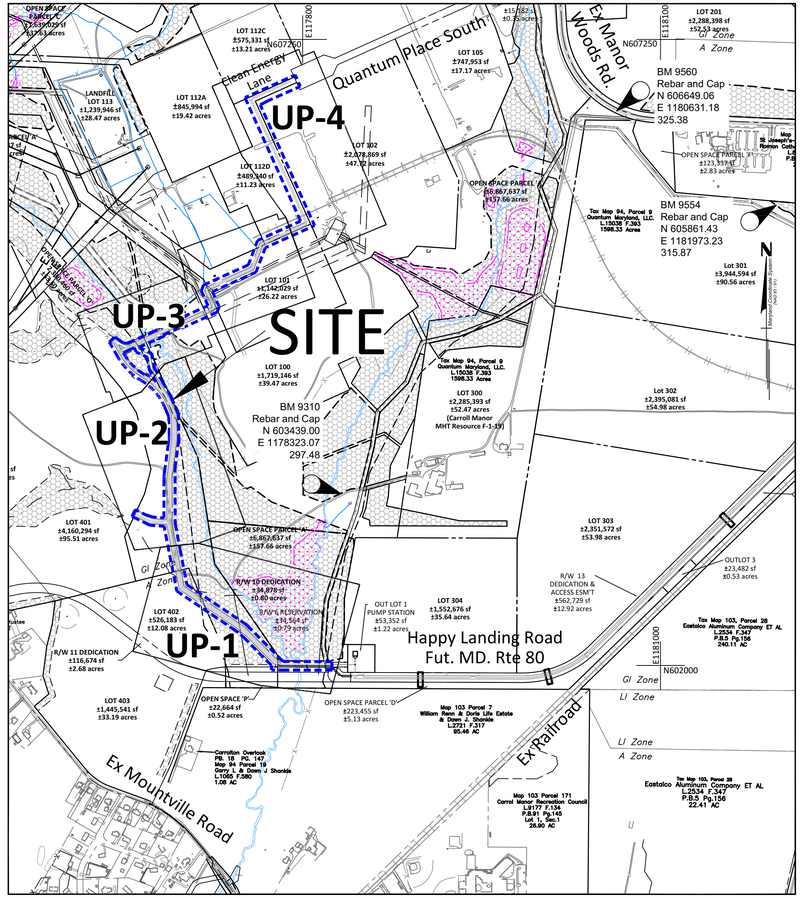
Quantum Frederick

Water, Potable Cooling Water & Sewer
West Loop to Quantum Place South &
Conn's to lots 100, 101 and 401

Combined Stormwater Management Development and Improvement Plan

GENERAL NOTES:

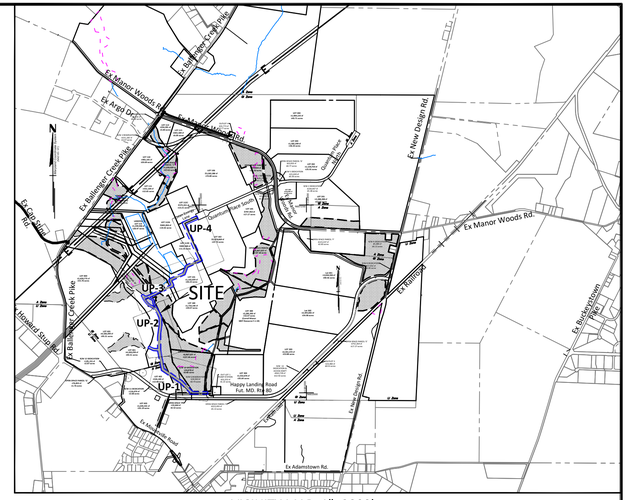
1. Total site area approved under Section 1 Preliminary Plan (PP266504) = ±1,053.78 Acres and Section 2 Preliminary Plan (PP273777) = ±258.67 Acres. The property is zoned LI, GI and A and is in the Adamstown Planning Region with a land use designation of General Industrial and Agriculture/Rural and Natural Resource per the 2010 Comprehensive Plan.
2. The Preliminary Plan is comprised of Parcels 70, 71 and part of Parcel 9, Tax Map 94 recorded in Liber 15038 at folio 393.
3. The property is located on Frederick County Tax Maps 94 and Frederick County Soils Maps 94.
4. Boundary information as shown on this plan was taken from August 2021 field boundary surveys conducted by Rodgers Consulting, Inc., and other available deed and plat information.
5. Topography is shown hereon at 2 foot contour intervals per photogrammetric mapping compiled by McKenzieSnyder, Inc., based on aerial photography and LiDAR data collected in April 2021.
6. Survey datum is the Maryland Coordinate System [NAD83(2011), SPCS zone 1900(MD), U.S. Survey Feet], based on static GPS observations post-processed by the National Geodetic Survey's Online Positioning User Service (OPUS). Measured points include RCI control points 9501 and 9504. The average combined (map scale x elevation) factor for the site is 0.99997061.
   9501 N 609450.579 E 1184241.605
   9504 N 604476.704 E 1174468.799
   Vertical datum is NAVD88, based on static GPS observations post-processed by the National Geodetic Survey's Online Positioning User Service (OPUS). Measured points include RCI control points 9501 and 9504.
   9501 NAVD88 orthometric height 300.656
   9504 NAVD88 orthometric height 377.729
7. This property is to be served by public water & sewer. The current water & sewer classification for the Section 1 Site LI/GI zoned property is W1/W3 and S4. The Section 2 Site LI/GI zoned property is W5/S5. Property zoned A is not designated for public water and sewer.
8. This property is within the Tuscarora Creek Watershed and is a Class I-P watershed. **In-stream work may not be conducted between March 1st and June 15th inclusive of any year.**
9. The 100 Year Floodplain as shown is a compilation of several sources of data per Section 1-19-9.100 of the Frederick County Zoning Code. The line shown represents the greatest extent of the following: FEMA, Frederick County Floodplain Soils, and wetlands adjacent to other floodplain sources. A minimum setback of 25 feet shall be provided from all Floodplain district boundaries, except as otherwise approved through the mitigation process described in § 1-19-9.110(B)(7), or a minimum setback of 50 feet shall be provided from the bank of any perennial or intermittent stream, whichever is greater. All setback areas shall be maintained or planted with natural vegetation. This plan includes work within the floodplain and was approved 2023.02.15 - **MDE Tracking No. 22-NT-3124 & USACE Tracking No. 202260907**. The NOI for this plan is under review - Tracking No.MDRCK06R2.
10. Wetlands were delineated in September of 1996 and reconfirmed in Spring 2021 by RCI staff, in conformance with the 1987 U.S. Corps of Engineers' delineation manual. There are no wetlands present within the limits of this plan. Some wetland delineation boundaries were revised in Summer 2022 in conjunction with MDE review.
11. The project purpose is to construct a 12" waterline to provide domestic and fire service completing a western loop to Quantum Place South, a parallel 16" potable cooling water line to provide cooling water for data center operations and a parallel sewer line.
12. A Preliminary Forest Conservation Plan was approved under F266567 on 2021.12.15. Quantum Frederick Final FRO Plan Section 1 was approved under F271158 on 2022.06.17. Section 2 Preliminary FRO Plan was approved under F273779 on 2023.02.08.
13. The project scope of work consists of linear trenching for installation of proposed sewer, water & potable cooling waterline improvements. Stormwater Management shall be addressed through the use of vegetative filtering and other Best Management Practices in accordance with the Maryland 2000 Stormwater Design Manual & 2007 Supplement including all revisions and amendments. The Quantum Frederick Stormwater Management Concept Plan, PW 266568, was approved by Frederick County.
14. The Ballenger-McKinney Sewage Treatment Plant provides sanitary sewage treatment for this project & the New Design Water Treatment Plant provides potable water service for this project.
15. The location, orientation, grading through and around all water and sewer easements outside of the public right of way are subject to approval by the Division of Water and Sewer Utilities with the Improvement Plan.
16. Non-governmental users shall dedicate the floodplain areas to a Lot Owners Association in open space parcels.
17. This site is subject to APFO requirements for roads, water and sewer, this site is exempt from schools.
18. Lot 300 contains Carrollton Manor designated to the National Register of Historic Places and identified on the Maryland Inventory of Historic Properties (MIHP) as inventory number F-1-19.
19. The Landfills on-site are considered closed by the Maryland Dept. of the Environment (MDE). No disturbances are proposed. Any disturbance will require MDE approval. Contact #410-537-3315.
20. No buildings, structures, or impervious surfaces, and no activities requiring clearing or grading over 5,000 square feet will be permitted in waterbody buffers, except for stormwater management facilities, structures and appurtenant conveyances; environmental restoration or mitigation projects; utilities; public and private roads; driveways; bikeways, and trails unless otherwise permitted per1-19-9.400.
21. The waterbody buffers shown on this plan were delineated based on Section 1-19-9.400(C) of the Frederick County Code (the waterbody buffer ordinance). First, a minimum 100' buffer was delineated on each side of intermittent and perennial streams. Second, 175-foot cross-sections were taken at 50-foot intervals along each stream. The buffer was expanded to 150 feet along these cross sections when 60% of the cross-section contained slopes between 15% -25%. The buffer was expanded to 175 feet along these cross sections when 60% of the cross-section contained slopes 25% and greater. The buffer was adjusted to the top of the crest per the waterbody buffer ordinance when applicable. The streams shown on this plan are located outside of the Linganore Watershed Protection Area. After the cross-sections were taken the waterbody buffer was expanded to include wetlands and floodplains, including flooding soils, that extend outside of hate calculated waterbody buffer area.
22. No subsurface investigation has been performed by Rodgers Consulting, Inc. to determine ground water, rock or any other natural or manmade existing feature.
23. Certain areas of Frederick County are located within the Monocacy Valley Region which is historically considered to contain subsurface limestone formations with inherent solution cavities commonly referred to as sinkholes. Engineers recommend that the party responsible for the construction of this development retain the services of a professional geotechnical engineer to investigate the site's suitability for construction and make recommendations for site development and corrective measures if subsurface conditions affecting the site are discovered.
24. Any attempts to estimate costs associated with rock handling / removal and/or subsurface must be based on geotechnical reports and recommendations. Geotechnical reports may include information pertinent to the development of the site which is not included on these plans. The contractor must consult any existing geotechnical or other consultant's reports in conjunction with this set of plans.
25. Engineers are not responsible for the contractor's means or methods for construction, including, but not limited to the contractor's utilization of men, materials, equipment or safety measure in the performance of any work for this construction. The contractor assumes all responsibility for performing the work correctly and in conformance with all federal, state, and local code and/or regulatory requirements.
26. The contractor shall notify Miss Utility at 1-800-257-7777, at least 72 hours before the start of construction and shall not commence any excavation work until all utilities are located.
27. The contractor shall notify the applicable county and/or state authorities at least 48 hours before beginning any work within public rights of way.
28. All contractors must comply with all applicable County, State and Federal safety, labor and industry regulations to include MOSHA, OSHA, etc, all work will comply with the Maryland Handicap code.
29. The contractor shall be responsible for obtaining all necessary permits and for complying with all applicable legal and regulatory requirements.
30. The contractor shall note that in case of a discrepancy between the scaled and figured dimensions shown on these plans the figured dimensions shall govern.
31. Contractor shall be responsible for notifying the engineers in the event of any discrepancies in the plans or in the relationships of finished grades to existing grade prior to beginning work.
32. It shall be distinctly understood that failure to mention specifically any work which would normally be required to complete the project shall not relieve the contractor of his responsibility to perform such work.
33. All existing paving disturbed by the contractor's operation shall be replaced in accordance with the County Inspector's direction.
34. All benchmarks shall be maintained for the duration of construction until County has granted final approval of project.
35. The Contractor shall not (1) stage work, (2) store materials or (3) permit parking of equipment and/or construction-related vehicles in the public rights-of-way or publicly-owned property without prior approval of the County Traffic Engineer or designee. Where practical and to the degree possible, the Engineer shall designate on these plans appropriate space that can be utilized for the above purposes. It is the Contractor's ultimate responsibility to ensure that proper and appropriate areas are secured for these uses for the duration of the project.
36. Contractor shall be responsible for preventing dust, debris and mud from entering all roadways. If dust, dirt and/or mud happen to override the prevention measures and enter the roadway or sidewalk, the contractor shall be required to clean the roadway or sidewalk as soon as possible, at his/her expense. The contractor shall be responsible for the elimination of dust in the air by the required watering of the ground as needed.
37. Any necessary adjustments of sewer appurtenances, manholes, etc. will be in accordance with the Frederick County General Conditions and Standard Specifications for Water Mains, Sanitary Sewers and Related Structures, Standard Details, and Special Provisions and Amendments thereto. No adjustments to DWSU facilities is to be made without written authorization from Frederick County DWSU.
38. All utilities outside of right-of-ways or public utility easements to be owned and maintained by property owner.
39. When working in the area of an existing gas line, the Contractor shall have the Washington Gas Company (301)662-2151 verify that no leaks exist prior to any work in the area. A Gas Company representative must be present at the project site before any blasting within 20 feet of gas lines. Any excavation within 5' of a gas line shall be done by hand (no machinery). The Developer, or the Developer's Representative shall get approval from the Gas Company for any work within a gas line easement area.
40. Contractor is responsible for maintenance of traffic on existing roadways in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) and the Maryland Sate Highway Administration (SHA) Book of Standards, latest editions.
41. Developer is responsible for all cost related to temporary and permanent traffic control (pavement markings, signage, signalization, traffic barriers, flaggers, etc.)
42. If temporary parking, ingress/egress or pedestrian restrictions shall be required during project, the Contractor shall be responsible for installing signs and notifying all affected residents/businesses at least 1 day in advance. Contractor is responsible for contacting the appropriate County authorities before any of the above modifications are enacted.
43. All easements necessary to provide public access/maintenance/etc will be recorded and referenced on the final plats.
44. See Sheet 16 (WSN-1) for Water & Sewer General Notes.
45. Construction activities shall conform to provisions set forth in the Environmental Covenant L.12205 F.01.
46. This site is subject to an MDE Environmental Management Plan (EMP). Any disturbance on site must comply with requirements of the most current "Environmental Management Plan, Former Alcoa Eastalco Works - Initial Infrastructure Phase" , Prepared by Geo-Technology Associates, Inc. (GTA), Ph: (410)792-9446. The EMP addresses or references contractor Health and Safety Plan (HASP) requirements and other on-site requirements before, during, and after construction activities.



LOCATION MAP
Scale: 1"=600'
GRAPHIC SCALE

600' 0 300' 600' 1,200' 2,400'

1 INCH = 600 FT



VICINITY MAP: 1"=2000'
Tax Map 94
Parcel 9 (Tax Acct. #01-005405)
Parcel 70 (Tax Acct. #01-000152)
Parcel 71(Tax Acct. #01-005383)

LEGEND

- LIMITS OF PLAN
- 50' STREAM B.R.L.
- WETLANDS
- WETLAND 25' B.R.L.
- 100 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN B.R.L.
- SOILS LINES
- SOIL TEXT TYPE (GdB)
- 30" > DBH TREE
- EXISTING TREE LINE
- FOREST CONSERVATION EASEMENT
- FOREST PLANTING AREA
- STREAMS

Division of Water and Sewer Utilities Notes:

1. A waste fixture count must be prepared by the Frederick County DWSU, Division of Engineering and Planning before a building permit can be approved.
2. Each tenant or owner shall complete an industrial waste survey and comply with the Frederick County industrial waste ordinance. Furnishment and installation of monitoring manholes, grease taps and other pre treatment devices shall be the responsibility of the owner or contract purchaser of the lot. The final location of said devices are subject to review and approval by Frederick County DWSU as part of the site improvement plan.

WATER & SEWER SWM NOTES:

1. THE PROJECT SCOPE OF WORK CONSISTS OF LINEAR TRENCHING FOR INSTALLATION OF PROPOSED WATER, NON-POTABLE WATER AND SEWER LINE IMPROVEMENTS.
2. THERE IS NO INCREASE IN IMPERVIOUS AREA PROPOSED BY THIS PLAN.
3. "BEST MANAGEMENT PRACTICES" ARE TO BE FOLLOWED FOR SITE STORMWATER MANAGEMENT:
   A. STORMWATER QUALITY MANAGEMENT SHALL BE ADDRESSED THROUGH THE USE OF VEGETATIVE FILTERING AND OTHER BEST MANAGEMENT PRACTICES AS OUTLINED IN CHAPTER 5 OF THE "2000 MARYLAND STORMWATER DESIGN MANUAL."
   B. THE AREA DISTURBED DOES NOT IMPACT ADDITIONAL WOODED AREA BEYOND THE WATER & SEWER EASEMENT LIMITS OR DEGRADE THE CURRENT LAND USE.
   C. ALL DISTURBED AREAS SHALL BE RETURNED TO A COMPARABLE OR BETTER CONDITION THAN WHAT PREVIOUSLY EXISTED.
   D. REGRADED AREAS SHALL NOT FURTHER IMPACT OTHER PROPERTIES WITH RESPECT TO DRAINAGE.
   E. THE TOP 6-INCH BACKFILL LAYER LOCATED WITHIN GRASS AND/OR OTHER PERVIOUS AREAS IS NOT TO BE COMPACTED.

SHEET INDEX

Sheet 1	Cover Sheet	CS-1
Sheet 2	Overall Sediment Control Plan	SC-1
Sheet 3	Sediment Control Plan	SC-2
Sheet 4	Sediment Control Plan	SC-3
Sheet 5	Sediment Control Plan	SC-4
Sheet 6	Sediment Control Plan	SC-5
Sheet 6A	Sediment Control Plan	SC-6
Sheet 7	Sediment Control Notes & Details	ND-1
Sheet 8A	Overall Utility Plan	UP-0
Sheet 8	Utility Plan	UP-1
Sheet 9	Utility Plan	UP-2
Sheet 10	Utility Plan	UP-3
Sheet 11	Utility Plan	UP-4
Sheet 12	Water & Sewer Profiles	WSP-1
Sheet 13	Water & Sewer Profiles	WSP-2
Sheet 14	Water & Sewer Profiles	WSP-3
Sheet 15	Water & Sewer Profiles	WSP-4
Sheet 16	Water & Sewer Notes	WSN-1
Sheet 17	Water & Sewer Details	WSD-1

TAX MAP #:	94
TAX ACCOUNT #:	01-000152 01-005405
COUNTY FILE	S-1179
PRELIMINARY FRO SECTION 1	F266567
PRELIMINARY PLAN SECTION 1	PP273774
PRELIMINARY FRO SECTION 2	F273779
PRELIMINARY PLAN SECTION 2	PP273777
SWM CONCEPT PLAN	PW266568
FINAL FRO PHASE 1	F271158
FINAL FRO PHASE 2	F274907
IMPROVEMENT PLAN	PW275326

INTERNAL USE ONLY
DEVELOPMENT REVIEW
FILE #: S-1179
A/P #: PW275326
DUE DATE:

SWM Concept Plans
- Section 1 & Part of Sections 2 & 3 (PW266568) Approved 11/30/2021
- Section 2 (PW273817) Approved 11/29/2022

FREDERICK SOIL CONSERVATION DISTRICT
APPROVED BY Steve Leatherman DISTRICT MANAGER
DATE 5-30-23
SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

FREDERICK COUNTY DIVISION OF
WATER AND SEWER UTILITIES
REVIEWED: Martin Shuck DIRECTOR 6/5/2023 DATE
REVIEWED: Brian J. Baker DEPARTMENT HEAD, ENGINEERING AND PLANNING 6/5/2023 DATE
THE ABOVE SIGNATURES ARE FOR THE COUNTY'S PURPOSE INDICATING THE DESIGN COMPLIES WITH THE PROGRAM OBJECTIVES AND TO AUTHORIZE THE PROJECT TO PROCEED TO THE NEXT STAGE IN THE CONSTRUCTION PROCUREMENT PROCESS. THIS REVIEW DOES NOT IN ANY WAY RELIEVE THE ARCHITECT/ENGINEER OF THEIR RESPONSIBILITY FOR THE PROVESSIONAL QUALITY, TECHNICAL ADEQUACY, AND COORDINATION OF ALL DESIGNS, DRAWINGS, SPECIFICATIONS AND OTHER SERVICES FURNISHED UNDER THIS AGREEMENT.

CERTIFICATION OF THE QUANTITIES

I hereby certify that the estimated total amount of excavation and fill as shown on these plans has been computed to 21,693 c.y. of excavation, 21,693 c.y. of fill and the total area to be disturbed as shown on these plans has been determined to be 920,394 square feet.

Phillip Thomas Wagner 4/24/2023
Signature Date
Phillip Thomas Wagner 29782
Printed Name Registration Number

Note: These figures are estimated quantities for Sediment Control purposes only.

ENGINEER/ARCHITECT DESIGN CERTIFICATION

"I hereby certify that the plans have been designed in accordance with local ordinances, COMAR 26.17.01, and 2011 Maryland Standards and Specifications for Soil and Sediment Control."

Phillip Wagner 29782 4/24/2023
Signature Reg. No. Date

OWNER'S/DEVELOPER'S CERTIFICATION

I certify that this plan of Sediment Control will be implemented to the fullest extent, and all structures will be installed to the design and specifications as spelled out in this plan and that any responsible personnel involved in construction project will have a certification of attendance at a Department of Natural Resources approved training program for the control of sediment and erosion before beginning the project. I also authorized periodic on site evaluation by the Frederick Soil Conservation District personnel and cooperating agencies.

Owner/Developer Certificate
Quantum Maryland, LLC
Date: 4/24/2023 By: A.D Robison
Authorized Person

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND PHILLIP THOMAS WAGNER 29782 PROFESSIONAL ENGINEER
5/25/2023

CALL "MISS UTILITY" AT 1-800-257-7777 72 Hours Before Start Of Construction

Contract No. 603D-SW

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Cover Sheet

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South
QUANTUM FREDERICK
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: As shown
JOB No. 1339A2
April, 2023
INDEX No. CS-1
SHEET No. 1 OF 17,6A&8A

5/15/2023
4/24/2023

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

Signature:

Overall Sediment Control Plan

Prop. Stabilized Construction Entrance # SCE-1

Ex Stockpile/ Staging Area #SA-2

Prop Stockpile/ Staging Area #SA-1

Ex Stabilized Construction Entrance # SCE-2 (PW275129)

Ex Stabilized Construction Entrance #SCE-3 (PW 271145)

Ex Stabilized Construction Entrance #SCE-4 (PW 273380)

Ex Stabilized Construction Entrance # SCE-5 (PW271142)

Ex Staging Area #SA-3 (PW 271145)

Ex Staging Area #SA-4 (PW 271142)

LOT 106 ±3,262,386 sf ±74.89 acres

LOT 102 ±2,078,869 sf ±47.72 acres

LOT 112D ±489,340 sf ±11.23 acres

LOT 101 ±1,142,029 sf ±26.22 acres

LOT 100 ±1,719,146 sf ±39.47 acres

Lot 301 ±3,944,594 sf ±90.56 acres

PACE PARCEL 'F' 123,337 sf ±2.83 acres

Quantum Place South

Fut. Quantum Place North

Fut. Clean Energy Lane

Ex. Manor Woods Road

Fut. Happy Landing Road

Fut. MD Route 80

Ex. Ballenger Creek Pike

Ex. Mountville Rd.

Tuscarora Creek

Huntsman Creek

Prop Silt Fence

Prop Super Silt Fence

Ex Silt Fence (PW 275129)

Ex Super Silt Fence (PW 271145)

Ex Super Silt Fence (PW 273380)

Ex Super Silt Fence (PW275129)

Ex Super Silt Fence (PW 271142)

Ex Silt Fence (PW 271145)

Ex Super Silt Fence (PW275040)

Ex Silt Fence (PW275040)

Ex Super Silt Fence

WDS-3 WDS-4 WDS-5 WDS-6N WDS-6S WDS-7 WDS-8

SC-2 SC-3 SC-4 SC-5 SC-6

N607400 N606000 E1178000 E1181800

LEGEND

- EXISTING TREE
- EXISTING TREE - TO BE REMOVED
- TREE PROTECTION (ARMOR)
- EXISTING TREELINE
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- EXISTING 100 YEAR FLOODPLAIN
- EXISTING WATERBODY BUFFER
- EXISTING TOPO w/ CONTOUR LABEL (380 / 378)
- SOILS LINES
- GdB — SOIL TYPE
- EXISTING DRAINAGE DIVIDE
- LOD — LIMIT OF DISTURBANCE
- SSF SSF — EX SUPER SILT FENCE
- SF SF — EX SILT FENCE
- SSF SSF — SUPER SILT FENCE
- SF SF — SILT FENCE
- SCE — STABILIZED CONSTRUCTION ENTRANCE
- FOREST CONSERVATION EASEMENT
- FOREST PLANTING AREA
- ENVIRONMENTAL COVENANT BOUNDARY L.12205 F.001
- WDS-7 — WASTE DISPOSAL SITE LIMITS
- SOIL MANAGEMENT AREA L.12205 F.001

Symbol	Soil Type/ Classification	HSG
AfB	Adamstown-Funkstown complex, 0 to 8 percent slopes	C
CrA	Croton-Abbottstown silt loams, 0 to 3 percent slopes	D
CrB	Croton-Abbottstown silt loams, 3 to 8 percent slopes	D
DtB	Duffield-Ryder silt loams, 3 to 8 percent slopes	B
HcB	Hagerstown-Opequon silty clay loams, 3 to 8 percent slopes, rocky	B
KeC	Klinesville very channery loam, 8 to 15 percent slopes	D
KeD	Klinesville very channery loam, 15 to 25 percent slopes	D
KnC	Klinesville channery silt loam, 8 to 15 percent slopes	D
LsA	Lindside silt loam, 0 to 3 percent slopes	C
MaA	Melvin-Lindside silt loams, 0 to 3 percent slopes	B/D
MbB	Morven loam, 3 to 8 percent slopes	B
PaB	Penn loam, 3 to 8 percent slopes	B
PrB	Penn-Reaville silt loams, 3 to 8 percent slopes	B
RgA	Readington silt loam, 0 to 3 percent slopes	C
RgB	Readington silt loam, 3 to 8 percent slopes	C
RwA	Rowland silt loam, 0 to 3 percent slopes	C
SpB	Springwood gravelly loam, 3 to 8 percent slopes	C
SpC	Springwood gravelly loam, 8 to 15 percent slopes	C
UdB	Udorthents, smooth, 0 to 8 percent slopes	C
UrC	Urban land, 3 to 15 percent slopes	D
W	Water	

NOTE:
Sediment control measures shown as existing are approved under Frederick Co. plans PW271142, PW271145, PW275129, PW275040 & PW273380

NOTES:
- Place all excavated material on high side of trench.
- Only do as much work as can be done on one day so backfilling, final grading, seeding and mulching can occur. No stockpile area is required.
- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

GRAPHIC SCALE

300 0 150' 300' 600' 1200'

1 INCH = 300 FT

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____ DISTRICT MANAGER

DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND · PHILLIP THOMAS · 29782 · PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE _____

5/15/2023

4/24/2023

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=300'
JOB No.	1339A2
	April, 2023
INDEX No.	
SHEET No.	2 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

Match Line - See Sheet SC-3

Ex. Environmental Covenant
L. 12205 F.01

100Yr Floodplain

100Yr Floodplain Buffer

Prop Silt Fence

E 1,176,900

N 602,800

Ex unpaved road

Waterbody Buffer

PARCEL 'O'
OPEN SPACE

Ex. FRO Esm't
L.16174 F.213

Ex unpaved road

Wetlands Buffer

Wetlands

Tuscarora Creek

Prop. Public
W/S Esm't
L. F.

Prop Silt Fence

Prop Stockpile and Staging Area #1
Max Height 15'
Max Slope 2:1

LOT 402

Prop. FRO Esm't
L. F.

NOTES:
- Place all excavated material on high side of trench.
- Only do as much work as can be done on one day so backfilling, final grading, seeding and mulching can occur. No stockpile area is required.
- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

Impacts for this area between the W/S Esm't and the L.O.D. within the "Effective 100Yr Floodplain at time of Nontidal Wetlands and Waterway Permit 22-NT-3124/202260907" are not covered by the current MDE Permit 22NT-3124/202260907. Disturbances are not permitted in this area until a permit modification has been approved by MDE. Work within the W/S Esm't is permitted and can proceed without permit modification.

Effective 100Yr Floodplain at time of Nontidal Wetlands and Waterway Permit 22-NT-3124/202260907. Site is still subject to this Floodplain for MDE permitting while this permit is open.

Prop. FRO Esm't
L. F.

Ex. Environmental Covenant
L. 12205 F.01

Waterbody Buffer

Public
W/S Esm't
L. F.

Remove ex silt fence within LOD. Conn prop. silt fence to ex. silt fence.

Ex Super Silt Fence

Contractor to install stream diversion and utility crossing per details on sht. ND-1 or as directed by the sediment control Inspector. Based on field conditions and with the inspectors approval, a pump around may be used in lieu of a diversion pipe. See detail this sheet. After installation, the contractor is to line the stream bed with riprap stabilization per MDE Std 2.1 (see detail on sht. ND-1).

R/W 10 DEDICATION
FUTURE MD ROUTE 80

LEGEND

- Ex. tree
- Ex. treeline
- Ex. wetland
- Ex. wetland buffer
- Ex. 100 year floodplain
- Ex. waterbody buffer
- Ex. topo w/ contour label
- LOD — Limit of disturbance
- SSF SSF — Ex. super silt fence
- SF SF — Ex. silt fence
- SSF SSF — Super silt fence
- SF SF — Silt fence
- Stabilized construction entrance
- Forest conservation easement
- Forest planting area
- Environmental covenant boundary
- L.12205 F.001
- WDS-7 — Waste disposal site limits
- Soil management easement
- L. 12205 F.001

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

FREDERICK SOIL CONSERVATION DISTRICT
APPROVED BY _____ DISTRICT MANAGER
DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

MGWC 1.2: PUMP-AROUND PRACTICE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing a temporary pump around and supporting measures to divert flow around in-stream construction sites.

IMPLEMENTATION SEQUENCE

Sediment control measures, pump-around practices, and associated channel and bank construction should be completed in the following sequence (refer to Detail 1.2):

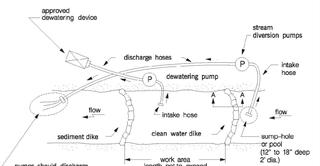
1. Construction activities including the installation of erosion and sediment control measures should not begin until all necessary easements and/or right-of-ways have been acquired. All existing utilities should be marked in the field prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and should repair the damage at his/her own expense to the county's or utility company's satisfaction.
2. The contractor should notify the Maryland Department of the Environment or WMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor should inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.
3. The contractor should conduct a pre-construction meeting on site with the WMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. The contractor should stake out all limits of disturbance prior to the pre-construction meeting so they may be reviewed. The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance which will be removed for construction access. Trees should not be removed within the limit of disturbance without approval from the WMA or local authority.
4. Construction should not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor should stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible.
5. Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor should begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. In some cases, work may begin downstream if appropriate. The sequence of construction must be followed unless the contractor gets written approval for deviations from the WMA or local authority. The contractor should only begin work in an area which can be completed by the end of the day including grading adjacent to the channel. At the end of each work day, the work area must be stabilized and the pump around removed from the channel. Work should not be conducted in the channel during rain events.
6. Sandbag dikes should be situated at the upstream and downstream ends of the work area as shown on the plans, and stream flow should be pumped around the work area. The pump should discharge onto a stable velocity dissipater made of riprap or sandbags.

MGWC 1.2: PUMP-AROUND PRACTICE

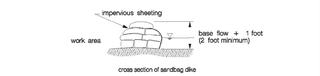
7. Water from the work area should be pumped to a sediment filtering measure such as a dewatering basin, sediment bag, or other approved source. The measure should be located such that the water drains back into the channel below the downstream sandbag dike.
8. Traversing a channel reach with equipment within the work area where no work is proposed should be avoided. If equipment has to traverse such a reach for access to another area, then timber mats or similar measures should be used to minimize disturbance to the channel. Temporary stream crossings should be used only when necessary and only where noted on the plans or specified. (*See Section 4, Stream Crossings, Maryland Guidelines to Waterway Construction*).
9. All stream restoration measures should be installed as indicated by the plans and all banks graded in accordance with the grading plans and typical cross- sections. All grading must be stabilized at the end of each day with seed and mulch or seed and matting as specified on the plans.
10. After an area is completed and stabilized, the clean water dike should be removed. After the first sediment flush, a new clean water dike should be established upstream from the old sediment dike. Finally, upon establishment of a new sediment dike below the old one, the old sediment dike should be removed.
11. A pump around must be installed on any tributary or storm drain outfall which contributes baseflow to the work area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. This water should discharge onto the same velocity dissipater used for the main stem pump around.
12. If a tributary is to be restored, construction should take place on the tributary before work on the main stem reaches the tributary confluence. Construction in the tributary, including pump around practices, should follow the same sequence as for the main stem of the river or stream. When construction on the tributary is completed, work on the main stem should resume. Water from the tributary should continue to be pumped around the work area in the main stem.
13. The contractor is responsible for providing access to and maintaining all erosion and sediment control devices until the sediment control inspector approves their removal.
14. After construction, all disturbed areas should be regraded and revegetated as per the planting plan.

Maryland's Guidelines To Waterway Construction
DETAIL 1.2: PUMP–AROUND PRACTICE

PLAN VIEW



SECTION A–A



cross section of sandbag dike

PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND — THOMAS PHILLIP DRAGNA — 29782 — PROFESSIONAL ENGINEER

5/25/2023

GRAPHIC SCALE
50' 0 25' 50' 100' 200'
1 INCH = 50 FT

REVISION	DATE	REVISION	DATE

5/15/2023

4/24/2023

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Sediment Control Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=50'
JOB No. 1339A2
April, 2023
INDEX No. SC-2
SHEET No. 3 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

PARCEL 'A'
OPEN SPACE

PARCEL '0'
OPEN SPACE

LOT 401

LOT 401

LOT 401

Tuscarora Creek

Prop Silt Fence

Prop. FRO Esm't
L. F.

Ex. Soil Management Esm't
L. 12205 F.01

Ex Fence

Ex. Overhead Elec.

Ex Util. Pole

Ex Utility Pole

Ex Util.Pole

100Yr Floodplain

100Yr Floodplain Buffer

Ex. Environmental Covenant
L. 12205 F.01

Prop. Public
W/S Esm't
L. F.

Ex. FRO Esm't
L.16174 F.213

Effective 100Yr Floodplain at time of Nontidal Wetlands and Waterway Permit 22-NT-3124/202260907. Site is still subject to this Floodplain for MDE permitting while this permit is open.

Ex unpaved road

Match Line - See Sheet SC-4

Match Line - See Sheet SC-6

Match Line - See Sheet SC-2

N 604,150
E 1,176,475

N 603,100
E 1,177,100

Maryland Coordinate System
Scale: 1" = 50'

NOTES:
- LOD is 14' centered on existing unpaved drive
- This area it to be used for access only - no excavation is proposed.
- Any incidental earth disturbance caused by access operations is to be returned to existing grade and stabilized the same day.

NOTES:
- Place all excavated material on high side of trench.
- Only do as much work as can be done on one day so backfilling, final grading, seeding and mulching can occur. No stockpile area is required.
- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

LEGEND

- Ex. tree
- Ex. treeline
- Ex. wetland
- Ex. wetland buffer
- Ex. 100 year floodplain
- Ex. waterbody buffer
- Ex. topo w/ contour label
- Limit of disturbance
- Ex. super silt fence
- Ex. silt fence
- Super silt fence
- Silt fence
- Stabilized construction entrance
- Forest conservation easement
- Forest planting area
- Environmental covenant boundary
- L.12205 F.001
- Waste disposal site limits
- Soil management easement
- L. 12205 F.001

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____ DISTRICT MANAGER

DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND · THOMAS PHILLIP DUGAN · 29782 · PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE _____

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Sediment Control Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=50'
JOB No. 1339A2
April, 2023
INDEX No. SC-3
SHEET No. 4 OF 17,6A&8A

5/15/2023
4/24/2023

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

Match Line - See Sheet SC-5

LOT 112D

LOT 113

LOT 101

LOT 100

Prop Silt Fence

Prop Super Silt Fence

Ex. Monitoring Well

Prop. Public W/S Esm't L. F.

Ex. sewer manhole & associated pipe to be removed within easement area

Ex. Monitoring Well

Ex. Monitoring Well

Ex. Landfill

Ex. Monitoring Wells

Ex. 36"CMP

Ex. 15"CMP

Waterbody Buffer

Ex. AT&T Esm't L.802 F.294

N 605,350

E 1,177,650

E 1,177,100

N 604,975

E 1,177,650

Ex. Monitoring Well

Ex. AT&T Esm't L.802 F.294

Ex. AT&T Esm't L.823 F.429

Future private road

Ex. AT&T MH & conduit to be removed or relocated prior to construction.

Waterbody Buffer

Prop Silt Fence

8"W

Prop Super Silt Fence

Ex. AT&T Esm't L.823 F.429

Prop. Public W/S Esm't L. F.

Match Line - See This Sheet

Harford Coordinate System Scale: 1" = 50'

NOTES:
- Place all excavated material on high side of trench.
- Only do as much work as can be done on one day so backfilling, final grading, seeding and mulching can occur. No stockpile area is required.
- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

LEGEND

- Ex. tree
- Ex. treeline
- Ex. wetland
- Ex. wetland buffer
- Ex. 100 year floodplain
- Ex. waterbody buffer
- Ex. topo w/ contour label
- LOD — Limit of disturbance
- SSF — SSF — Ex. super silt fence
- SF — SF — Ex. silt fence
- SSF — SSF — Super silt fence
- SF — SF — Silt fence
- STABILIZED CONSTRUCTION ENTRANCE SCE — Stabilized construction entrance
- Forest conservation easement
- Forest planting area
- Environmental covenant boundary
- L.12205 F.001
- WDS-7 — Waste disposal site limits
- Soil management easement
- L. 12205 F.001

Match Line - See This Sheet

Prop. Public W/S Esm't L. F.

N 605,050

E 1,177,000

100Yr Floodplain Buffer

100Yr Floodplain

Waterbody Buffer

Effective 100Yr Floodplain at time of Nontidal Wetlands and Waterway Permit 22-NT-3124/202260907. Site is still subject to this Floodplain for MDE permitting while this permit is open.

Harford Coordinate System Scale: 1" = 50'

Prop. FRO Esm't L. F.

Ex Fence

PARCEL 'A' OPEN SPACE

Waste Disposal Site 9

Prop Super Silt Fence

Contractor to install stream diversion and utility crossing per details on sht. ND-1 or as directed by the sediment control Inspector. Based on field conditions and with the inspectors approval, a pump around may be used in lieu of a diversion pipe. See detail on sheet SC-2. After installation, the contractor is to line the stream bed with riprap stabilization per MDE Std 2.1 (see detail on sht. ND-1).

N 605,050

E 1,176,600

Ex. Overhead Elec.

Ex. Util. Pole

Ex. Soil Management Esm't L. 12205 F.01

Ex. Util. Pole To be relocated by others

Prop. Public W/S Esm't L. F.

PARCEL '0' OPEN SPACE

Ex. Environmental Covenant L. 12205 F.01

Prop. FRO Esm't L. F.

Waterbody Buffer

Prop Silt Fence

Ex Fence

Match Line - See Sheet SC-3

N 604,350

E 1,176,600

Prop. Public W/S Esm't L. F.

Remove ex. fence within limits of water and sewer easement

LOD

418

419

Effective 100Yr Floodplain at time of Nontidal Wetlands and Waterway Permit 22-NT-3124/202260907. Site is still subject to this Floodplain for MDE permitting while this permit is open.

NOTES:
- Place all excavated material on high side of trench.
- Only do as much work as can be done on one day so backfilling, final grading, seeding and mulching can occur. No stockpile area is required.
- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____ DISTRICT MANAGER

DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND — PHILLIP THOMAS DEGRAW — 29782 — PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
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Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=50'
JOB No. 1339A2
April, 2023
INDEX No. SC-4
SHEET No. 5 OF 17,6A&8A

5/15/2023

4/24/2023

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

Signature:

Ex. Ballenger Creek Pike

Map 94 Parcel 17
Daniel J. Geisinger
L.8670 F.393

Potomac Edison 13KV Underground Line

Builders Supply & Lumber Co Inc
C/O Builders First Source
L.2396 F.816
P.B.20 Pg.119
Lot 1, Sec 1

Map 94 P79

LOT 400

LOT 401

First Energy 230KV Transmission Lines

Ex. P.E. Easement
L.804 F.401

Ex. Transmission Tower

Ex unpaved road

LOD

E 1,174,400
N 604,500

E 1,175,350
N 604,500

E 1,175,350
N 604,000

E 1,175,900
N 604,000

E 1,175,900
N 603,675

E 1,176,450
N 603,675

Prop Stabilized Construction Entrance #SCE-1

NOTES:
- LOD is 14' centered on existing unpaved drive. Three -25'x80' bump outs are provided for vehicle bypass lanes in the event of 2-way traffic.
- This area it to be used for access only - no excavation is proposed.
- Any incidental earth disturbance caused by access operations is to be returned to existing grade and stabilized the same day.

Match Line - See this sheet

Match Line - See Sheet SC-3

N

Maryland Coordinate System
Scale: 1" = 50'

GRAPHIC SCALE

60' 0 30' 60' 120' 240'
1 INCH = 60 FT

LEGEND

- Ex. tree
- Ex. treeline
- Ex. wetland
- Ex. wetland buffer
- Ex. 100 year floodplain
- Ex. waterbody buffer
- Ex. topo w/ contour label
- LOD — Limit of disturbance
- SSF — SSF — Ex. super silt fence
- SF — SF — Ex. silt fence
- SSF — SSF — Super silt fence
- SF — SF — Silt fence
- Stabilized construction entrance
- Forest conservation easement
- Forest planting area
- Environmental covenant boundary
- L.12205 F.001
- WDS-7 — Waste disposal site limits
- Soil management easement
- L. 12205 F.001

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY _____ DISTRICT MANAGER

DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND · PHILLIP THOMAS DEGRAW · 29782 · PROFESSIONAL ENGINEER

5/25/2023

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Sediment Control Plan

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Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=60'
JOB No.	1339A2
	April, 2023
INDEX No.	SC-6
SHEET No.	6A OF 17,6A&8A

5/15/2023
4/24/2023

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/11/23

Signature:

Quantum Place South
(Public)

Clean Energy Lane
(Private)

Ex Super Silt Fence

Prop Silt Fence

Ex Silt Fence

Ex Silt SuperFence

Ex Silt Fence to remain

Ex Stabilized Construction Entrance #SCE-2 is to be utilitzed for this plan. Contractor is to inspect/ repair or reestablish SCE prior to beginning construction

Remove ex super silt fence within LOD. Install silt fence at limit of LOD.

Remove & Replace or Relocate ex. silt fence/to proposed LOD

Remove ex. silt fence/ super silt fence and tie in proposed silt fence

Public W/S Esm't L. F.

Ex. Monitoring Well

Ex. Soil Management Esm't L. 12205 F.01

Ex Stockpile & Staging Area #SA-2

MAX HEIGHT15'
MAX SLOPE 2:1

Waste Disposal Site 4

Ful. 6'W

Ful. 10'S

E 1,177,900
N 607,075

E 1,178,500
N 605,800

Maryland Coordinate System
Scale: 1" = 50'

LOT 102

LOT 112C

LOT 112D

LOT 112A

Match Line - See Sheet SC-4

LEGEND

- Ex. tree
- Ex. treeline
- Ex. wetland
- Ex. wetland buffer
- Ex. 100 year floodplain
- Ex. waterbody buffer
- Ex. topo w/ contour label
- Limit of disturbance
- Ex. super silt fence
- Ex. silt fence
- Super silt fence
- Silt fence
- Stabilized construction entrance
- Forest conservation easement
- Forest planting area
- Environmental covenant boundary
- L. 12205 F.001
- Waste disposal site limits
- Soil management easement
- L. 12205 F.001

NOTES:

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- All excavated material remaining after construction is to be removed from floodplain.
- Prop. manholes in floodplain to be set 1-foot above existing grade and will not contain additional fill.
- Area within the floodplain is to be returned to preconstruction conditions and elevation.

FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY [signature] DISTRICT MANAGER

DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND · PHILLIP THOMAS DAGNA · 29782 · PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR ☐

BY DATE

5/15/2023

4/24/2023

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
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Combined Stormwater Management Development and Improvement Plan
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QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A2
	April, 2023
INDEX No.	SC-5
SHEET No.	6 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1[illegible]/23

Signature:

MGWC 1.4: DIVERSION PIPE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing flow diversion pipes in combination with sandbag or stone diversions when construction activities occur within the stream channel.

EFFECTIVE USES & LIMITATIONS

Diversion pipes with an insufficient flow capacity can cause the channel diversion to fail thereby resulting in severe erosion of the disturbed channel section under construction. Therefore, in-channel construction activities should occur only during periods of low flow.

MATERIAL SPECIFICATIONS

Materials for stream diversions should meet the following requirements:

- *Riprap*: Stone should be washed and have a minimum diameter of 6 inches (15 centimeters).
- *Sandbags*: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.).
- *Sheeting*: Sheeting should consist of polyethylene or other material which is impervious and resistant to puncture and tearing.

INSTALLATION GUIDELINES

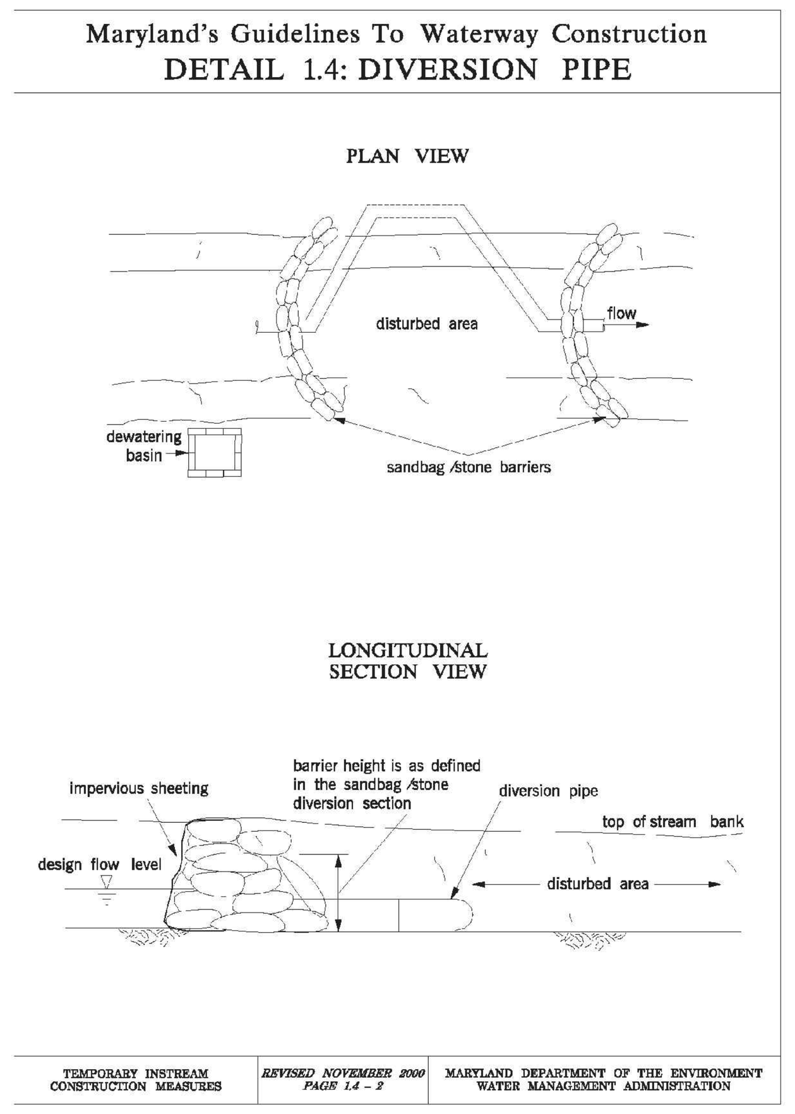
All erosion and sediment control devices including mandatory dewatering basins should be installed as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during low flow conditions. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.

Diversion pipes with sandbag or stone barriers should be completed as follows (refer to Detail 1.4):

1. Sandbag/stone barriers should be sized and installed as detailed in MGWC 1.5: Sandbag/Stone Diversion. The materials should be sized to withstand baseflow velocities.
2. All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
3. Sediment-laden water from the construction area should be pumped to a dewatering basin.
4. The diversion pipe should have a minimum capacity sufficient to convey the 2-year flow for projects with a duration of two weeks or greater. For projects of shorter duration, the capacity of the pipe can be reduced accordingly.
5. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.
6. Sediment control devices are to remain in place until all disturbed areas are stabilized and the inspecting authority approves their removal.

TEMPORARY INSTREAM CONSTRUCTION MEASURES — *MARYLAND DEPARTMENT OF THE ENVIRONMENT WATERWAY CONSTRUCTION GUIDELINES REVISED NOVEMBER 2000*

PAGE 1.4 - 1



MGWC 4.2: UTILITY CROSSING

Temporary in-stream construction

DESCRIPTION

The work should consist of installing erosion control devices in and adjacent to the construction of utility crossings.

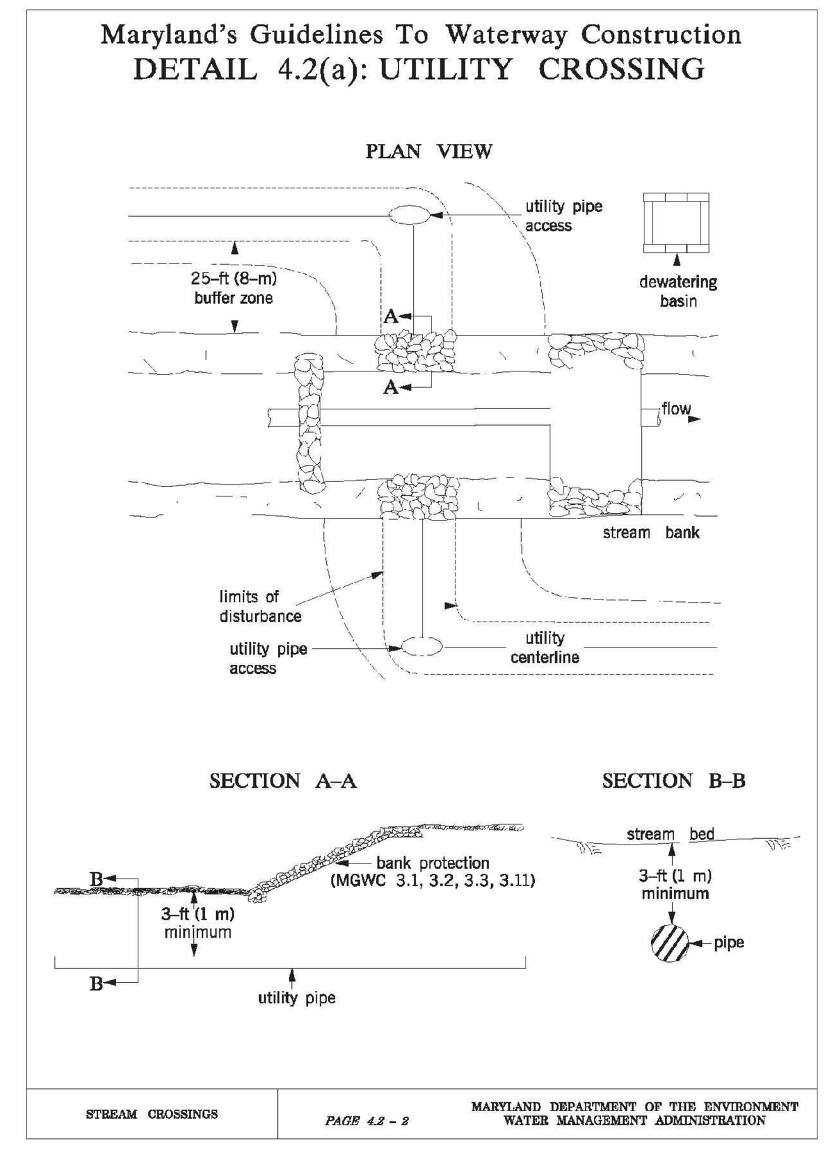
INSTALLATION GUIDELINES

All erosion and sediment control devices, including dewatering basins, should be implemented as the first order of business according to a plan approved by the WMA or local authority. (See *the 1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control*.) The proposed construction sequence is as follows (refer to Detail 4.2):

1. The contractor should insure that a continuous perimeter control barrier is in place to minimize the amount of pollutants entering the flow. A diversion pipe as shown in MGWC 1.4: Diversion Pipe or other measure should be installed and sandbag or stone barriers as shown in MGWC 1.5: Sandbag/Stone Diversion should be constructed according to specifications to divert the streamflow.
2. Excavated topsoil and subsoil should be kept separate, placed on the upland side of the excavation, and replaced in their natural order.
3. All construction should take place during stream low flows. The length of construction time should be limited to a maximum of 5 consecutive days for each crossing.
4. All utility crossings should be placed a minimum of 3 feet (1 meter) beneath the stream bed unless an alternative section is specifically approved by the WMA. For instances where a 3-foot cover is not viable, two alternate stabilization options are given in the Detail 4.2. A low flow channel shall be constructed through all riprap placements across the stream bed.
5. The stream should be diverted by an approved temporary stream diversion, the construction area should be dewatered, and any disturbed banks should be stabilized. The contractor may elect to construct the utility crossing in two stages. In this case, a WMA approved flow barrier may be constructed to keep the construction area dry.
6. Once the crossing is completed, the diversion should be removed from upstream to downstream. Sediment control devices, including perimeter erosion controls, are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspection authority approves their removal.

STREAM CROSSINGS — *MARYLAND DEPARTMENT OF THE ENVIRONMENT WATERWAY CONSTRUCTION GUIDELINES REVISED NOVEMBER 2000*

PAGE 4.2 - 1



SEDIMENT CONTROL/STORMWATER MANAGEMENT REQUIRED INSPECTION

YOU MUST NOTIFY THE FREDERICK COUNTY ENVIRONMENTAL COMPLIANCE SECTION AT 301-600-3507 BEFORE 9:00 AM, 24 HOURS PRIOR TO THE REQUIRED INSPECTION. FAILURE TO NOTIFY THIS OFFICE WILL RESULT IN A STOP WORK ORDER OR OTHER PENALTIES AS OUTLINED IN FREDERICK COUNTY CODES.

••••••• NOTICE ••••••

THIS LIST IS FOR SEQUENCE OF CONSTRUCTION ONLY. THIS OFFICE ASSUMES NO RESPONSIBILITY OR LIABILITY FOR IMPROPER INSTALLATION OF ANY ITEM ON THIS CHECKLIST. THIS OFFICE RECOMMENDS THAT A PROFESSIONAL ENGINEER BE PRESENT FOR EACH OF THE REQUIRED INSPECTIONS.

TYPE OF INSPECTION	MISC. COMMENT	INITIALS
1. PRECONSTRUCTION MEETING		
2. COMPLETION OF SEDIMENT CONTROL MEASURES (IF USING BASIN SEE #6 BELOW)		
3. PRIOR TO MODIFICATION OR REMOVAL OF SEDIMENT CONTROL		
4. INFILTRATION SYSTEMS		
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION		
B. INFILTRATION AREA PROTECTED FROM SEDIMENTATION		
C. DIMENSIONS		
D. FILTERING MATERIAL (TYPE/DEPTH)		
E. FILL MATERIAL		
F. SIZE, PLACEMENT, TYPE OF PIPING (IF APPLICABLE)		
G. OBSERVATION WELL		
H. COVER/STABILIZATION		
5. OPENCHANNEL FLOW ATTENUATION		
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION		
B. CROSS SECTION CONFORMANCE		
C. MATERIAL (TYPE/SIZE)		
D STABILIZATION		
6. RETENTION/DETENTION STRUCTURES (BASINS/PONDS)		
A. SUBGRADE PREPARATION		
1. CORE TRENCH		
2. SUITABLE MATERIAL/COMPACTION		
B. EMBANKMENT CONSTRUCTION		
1. SUITABLE MATERIAL/COMPACTION		
2. SLOPE GRADE		
3. DIMENSIONS		
C. BARREL AND RISER ASSEMBLY		
1. CORRECT MATERIAL ONSITE		
2. SIZING		
3. ANTI-SEEP COLLARS		
4. ANTI-FLOATATION DEVICE		
5. CONCRETE CRADLE (RCP ONLY)		
6. INSTALLATION/BACKFILL/COMPACTION		
D. CONCRETE STRUCTURES		
1. FOOTER DIMENSIONS		
2. REINFORCING MATERIAL (TYPE, SIZE, PLACEMENT)		
3. WEIR POUR/MATERIAL/SLUMP TEST		
4. FORM STRIP AND FINISHING		
E. IMPOUNDING AREA		
1. LOW FLOW CHANNELS/STABILIZATION		
2. DEWATERING DEVICE		
3. EMERGENCY SPILLWAY		
4. EXTENDED DETENTION DEVICE		
F. OUTFALL AREA (LEVEL, SPREADER, RIPRAP CHANNEL, ETC.)		
G. VEGETATIVE STABILIZATION		
H. MISCELLANEOUS		

SECONDARY UTILITY NOTES

A. ALL DISTURBANCES FROM SECONDARY UTILITIES SUCH AS PHONE CABLE, ELECTRIC CABLE, TV CABLE, ETC. WILL BE SUBCONTRACTORS RESPONSIBILITY TO BRING WORK AREA BACK TO GRADE LEVEL THAT WAS EXISTING AND SEED AND MULCH ANY DISTURBANCE FROM INSTALLATION OF LINES OR CONDUIT.

B. SUB CONTRACTORS WILL BE RESPONSIBLE FOR RE-INSTALLING OR REPAIRING ANY SILT FENCE OR SEDIMENT CONTROLS THAT WERE EXISTING TO MAINTAIN PROPER SEDIMENT CONTROL THAT MIGHT HAVE BEEN DAMAGED.

FOR UTILITY WORK ONLY OR FOR OFF-SITE UTILITY WORK

1. DISTURBANCE OUTSIDE OF LOD CAN NOT EXCEED 5000 SQUARE FEET.
2. PLACE ALL EXCAVATED MATERIAL ON HIGH SIDE OF TRENCH.
3. ONLY DO AS MUCH WORK AS CAN BE DONE ON ONE DAY SO BACKFILLING, FINAL GRADING, SEEDING AND MULCHING CAN OCCUR.
4. ANY SEDIMENT CONTROL MEASURES DISTURBED BY CONSTRUCTION WILL BE REPAIRED THE SAME DAY.

STOCKPILE NOTES

1. NO STOCKPILING ALLOWED ON ASPHALT.
2. ALL STOCKPILES LEFT AT THE END OF THE DAY NEED TO BE STABILIZED UNTIL THE NEXT RE-DISTURBANCE.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL NOTIFY THE FREDERICK COUNTY ENVIRONMENTAL COMPLIANCE SECTION (ECS) AT (301) 600-3507 AT LEAST FIVE (5) DAYS BEFORE STARTING AUTHORIZED ACTIVITIES.
2. ALL REQUIRED APPROVALS AND PERMITS MUST BE IN HAND PRIOR TO ANY CONSTRUCTION ACTIVITIES.
3. CONTACT MISS UTILITY 5 DAYS PRIOR TO PRE-CONSTRUCTION MEETING.
4. CONTRACTOR SHALL INSPECT & REPAIR AS NECESSARY, EXISTING STABILIZED CONSTRUCTION ENTRANCE #SCE-2, SILT FENCE & SUPER SILT FENCE UTILIZED UNDER THIS PLAN.
5. CONTRACTOR TO PERFORM STAKEOUT OF SEDIMENT CONTROL DEVICES PRIOR TO PRE-CONSTRUCTION MEETING.
6. HOLD PRE-CONSTRUCTION MEETING WITH THE FREDERICK COUNTY ECS. CALL FREDERICK COUNTY ECS 24 HOURS IN ADVANCE AT 301-600-3507 FOR INSPECTION BEFORE ANY GRADING OR OTHER CONSTRUCTION ACTIVITIES BEGIN
7. WITH INSPECTORS APPROVAL, CLEAR AND GRUB FOR INSTALLATION OF SEDIMENT CONTROL DEVICES ONLY - STABILIZED CONSTRUCTION ENTRANCE, SILT FENCE, SUPER SILT FENCE . INSTALL SILT FENCE AND SUPER SILT FENCE ALONG LIMITS OF DISTURBANCE AS SHOWN ON PLANS. STABILIZE PER REQUIREMENTS IN SEDIMENT CONTROL NOTES (THIS SHEET).
8. UPON COMPLETION OF INSTALLATION OF SEDIMENT CONTROL MEASURES THE SEDIMENT CONTROL INSPECTOR MUST VERIFY THE SEDIMENT CONTROL MEASURES ARE PROPERLY INSTALLED AND IN PLACE PRIOR TO BEGINNING CONSTRUCTION. SEE "FOR UTILITY WORK ONLY OR FOR OFF-SITE UTILITY WORK" NOTES (THIS SHEET).
9. ONCE SEDIMENT CONTROL DEVICES ARE INSTALLED, CONTRACTOR SHALL NOTIFY MDE 5 DAYS PRIOR TO BEGINNING WORK ON THE STREAM CROSSINGS. IN-STREAM WORK MAY **NOT** BE CONDUCTED BETWEEN MARCH 1ST AND JUNE 15TH INCLUSIVE OF ANY YEAR. ONCE PERMISSION TO START WORK HAS BEEN GRANTED BY THE INSPECTOR, INSTALL STREAM DIVERSION AND UTILITY CROSSING IN ACCORDANCE WITH IMPLEMENTATION SEQUENCE AND DETAIL 1.4, 1.5 AND 4.2a (THIS SHEET). IF FIELD CONDITIONS ALLOW, A PUMP AROUND MAY BE USED IN LIEU OF A DIVERSION PIPE - DETAIL 1.2 (SHEET SC-3) AS APPROVED BY THE INSPECTOR.
10. INSTALL SEWER, WATER & POTABLE COOLING WATER LINES. ONLY DO AS MUCH WORK AS CAN BE DONE ON ONE DAY SO BACKFILLING, FINAL GRADING, SEEDING AND MULCHING CAN OCCUR. NO STOCKPILE AREA IS REQUIRED. ONCE STREAM CROSSING IS CONSTRUCTED, INSTALL RIPRAP BANK PROTECTION PER DETAIL 2.1 (THIS SHEET).
11. CONTRACTOR TO CONTROL DUST PER H-5 STANDARDS AND SPECIFICATIONS OF THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
12. STABILIZE ALL DISTURBED AREAS WITH VEGETATION PER SEEDING SPECIFICATIONS.
13. UPON APPROVAL FROM SEDIMENT CONTROL INSPECTOR, REMOVE ALL SEDIMENT CONTROL DEVICES AND PERMANENTLY STABILIZE ANY REMAINING DISTURBED AREAS.
14. DEPENDING ON SITE CONDITIONS, PHASING OR CONSTRUCTION SEQUENCING, AND STABILIZATION METHODS, ADDITIONAL SEDIMENT CONTROLS (OTHER THAN AS SHOWN HEREON) MAY BE REQUIRED BY THE INSPECTOR.
15. OWNER AND CONTRACTOR ARE RESPONSIBLE FOR ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES NEEDED DURING DISTURBANCE IN CONJUNCTION WITH PROPOSED PLAN IF ISSUES ARISE. (CONSULT SEDIMENT AND EROSION INSPECTOR FOR GUIDANCE.)
16. ALL EROSION/SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN CONTINUOUS COMPLIANCE WITH THE LATEST VERSION OF THE MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL.
17. ALL UTILITIES, SUCH AS; STORM DRAIN, PUBLIC WATER, SANITARY SEWER, ELECTRIC POWER, TELEPHONE, CABLE AND GAS LINES, THAT ARE NOT IN PAVED AREAS AND ARE NOT UNDERGOING ACTIVE GRADING SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 3 DAYS OF INITIAL DISTURBANCE.
18. THE OWNER/DEVELOPER OR THEIR DESIGNATE IS RESPONSIBLE FOR CONDUCTING ROUTINE INSPECTIONS AND REQUIRED MAINTENANCE. THE SITE AND CONTROLS SHOULD BE INSPECTED WEEKLY AND THE NEXT DAY AFTER EACH RAIN EVENT**. ANY ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN A SUITABLE AREA AND SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED.
19. **ANY PROJECT THAT HAS A STATE ISSUED N.O.I PERMIT MUST DOCUMENT EACH INSPECTION AND MAINTAIN AN INSPECTION LOG (PLEASE SEE THE N.O.I. FOR DETAILS)
20. NOI MUST BE OBTAINED AND FURNISHABLE TO SOIL CONSERVATION DISTRICT (SCD) PRIOR TO STARTING OF ANY CONSTRUCTION.

SEDIMENT AND EROSION CONTROL NOTES

1. ALL EROSION/SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN CONTINUOUS COMPLIANCE WITH THE LATEST VERSION OF THE MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL.
2. ALL UTILITIES, SUCH AS; STORM DRAIN, PUBLIC WATER, SANITARY SEWER, ELECTRIC POWER, TELEPHONE, CABLE AND GAS LINES, THAT ARE NOT IN PAVED AREAS AND ARE NOT UNDERGOING ACTIVE GRADING SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 3 DAYS OF INITIAL DISTURBANCE.
3. THE OWNER/DEVELOPER OR THEIR DESIGNATE IS RESPONSIBLE FOR CONDUCTING ROUTINE INSPECTIONS AND REQUIRED MAINTENANCE. THE SITE AND CONTROLS SHOULD BE INSPECTED WEEKLY AND THE NEXT DAY AFTER EACH RAIN EVENT**. ANY ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN A SUITABLE AREA AND SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED.

**ANY PROJECT THAT HAS A STATE ISSUED N.O.I PERMIT MUST DOCUMENT EACH INSPECTION AND MAINTAIN AN INSPECTION LOG (PLEASE SEE THE N.O.I. FOR DETAILS).

STANDARD STABILIZATION NOTE

FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN:

A. THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER 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 PROJECT SITE NOT UNDER ACTIVE GRADING.

TEMPORARY SEEDING NOTES

GENERAL

1. SCOPE: PLANTING SHORT TERM VEGETATION TO STABILIZED, CLEARED OR GRADED AREAS SUBJECT TO EROSION FOR A PERIOD OF 7 DAYS OR MORE.
2. STANDARDS: TEMPORARY SEEDING SHALL CONFORM TO ALL REQUIREMENTS OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, THE NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.
3. SEDIMENT & EROSION CONTROL: ALL PERIMETER CONTROL MUST BE STABILIZED IN 3 DAYS. ALL INTERIOR CONTROLS MUST BE STABILIZED IN 7 DAYS.

SPECIFICATIONS

1. SITE PREPARATIONS:
   - A.) PRIOR TO SEEDING INSTALL ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES.
   - B.) FINAL GRADING NOT REQUIRED FOR TEMPORARY SEEDING.
2. SOIL AMENDMENTS:
   - A.) FERTILIZER SHALL BE APPLIED AT THE RATE OF 800 LBS/ACRES USING 10-10-10 OR EQUIVALENT.
   - B.) ACID SOILS SHALL BE LIMED.
3. SEEDBED PREPARATION:
   - A.) SOIL SHALL BE LOOSENED TO A DEPTH OF 3 INCHES BY RAKING, DISKING, OR OTHER ACCEPTABLE MEANS PRIOR TO SEEDING.
4. SEEDING:
   - A.) SELECT A MIXTURE FROM TABLE B.1 IN THE STANDARD SPECIFICATIONS.
   - B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER.
5. MULCHING:
   - A.) MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING. MULCH MATERIALS AND APPLICATIONS SHALL CONFORM TO THE STANDARD SPECIFICATIONS.

PERMANENT SEEDING & SOD NOTES

GENERAL

1. SCOPE: PLANTING PERMANENT, LONG LIVED VEGETATIVE COVER ON GRADED OR CLEARED AREAS.
2. STANDARDS: PERMANENT SEEDING SHALL CONFORM TO ALL REQUIREMENTS OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, THE NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.

SPECIFICATIONS

1. 1. SITE PREPARATIONS:
   - A.) PRIOR TO SEEDING INSTALL ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES.
   - B.) FINAL GRADING NOT REQUIRED FOR TEMPORARY SEEDING.
2. SOIL AMENDMENTS:
   - A.) FERTILIZER SHALL BE APPLIED AT THE RATE OF 1000 LBS/ACRES USING 10-10-10 OR EQUIVALENT.
   - B.) ACID SOILS SHALL BE LIMED.
3. 3. SEEDBED PREPARATION:
   - A.) SOIL SHALL BE LOOSENED TO A DEPTH OF 3 INCHES BY RAKING, DISKING, OR OTHER ACCEPTABLE MEANS PRIOR TO SEEDING.
   - B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER (SLURRY INCLUDES SEED AND FERTILIZER ON A FIRM, MOIST SEEDBED.) MAXIMUM SEEDING DEPTH SHOULD BE 1/4" INCH ON CLAYEY SOILS AND 1/2 INCH ON SANDY SOILS, WHEN USING OTHER THAN HYDROSEEDER METHOD OF APPLICATION.

NOTE:
IF HYDROSEEDING IS USED AND THE SEED AND FERTILIZER IS MIXED, THEY WILL BE MIXED ON SITE AND THE SEEDING SHALL BE IMMEDIATE WITHOUT INTERRUPTION.

PERMANENT STABILIZATION WITH SOD

1. ALL SPECIFICATIONS, SITE PREPARATION, INSTALLATION AND MAINTENANCE OF SOD FOR PERMANENT, LONG "2011 MARYLAND STANDARDS AND LIVED VEGETATIVE COVER SHALL CONFORM TO SECTION B OF SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, THE NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE..

MGWC 1.5: SANDBAG/STONE CHANNEL DIVERSION

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing sandbag or stone flow diversions for the purpose of erosion control when construction activities occur within the stream channel.

EFFECTIVE USES & LIMITATIONS

Diversions are used to isolate work areas from flow during the construction of in-stream projects. Diversions which have an insufficient flow capacity can fail and severely erode the disturbed channel section under construction. Therefore, in-channel construction activities should occur only during periods of low rainfall. This temporary measure may not be practical in large channels.

MATERIAL SPECIFICATIONS

Materials for sandbag and stone stream diversions should meet the following requirements:

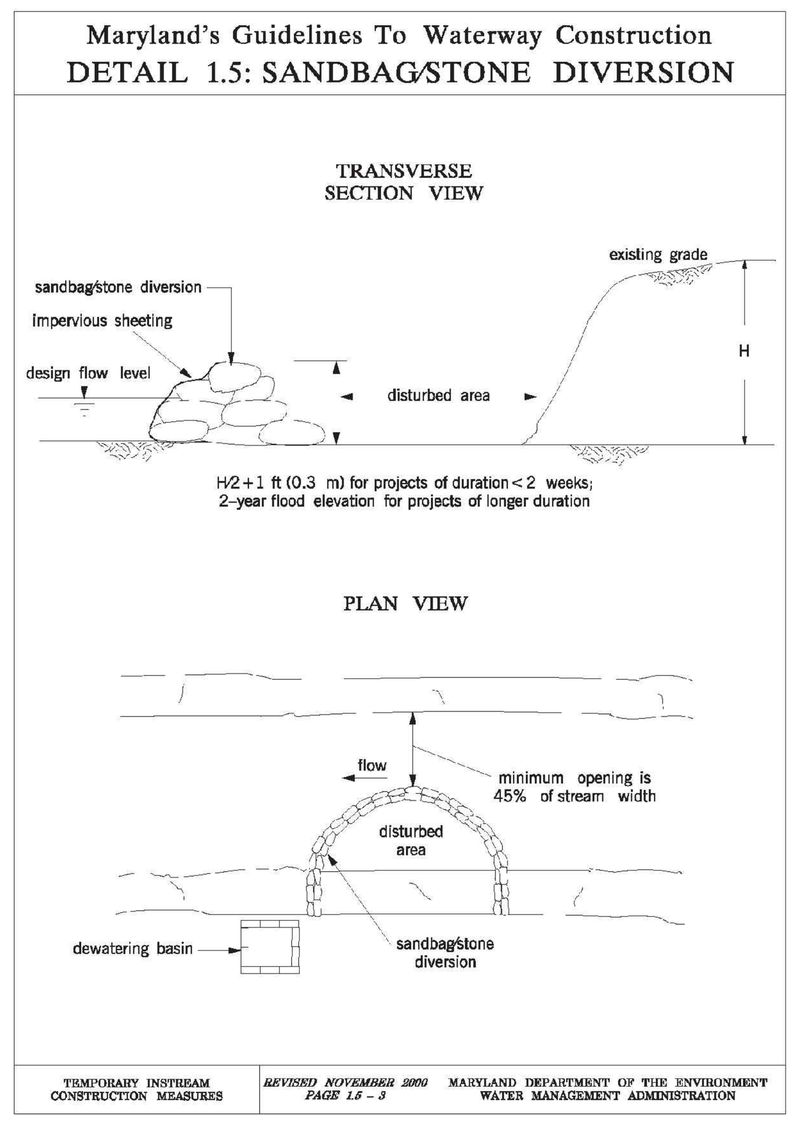
- *Riprap*: Riprap should be washed and have a minimum diameter of 6 inches (0.15 meters).
- *Sandbags*: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of the fill material (i.e., sand, fine gravel, etc.).
- *Sheeting*: Sheeting should consist of polyethylene or other materials which are impervious and resistant to puncture and tearing.

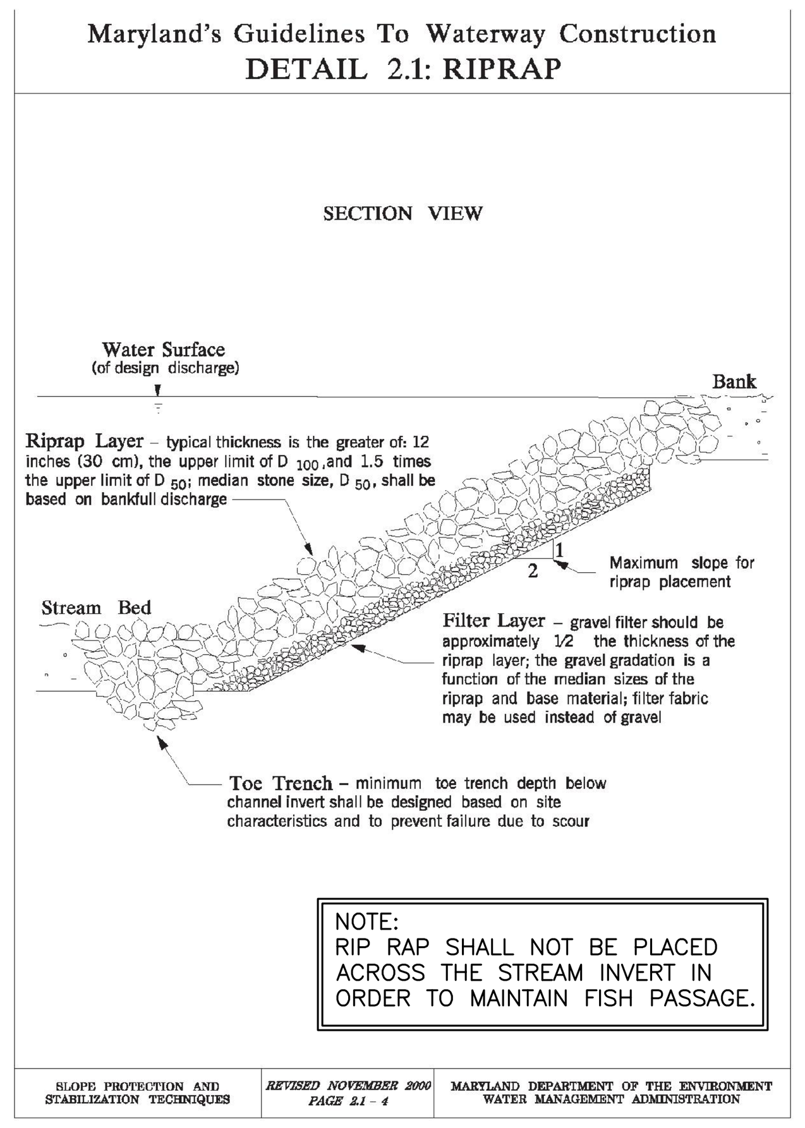
INSTALLATION GUIDELINES

All erosion and sediment control devices, including dewatering basins, should be implemented as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during periods of low flow. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.

Sandbag/stone diversions can be used independently or as components of other stream diversion techniques. Installation of this measure should proceed as follows (refer to Detail 1.5):

1. The diversion structure should be installed from upstream to downstream.
2. The height of the sandbag/stone diversion should be a function of the duration of the project in the stream reach. For projects with a duration less than 2 weeks, the height of the diversion should be one half the streambank height, measured from the channel bed, plus 1 foot (0.3 meters) or bankfull height, whichever is greater. For projects of longer duration, the top of the sandbag or stone diversion should correspond to bankfull height. For diversion structures utilizing sandbags, the stream bed should be hand prepared prior to placement of the base layer of sandbags in order to ensure a water tight fit. Additionally, it may be necessary to prepare the bank in a similar fashion.
3. All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
4. Sediment-laden water from the construction area should be pumped to a dewatering basin.
5. Sheeting on the diversion should be positioned such that the upstream portion covers the downstream portion with at least a 18-inch (0.45 meters) overlap.
6. Sandbag or stone diversions should not obstruct more than 45% of the stream width. Additionally, bank stabilization measures should be placed in the constricted section if accelerated erosion and bank scour are observed during the construction time or if project time is expected to last more than 2 weeks.
7. Prior to removal of these temporary structures, any accumulated sediment should be removed, deposited and stabilized in an approved area outside the 100-year floodplain unless authorized by the WMA.
8. Sediment control devices are to remain in place until all disturbed areas are stabilized in accordance with an approved sediment and erosion control plan and the inspecting authority approves their removal.





H-5 STANDARDS AND SPECIFICATIONS FOR DUST CONTROL

Definition

Controlling the suspension of dust particles from construction activities.

Purpose

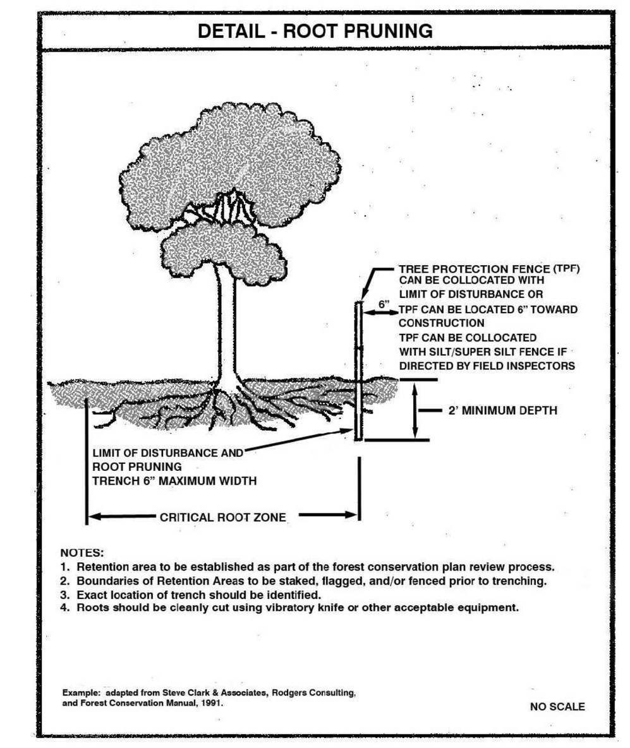
To prevent blowing and movement of dust from exposed soil surfaces to reduce on and off-site damage including health and traffic hazards.

Conditions Where Practice Applies

Areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

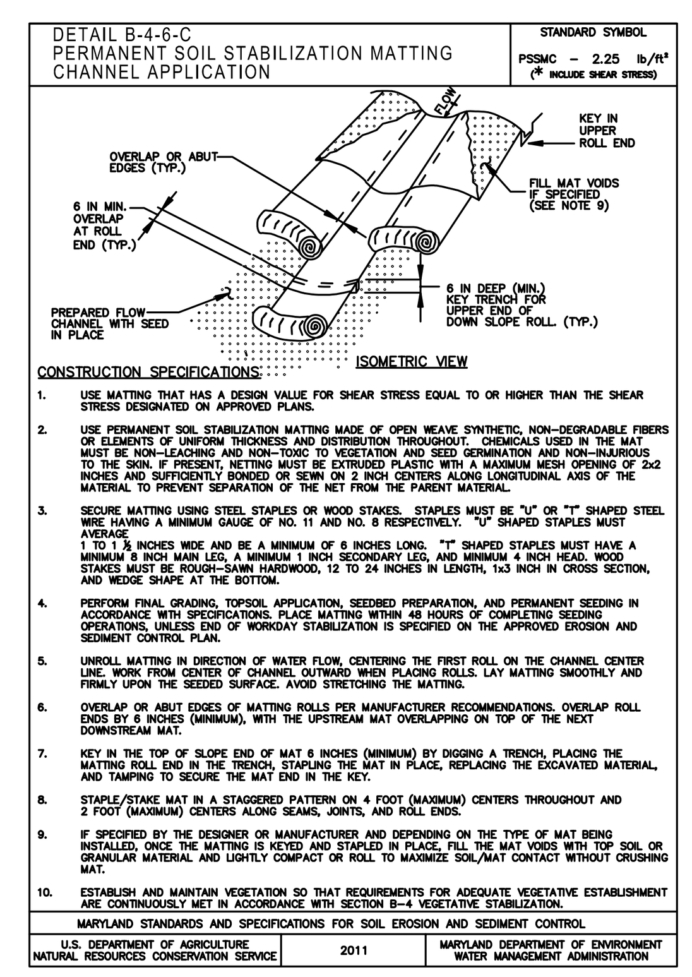
Specifications

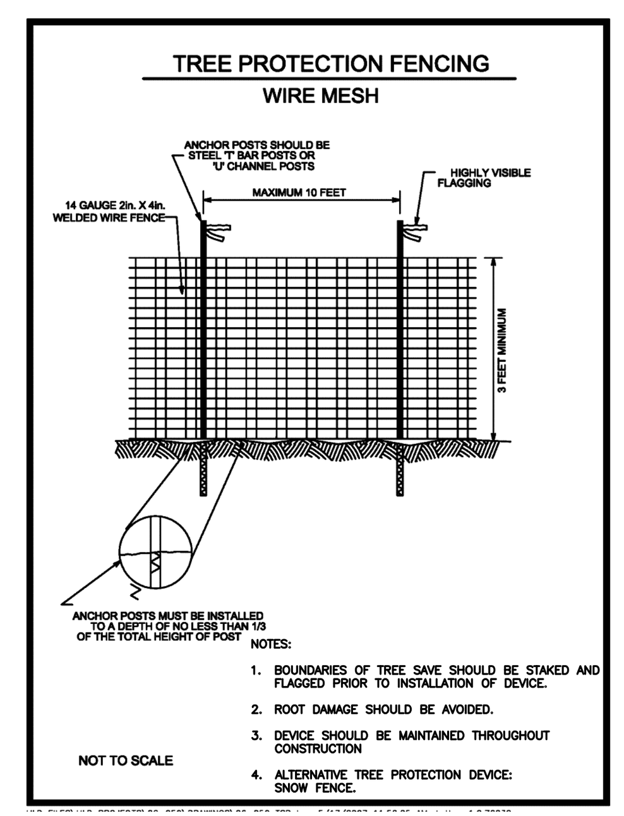
1. Mulches: See Section B-4-2 Soil Preparation, Topsoiling, and Soil Amendments, Section B-4-3 Seeding and Mulching, and Section B-4-4 Temporary Stabilization. Mulch must be anchored to prevent blowing.
2. Vegetative Cover: See Section B-4-4 Temporary Stabilization.
3. Tillage: Till to roughen surface and bring clods to the surface. Begin plowing on windward side of site. Chisel-type plows spaced about 12 inches apart, spring-toothed harrows, and similar plows are examples of equipment that may produce the desired effect.
4. Irrigation: Sprinkle site with water until the surface is moist. Repeat as needed. The site must not be irrigated to the point that runoff occurs.
5. Barriers: Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing.
6. Chemical Treatment: Use of chemical treatment requires approval by the appropriate plan review authority.



BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1) No excess fill, construction material, or debris shall be stockpiled or stored in nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
2) Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
3) Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.
4) Place heavy equipment on mats or suitably operate the equipment to prevent damage to nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
5) Repair and maintain any serviceable structure or fill so there is no permanent loss of nontidal wetlands, nontidal wetland buffers, or waterways, or permanent modification of the 100-year floodplain in excess of that lost under the originally authorized structure or fill.
6) Rectify any nontidal wetlands, wetland buffers, waterways, or 100-year floodplain temporarily impacted by any construction.
7) All stabilization in the nontidal wetland and nontidal wetland buffer shall consist of the following species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), Oats (Uniola sp.), and/or Rye (Secale cereale). These species will allow for the stabilization of the site while also allowing for the voluntary revegetation of natural wetland species. Other non-persistent vegetation may be acceptable, but must be approved by the Nontidal Wetlands and Waterways Division. Kentucky 31 fescue shall not be utilized in wetland or buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.
8) After installation has been completed, make post-construction grades and elevations the same as the original grades and elevations in temporarily impacted areas.
9) To protect aquatic species, in-stream work is prohibited as determined by the classification of the stream:
Use I waters: In-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year.
Use III waters: In-stream work shall not be conducted during the period October 1 through April 30, inclusive, during any year.
Use IV waters: In-stream work shall not be conducted during the period March 1 through May 31, inclusive, during any year.
10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway.
11) Culverts shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to impound water.





FOR SITES 1.0 ACRE OR MORE, THE FOLLOWING ARE REQUIRED:

A. MARYLAND DEPARTMENT OF THE ENVIRONMENT, GENERAL PERMIT FOR STORMWATER WITH A CONSTRUCTION ACTIVITY, NPDES PERMIT NUMBER MDR10, STATE DISCHARGE PERMIT NUMBER 09GP, OR AN INDIVIDUAL PERMIT

B. THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (GENERAL/ INDIVIDUAL PERMIT- NOTICE OF INTENT- NOI) APPLICATION AND PERMIT SHALL BE POSTED AND/OR AVAILABLE ON-SITE AT ALL TIMES.

C. DURING CONSTRUCTION, ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES (BMP'S) SHALL BE INSPECTED AND RECORDED ON THE "STANDARD INSPECTION FORM, GENERAL PERMIT FOR STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY" PER THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (GENERAL/ INDIVIDUAL PERMIT- NOTICE OF INTENT- NOI).

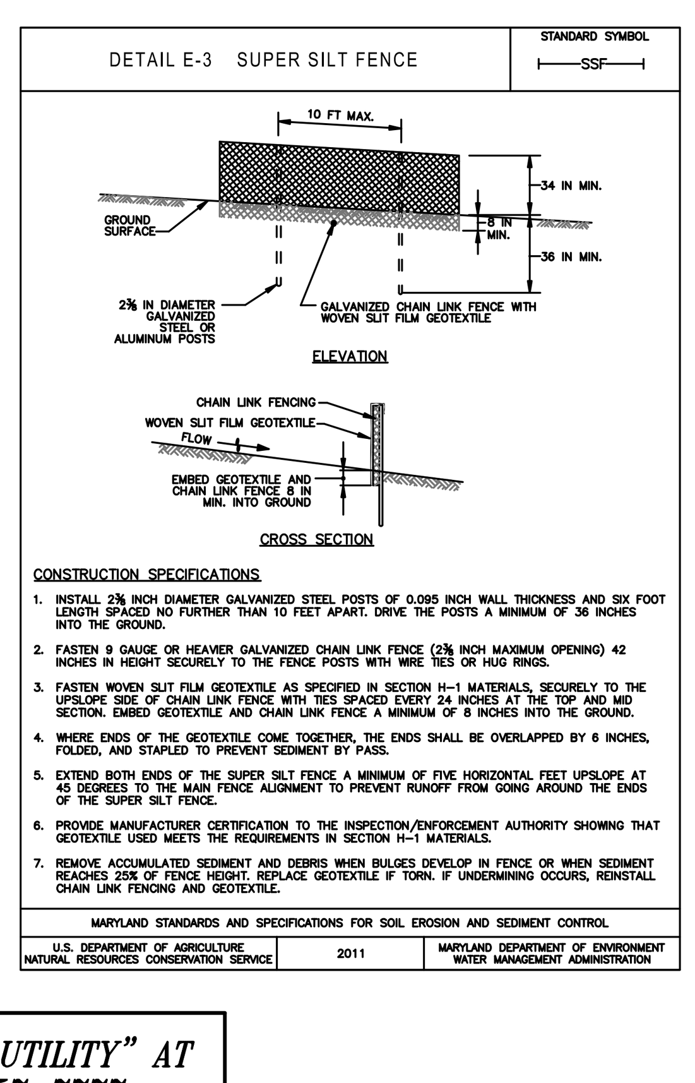
D. ONCE ALL PORTIONS OF A SITE HAVE BEEN PERMANENTLY STABILIZED, AND ALL STORMWATER DISCHARGES FROM CONSTRUCTION SITES THAT ARE AUTHORIZED BY THE PERMIT ARE ELIMINATED, THE AUTHORIZED PERMITTEE SHALL SUBMIT THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, GENERAL/ INDIVIDUAL PERMIT- NOTICE OF TERMINATION- NOT.

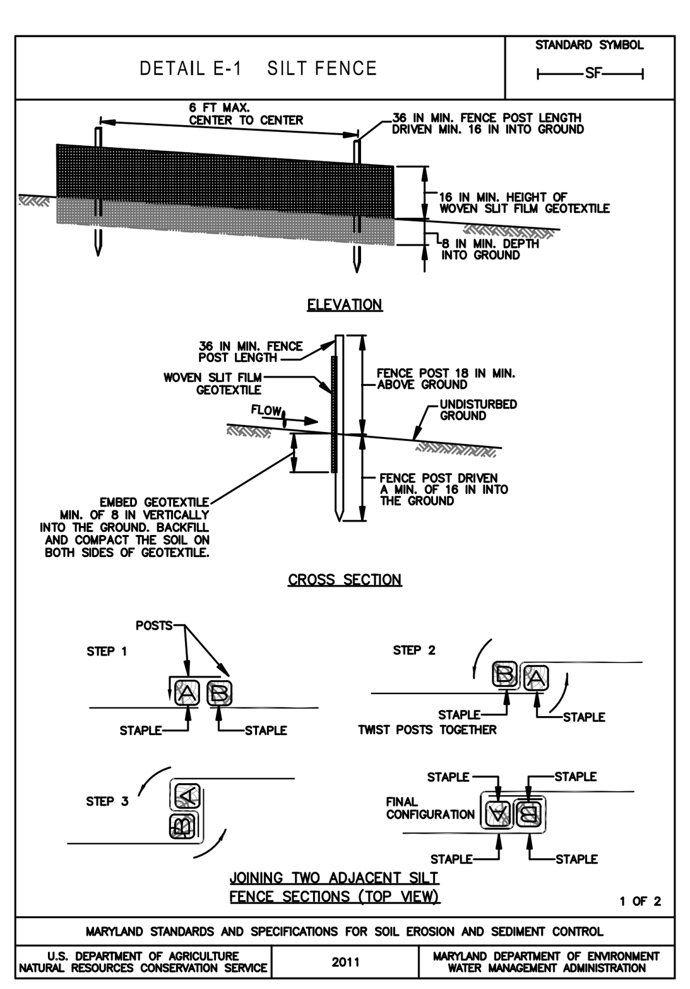
Table B.1: Temporary Seeding for Site Stabilization

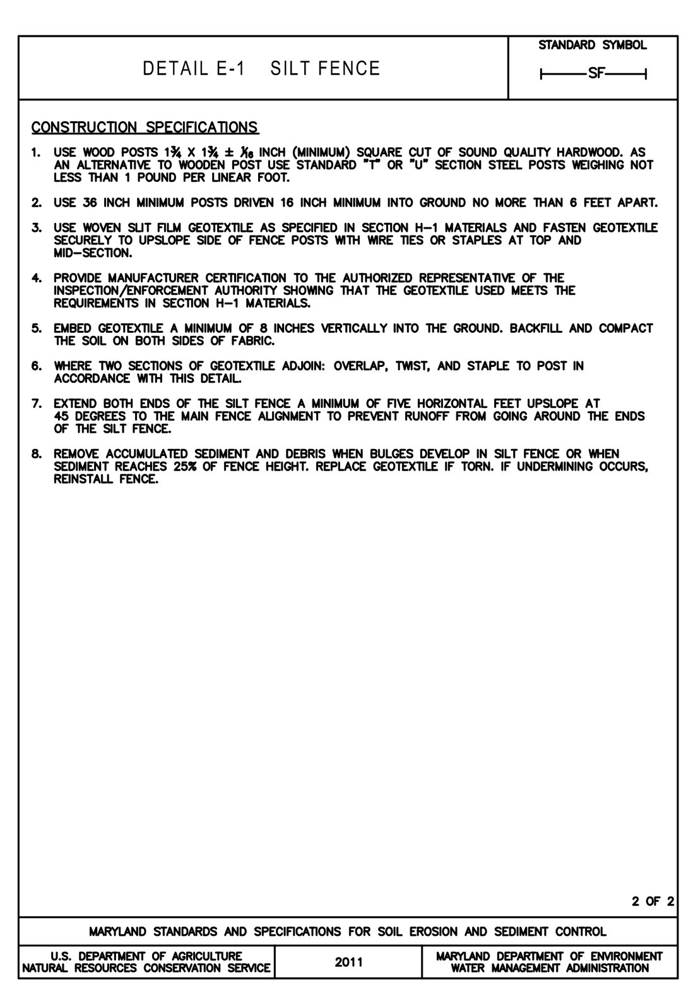
Plant Species	Seeding Rate [1/]		Seeding Depth [2/] (inches)	Recommended Seeding Dates by Plant Hardiness Zone [3/]		
	lb/ac	lb/1000 ft²		5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass (*Lolium perenne ssp. multiflorum*)	40	1.0	0.5	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Barley (*Hordeum vulgare*)	96	2.2	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Oats (*Avena sativa*)	72	1.7	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Wheat (*Triticum aestivum*)	120	2.8	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Cereal Rye (*Secale cereale*)	112	2.8	1.0	Mar 15 to May 31; Aug 1 to Oct 31	Mar 1 to May 15; Aug 1 to Nov 15	Feb 15 to Apr 30; Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet (*Setaria italica*)	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet (*Pennisetum glaucum*)	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

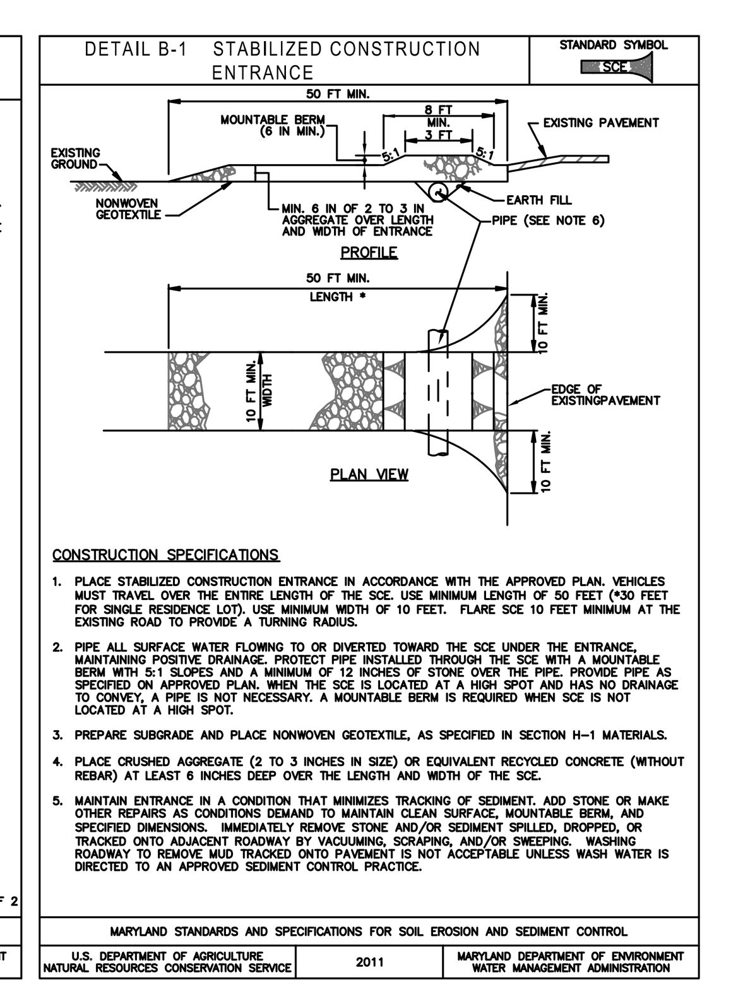
TABLE B.1 NOTES

1. SEEDING RATES FOR THE WARM-SEASON GRASSES ARE IN POUNDS OF PURE LIVE SEED (PLV). ACTUAL PLANTING RATES SHALL BE ADJUSTED TO REFLECT PERCENT OF SEED GERMINATION AND PURITY, AS TESTED. ADJUSTMENTS ARE USUALLY NOT NEEDED FOR THE COOL-SEASON GRASSES.
SEEDING RATES LISTED ABOVE ARE FOR TEMPORARY SEEDLINGS, WHEN PLANTED ALONE. WHEN PLANTED AS A NURSE CROP WITH PERMANENT SEED MIXES, USE 1/3 OF THE SEEDING RATE LISTED ABOVE FOR BARLEY, OATS AND WHEAT. FOR SMALLER-SEEDED GRASSES (ANNUAL RYEGRASS, PEARL MILLET, FOXTAIL MILLET), DO NOT EXCEED MORE THAN 5% (BY WEIGHT) OF THE OVERALL PERMANENT SEEDING MIX. CEREAL RYE GENERALLY SHOULD NOT BE USED AS A NURSE CROP, UNLESS PLANTING WILL OCCUR IN VERY LATE FALL BEYOND THE SEEDING DATES FOR OTHER TEMPORARY SEEDINGS. CEREAL RYE HAS ALLELOPATHIC PROPERTIES THAT INHIBIT THE GERMINATION AND GROWTH OF OTHER PLANTS. IF IT MUST BE USED AS A NURSE CROP, SEED AT 1/3 OF THE RATE LISTED ABOVE.
OATS ARE THE RECOMMENDED NURSE CROP FOR WARM-SEASON GRASSES.
2. FOR SANDY SOILS, PLANT SEEDS AT TWICE THE DEPTH LISTED ABOVE.
3. THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE AND MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONE.









FREDERICK SOIL CONSERVATION DISTRICT

APPROVED BY [signature] DISTRICT MANAGER

DATE 5-30-23

SCD approval for sediment and erosion control is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

5/25/2023

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

B 5/15/2023

A 4/24/2023

REVISION	DATE	REVISION	DATE		BY	DATE
				BASE DATA	CADD	
				DESIGNED		
				DRAWN		
				REVIEWED		
				RELEASE FOR ______________		
				BY ______ DATE ______		

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Sediment Control Plan Notes & Details

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: NTS
JOB No. 1339A2
April, 2023
INDEX No. ND-1
SHEET No. 7 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

Signature:

N607400
E1178000

Quantum Place South

Clean Energy Lane

UP-4

Lot 102

Lot 112C

Lot 112D

Lot 112A

Sheet UP-4
Sheet UP-3

UP-3

Lot 113
Landfill

Lot 101

Lot 100

Sheet UP-3
Sheet UP-3

WDS-3
WDS-4
WDS-5
WDS-6N
WDS-6S
WDS-7
WDS-8
WDS-9

Tuscarora Creek

Lot 300

Lot 304

Happy Landing Road

Open Space
Parcel 'A'

Open Space
Parcel 'O'

Open Space
Parcel 'A'

E4178000
N603000

Outlot 1

Tuscarora Creek

UP-1

Tuscarora Creek

Sheet UP-3
Sheet UP-2

UP-3

UP-2

Sheet UP-2
Sheet UP-1

Lot 401

Lot 400

Lot 402

E1176000
N603000

GRAPHIC SCALE
200' 0 100' 200' 400' 800'
1 INCH = 200 FT

PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND · THOMAS PHILLIP DIXON · 29782 · PROFESSIONAL ENGINEER
5/25/2023

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____
BY DATE

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. 603D-SW
Overall Utility Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South
QUANTUM FREDERICK
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1"=200'
JOB No. 1339A2
April, 2023
INDEX No.
SHEET No. 8A OF 17,6A&8A

5/15/2023
4/24/2023

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

Signature:

Match Line - See Sheet UP-2

MH406
N602940.00
E1176942.17

406

18" S
PVC SDR-26

16"PCW DIP Cl 52
12"W DIP Cl 52

18" S
PVC SDR-35

Ex. Environmental Covenant
L. 12205 F.01

100Yr Floodplain
100Yr Floodplain Buffer

45' Prop. Public
W/S Esm't
L. F.

Prop. FRO Esm't
L. F.

N 602,800
E 1,176,800

Waterbody Buffer

405

MH405
N602658.64
E1176996.94

65+32
16" 1/8 HB
N602651.76
E1176986.57

10+48
12" 1/8 HB
N602644.88
E1176976.19

12"V

PARCEL 'O'
OPEN SPACE

Tuscarora Creek

Wetlands
Wetlands Buffer

100Yr Floodplain
100Yr Floodplain Buffer

404

MH404
N602514.85
E1177210.46

Prop. 45' Public
W/S Esm't
L. F.

LOT 402

16"PCW DIP Cl 52
12"W DIP Cl 52

18" S
PVC SDR-35

403

MH403
N602314.27
E1177508.31

R= 500'
R= 488.5'

Prop. FRO Esm't
L. F.

PT= 59+61
N602332.82
E1177460.18

PT= 4+72
N602323.28
E1177453.76

PC= 58+63
N602270.49
E1177535.59

PC= 3+76
N602262.39
E1177527.44

Prop. FRO Esm't
L. F.

402

MH402
N602134.26
E1177687.15

16"PCW DIP Cl 52
12"W DIP Cl 52

18" S
PVC SDR-35

Ex. Environmental Covenant
L. 12205 F.01

Prop. 45' Public
W/S Esm't
L. F.

Prop. FRO Esm't
L. F.

0+29
12" 1/8 HB
N602016.42
E1177771.81

Ex 16"V

Ex 12"W
Cont. 601C-W

Ex 12"V

Ex. 30' Public
W/S Esm't
L. F.
(601C-W)

E 1,176,800
N 602,250

R/W 10 DEDICATION
FUTURE MD ROUTE 80

0+20
Remove ex.12" Cap
& blowoff.
Conn. to ex. 12"W
built under Cont.
601C-W
N602007.11
E1177771.78

OPEN SPACE PARCEL 'P'

FUTURE ROAD RESERVATION

Ex 12"W
R= 500'

N

Maryland Coordinate System
Scale: 1" = 50'

Ex. 24" S

EX. 5

PARCEL 'A'
OPEN SPACE

E 1,178,050
N 602,250

EX. 4

OPEN SPACE
PARCEL 'A'

Ex. FRO Esm't
L.16174 F.213

Ex. Environmental Covenant
L. 12205 F.01

Ex. FRO Esm't
L.16174 F.213

Ex. Monitoring Well

Ex. MH3
N602007.22
E1178198.06

Conn. to ex. 18" stub
built under Cont. 601A-S

Ex. 24" S
Cont. 601A-S

EX. 3

MH401-WT
N602008.47
E1177812.13

MH400-WT
N602007.79
E1178023.02

Encase 18"S in
concrete
from Sta. 0+18 to
Sta. 0+96
See Std. Det. 213.1

WT 400

WT 401

18" S
C-900 PVC DR-18

Ex 16"PCW
Cont. 601C-W

Ex 12"W
Cont. 601C-W

Ex 16"V

Ex 12"V

Ex. conc.
endecasement

Tuscarora Creek

Ex. 41.5' Public
W/S Esm't
L. F.
(601C-W)

Ex. Public
W/S Esm't
L.16342 F.436

R/W 6 RESERVATION
FUTURE MD ROUTE 80

OPEN SPACE PARCEL 'D'
±223,455 sf
±5.13 acres

54+91
Remove ex. 16"
cap & blowoff.
Conn to ex. 16" PCW
built under Cont.
601C-W
N602007.02
E1177797.36

100Yr Floodplain
100Yr Floodplain Buffer

Ex. Monitoring Wells

Map 103 Parcel 7
William Rene' & Doris Life Estate
& Dawn V. Shankle
2721, F.217

GRAPHIC SCALE
50' 0 25' 50' 100' 200'
1 INCH = 50 FT

PROFESSIONAL CERTIFICATION
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STATE OF MARYLAND · PHILLIP THOMAS LYNCH · 29782 · PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

5/15/2023

4/24/2023

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	BY	DATE
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DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ ☐
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DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. 603D-SW

Utility Plan

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Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A2
	April, 2023
INDEX No.	UP-1
SHEET No.	8 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

Signature:

PARCEL 'A'
OPEN SPACE

PARCEL '0'
OPEN SPACE

LOT 401

LOT 401

Tuscarora Creek

Match Line - See Sheet UP-3

Match Line - See Sheet UP-1

Maryland Coordinate System
Scale: 1" = 50'

E 1,177,100 N 604,150

E 1,176,475 N 604,150

E 1,177,100 N 603,100

MH410-WT
N604099.25
E1176934.50

Ex. Soil Management Esm't
L. 12205 F.01

Ex. Overhead Elec.

Ex. Fence

Ex. Util. Pole

100Yr Floodplain Buffer

100Yr Floodplain

MH411-WT
N604231.58
E1176878.29

Prop. 30' Public
W/S Esm't
L. F.

Prop. FRO Esm't
L. F.

79+89
16" 1/16 HB
N604096.86
E1176923.02

PC= 80+88
N604187.61
E1176884.47

WT 410

WT 411

PT= 78+22
N603929.21
E1176924.53

Prop. FRO Esm't
L. F.

MH409-WT
N603893.02
E1176936.36

WT 409

15" S
PVC SDR-26

16"PCW DIP Cl 52

12"W DIP Cl 52

12"V

R= 511.5'

R= 500'

R= 488.5'

R= 400'

PC= 26+06
N604183.12
E1176873.88

25+10
12" 1/16 HB
N604094.47
E1176911.54

Waterbody Buffer

Ex. Environmental Covenant
L. 12205 F.01

Prop. 31.5' Public
W/S Esm't
L. F.

Prop. 45' Public
W/S Esm't
L. F.

PT= 23+44
N603929.11
E1176913.03

PC= 22+75
N603860.08
E1176908.76

PC= 77+51
N603858.56
E1176920.15

PT= 74+99
N603609.14
E1176886.86

MH408
N603565.85
E1176894.97

PC= 74+47
N603557.58
E1176883.35

408

Prop. FRO Esm't
L. F.

Waterbody Buffer

70+98= 0+00
16"x8"T
N603208.00
E1176882.91

PT= 71+25
N603235.20
E1176882.25

MH407
N603187.84
E1176895.94

PC= 70+29
N603139.97
E1176891.29

407

Prop. 45' Public
W/S Esm't
L. F.

PC= 19+70
N603557.62
E1176871.85

PT= 20+23
N603610.66
E1176875.46

Prop. 45' Public
W/S Esm't
L. F.

PT= 16+48
N603235.24
E1176870.75

16+30= 0+00
12"x8"T
N603217.44
E1176871.01

16"V

18" S
PVC SDR-26

451

PC= 0+40
N603216.15
E1176830.86

8" Inside D.C.
Det. 202.1

PC= 15+50
N603137.76
E1176880.00

MH451
N603189.95
E1176859.59

8"W DIP Cl 52

8" S
PVC SDR-35

PC= 1+50
N603232.56
E1176722.88

Prop. Public
W/S Esm't
L. F.

PC= 0+65
N603204.62
E1176818.29

PT= 2+23
N603264.37
E1176657.84

452

MH452
N603197.75
E1176725.31

2+82
8" Cap & blowoff
Det. 116.1
N603296.89
E1176607.69

PT= 2+53
N603252.59
E1176639.25

MH453
N603260.91
E1176589.81

453

3+00
8"Cap & blowoff
Det. 116.1
N603278.11
E1176599.96

Vehicular access will be provided to the meter locations for meter reading. Access path to be coordinated at site plan for Lot 401.

GRAPHIC SCALE
50' 0 25' 50' 100' 200'
1 INCH = 50 FT

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5/25/2023

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Liber 15038 Folio 393
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	April, 2023
INDEX No.	UP-2
SHEET No.	9 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

Match Line - See Sheet UP-4

Match Line - See This Sheet

LOT 112D

LOT 113

LOT 101

LOT 100

PARCEL 'A'
OPEN SPACE

PARCEL '0'
OPEN SPACE

Ex. Monitoring Well

Prop. 31.5' Public W/S Esm't L. F.

Ex. sewer manhole & associated pipe to be removed within easement area

16"PCW DIP Cl 52

12"W DIP Cl 52

41+32
16" 1/8 HB
N605529.25
E1177658.42

16+76
12" 1/8 HB
N605537.79
E1177649.36

Ex. Monitoring Well

Ex. Monitoring Well

Ex. Landfill

Ex. Monitoring Wells

14+57
12" 1/8 HB
N605333.37
E1177571.80

43+51
16" 1/8 HB
N605324.83
E1177580.86

Prop. 31.5' Public W/S Esm't L. F.

Ex. Monitoring Well

Ex. AT&T Esm't L.802 F.294

Ex. AT&T Esm't L.823 F.429

Ex. AT&T MH & conduit to be removed or relocated within limits of easement prior to construction.

0+10
8"Cap
N605034.20
E1177260.73

49+00= 0+00
16"x8"T
N605030.08
E1177251.58

49+25
16" 1/8 HB
N605007.44
E1177261.76

49+45
16" 1/8 HB
N604988.43
E1177254.56

8+52
12"x8"T
N604992.81
E1177236.27

0+21
8"Cap
N604973.21
E1177245.10

47+63
16" 1/8 HB
N605155.67
E1177204.88

47+75
16" 1/8 HB
N605143.84
E1177200.39

Fut. Meter & Vault (By others)

0+22
8"Cap
N605052.42
E1177252.49

Fut. Meter & Vault (By others)

0+10
8"Cap
N604965.00
E1177226.86

49+80= 0+00
16"x8"T
N604974.12
E1177222.76

Ex. AT&T Esm't L.823 F.429

Prop. 31.5' Public W/S Esm't L. F.

9+13= 0+00
12"x8"T
N605043.60
E1177232.88

12" 1/8 HB
N604996.96
E1177245.49

8+62

8+73
12" 1/8 HB
N605007.06
E1177249.32

10+23
12" 1/8 HB
N605143.47
E1177187.95

10+45
12" 1/8 HB
N605164.21
E1177195.82

Ex. AT&T Esm't L.802 F.294

Waterbody Buffer

Fut. Priv. Drive

Fut. Priv. Drive

Fut. Priv. Drive

Ex. Soil Management Esm't L. 12205 F.01

Ex. Environmental Covenant L. 12205 F.01

Waste Disposal Site 9

100Yr Floodplain Buffer

100Yr Floodplain

Remove ex. fence as necessary to construct W/PCW. Replace fence in location shown once construction is complete. Add 12' double gate for access to easement. Place posts to avoid W/ PCW pipes.

Encroachment

Ex Fence to remain

3+61= 0+00
12"x12"T
N604791.31
E1176788.59

0+10
12"Cap
N604800.43
E1176784.48

Fut.12"W DIP Cl 52

Fut.12"S

Ex. Overhead Elec.

Ex. Util. Pole

1+19
12"x6"FHT (Dewat.)
Det. 108.2
N604692.10
E1176568.17

9.0' FH (Dewat.)
E.E.= 302.0
N604697.59
E1176565.69

PT= 1+05
N604686.16
E1176554.97

PT= 57+07
N604675.67
E1176559.69

57+15
16" 1/16 LVB
N604672.71
E1176553.24

0+97.5
12" 1/16 LVB
N604683.05
E1176548.21

0+48
12" 1/16 UVB
N604660.01
E1176504.42

PC= 57+51
N604655.89
E1176520.55

PC= 0+60
N604665.91
E1176514.91

MH417
N604729.39
E1176423.66

Fut. 8"W

Fut. 8"S

Ex Fence

Prop. 42.7' Public W/S Esm't

Encase 12"S in concrete from Sta. 0+36 to 1+01 See Std. Det. 213.1

Prop. FRO Esm't L. F.

MH508- WT
N604760.73
E1176775.95

Ex. Util. Pole To be relocated outside limits of water & sewer easement (by others)

MH412-WT
N604475.57
E1176725.22

MH413-WT
N604592.77
E1176704.03

56+88
16"x6"FHT (Dewat.)
Det. 108.2
N604683.66
E1176577.45

11.5' FH (Dewat.)
E.E.= 299.2
N604678.16
E1176579.92

MH414- WT
N604635.67
E1176611.64

MH415- WT
N604678.12
E1176592.43

MH416- WT
N604661.84
E1176556.26

Remove ex. fence within limits of easement

Specimen Tree #183

Remove ex. fence within limits of easement

Prop. 30' Public W/S Esm't L. F.

Prop. FRO Esm't L. F.

100Yr Floodplain Buffer

100Yr Floodplain

Marylnd Coordinate System Scale: 1" = 50'

Ex Fence to remain

Ex Fence

12"V

16"V

8"V

12"x8"R

12"S

15"S

8"S

16"PCW DIP Cl 52

12"W DIP Cl 52

PVC SDR-35

PVC SDR-26

PVC SDR-36

PVC C900 PVC

WT 508

WT 413

WT 412

WT 414

WT 415

WT 416

AR-1

AR-2

CO11

FUT. 418

FUT. 419

R= 486.5'

R= 500'

Remove ex. fence within limits of easement

PT= 86+78
N604613.68
E1176488.61

PT= 31+95
N604608.04
E1176478.59

86+99= 58+00
16"x16"T
N604632.08
E1176478.25

32+28= 0+00
12"x12"T
N604636.46
E1176462.59

33+01
8" 1/16 HB
N604700.40
E1176426.59

87+85
8" 1/16 HB
N604706.89
E1176436.13

88+10
8"cap & blowoff
Det. 116.1
N604722.14
E1176416.71

33+22
8" Cap & blowoff
Det. 116.1
N604713.48
E1176409.92

31+26
2" ARV in 48"MH
Det. 115.1
N604550.28
E1176516.59

86+19
2" ARV in 48"MH
Det. 115.1
N604563.65
E1176520.94

PC= 29+25
N604419.01
E1176666.49

PT= 29+31
N604421.95
E1176661.48

PC= 84+20
N604431.86
E1176667.29

PT= 84+15
N604428.95
E1176672.27

Prop. 31.5' Public W/S Esm't L. F.

N 605,050

E 1,177,000

N 605,350

E 1,177,650

N 604,975

E 1,176,600

N 605,350

E 1,177,100

Vehicular access will be provided to the meter locations for meter reading. Access paths to be coordinated at site plan for Lots 100 and 101.

GRAPHIC SCALE
50' 0 25' 50' 100' 200'
1 INCH = 50 FT

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5/25/2023

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DRAWN		
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5/15/2023

4/24/2023

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. 603D-SW

Utility Plan

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JOB No.	1339A2
	April, 2023
INDEX No.	UP-3
SHEET No.	10 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

Quantum Place South (Public)

Clean Energy Lane (Private)

LOT 112C

LOT 102

LOT 112D

LOT 112A

E 1,177,900
N 607.075

E 1,178,500
N 605.800

Waste Disposal Site 4

Manyland Coordinate System
Scale: 1" = 50'

EX. 111

EX. 8" S

EX. 99

22+15
Remove ex. 16"cap & blowoff.
Conn. to ex. 16"PCW
built under Cont. 603A-SW
N606904.20
E1177892.61

22+24
Remove ex. 12"cap
&blowoff. Conn. to ex. 12"W
built under Cont. 603A-SW
N606893.71
E1177897.33

Ex.42' Public W/S Esm't
L. F.
(603B-S)

EX. 10"S (Cont. 603B-S)

16"PCW DIP Cl 52

12"W DIP Cl 52

Ex. Monitoring Well

Ex.42.5' Public W/S Esm't
L. F.
(603B-S)

EX. 95

EX. 96

EX. 97

EX. 98

25+78
16" 1/8 HB
N606742.77
E1177574.76

25+54
16" 1/8 HB
N606764.99
E1177583.19

EX. 15" S (Cont. 603B-S)

12"x8"R
8"V

8"W DIP Cl 52

26+01
8"Cap
N606738.91
E1177553.25

FUT. 112

Fut. 10"S

FUT. 113

Fut. 6"W

Fut. 10"S

25+91= 32+21
12"x12"T
N606743.01
E1177562.37

Ex. Soil Management Esm't
L. 12205 F.01

12"V

16"PCW DIP Cl 52

12"W DIP Cl 52

37+04
16" 1/8 HB
N605715.71
E1178036.85

EX. C08

EX. 94

EX. 15" S (Cont. 603B-S)

Ex. 30' Public W/S Esm't
L. F.
(603B-S)

37+25
16" 1/8 HB
N605696.18
E1178029.44

20+94
12" 1/8 HB
N605715.74
E1178024.56

20+83
12" 1/8 HB
N605704.71
E1178020.37

31.5' Public W/S Esm't
L. F.

E 1,177,900
N 605.800

27"x42" CMP

36"RCP

24"RCP

SS MH

Match Line - See Sheet UP-3

GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

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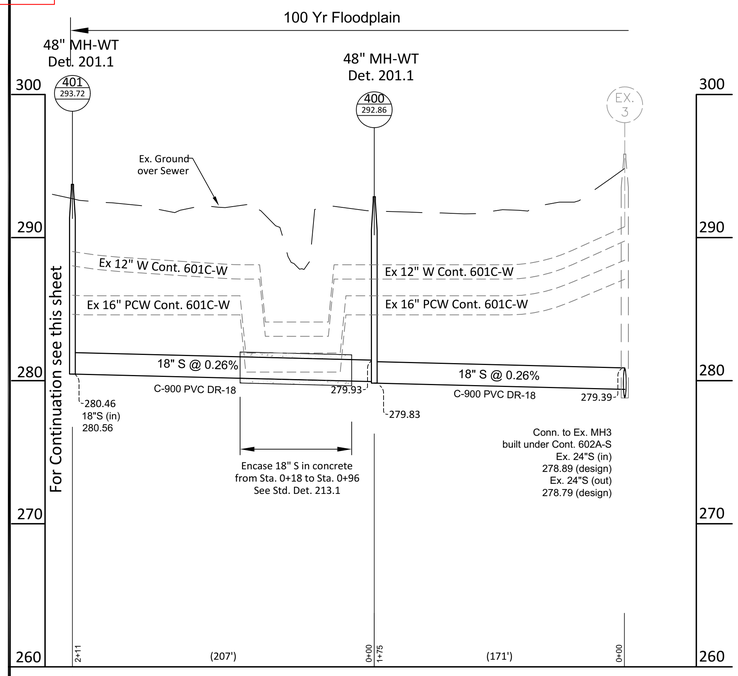
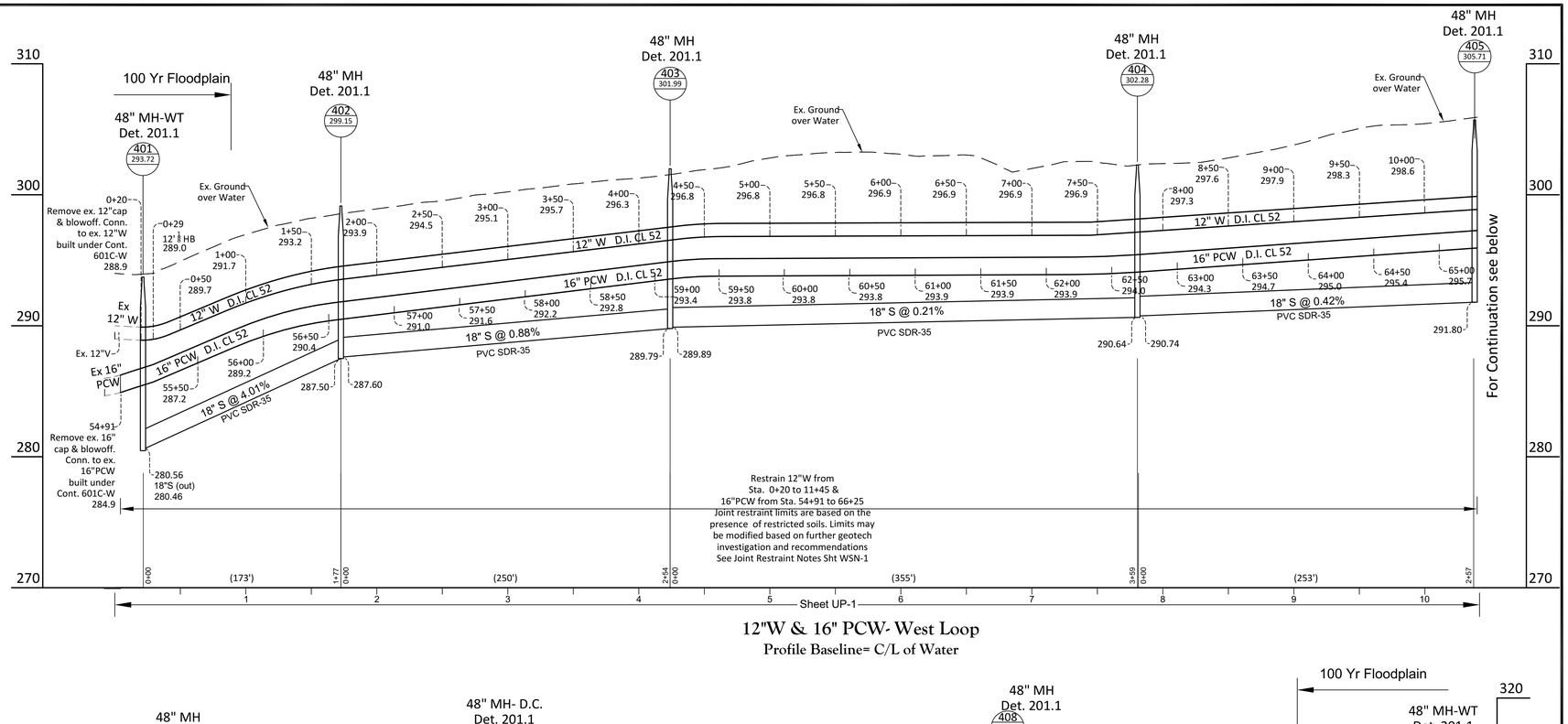
Division of Planning and Permitting
Department of Development
Review Engineering

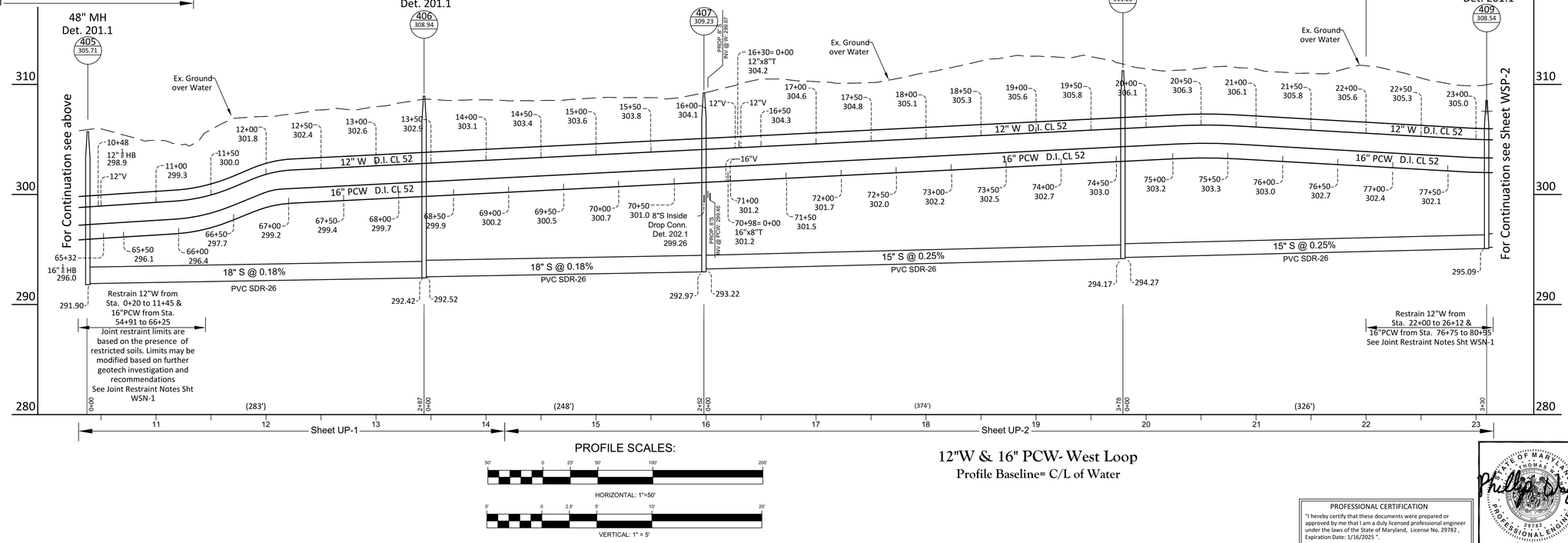
APPROVED: 06/1/23

Signature:





12"W & 16" PCW- West Loop
Profile Baseline= C/L of Water



PROFILE SCALES:

12"W & 16" PCW- West Loop
Profile Baseline= C/L of Water

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Water & Potable Cooling Water Profile

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

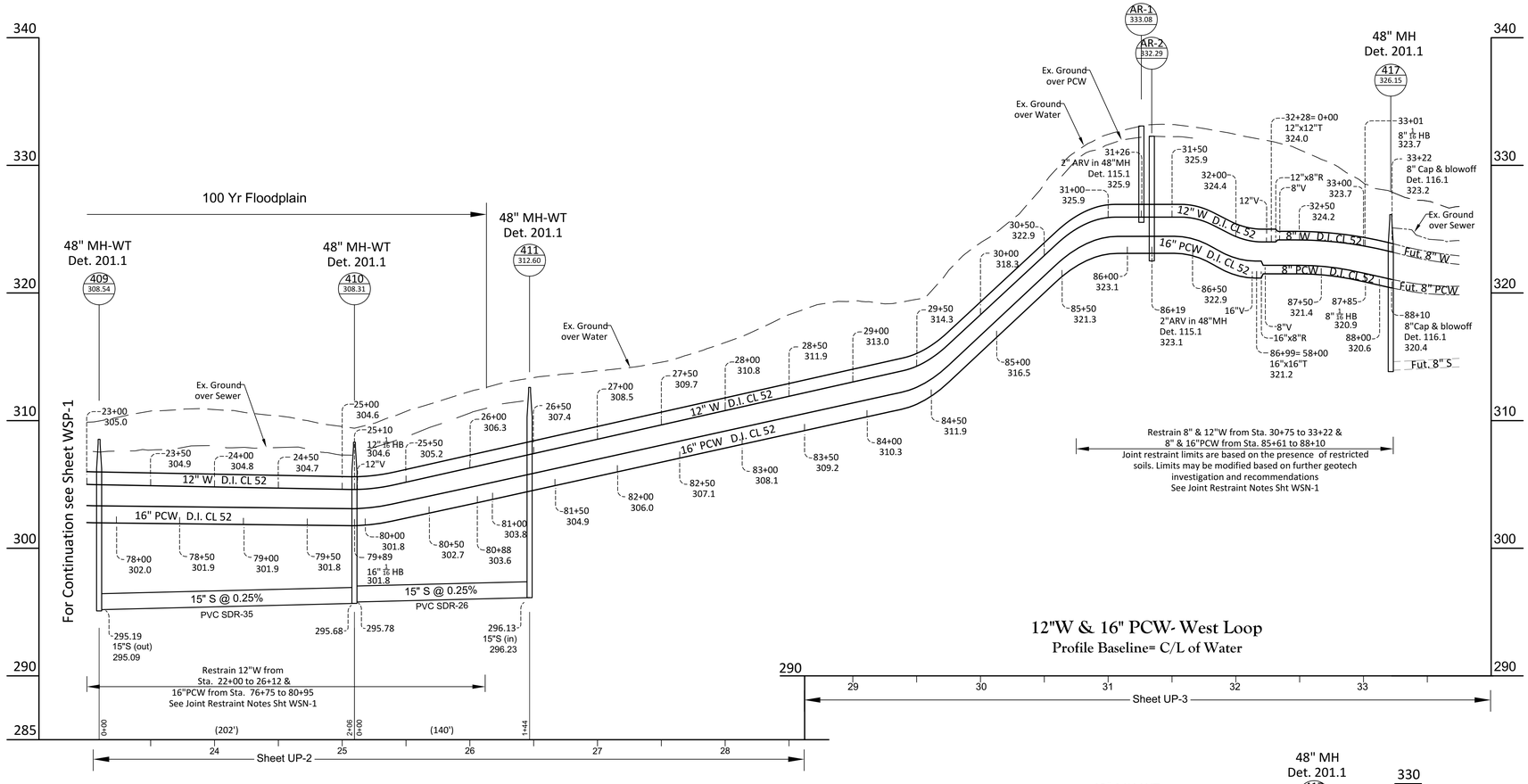
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A2
	April, 2023
INDEX No.	WSP-1
SHEET No.	12 OF 17,6A&8A

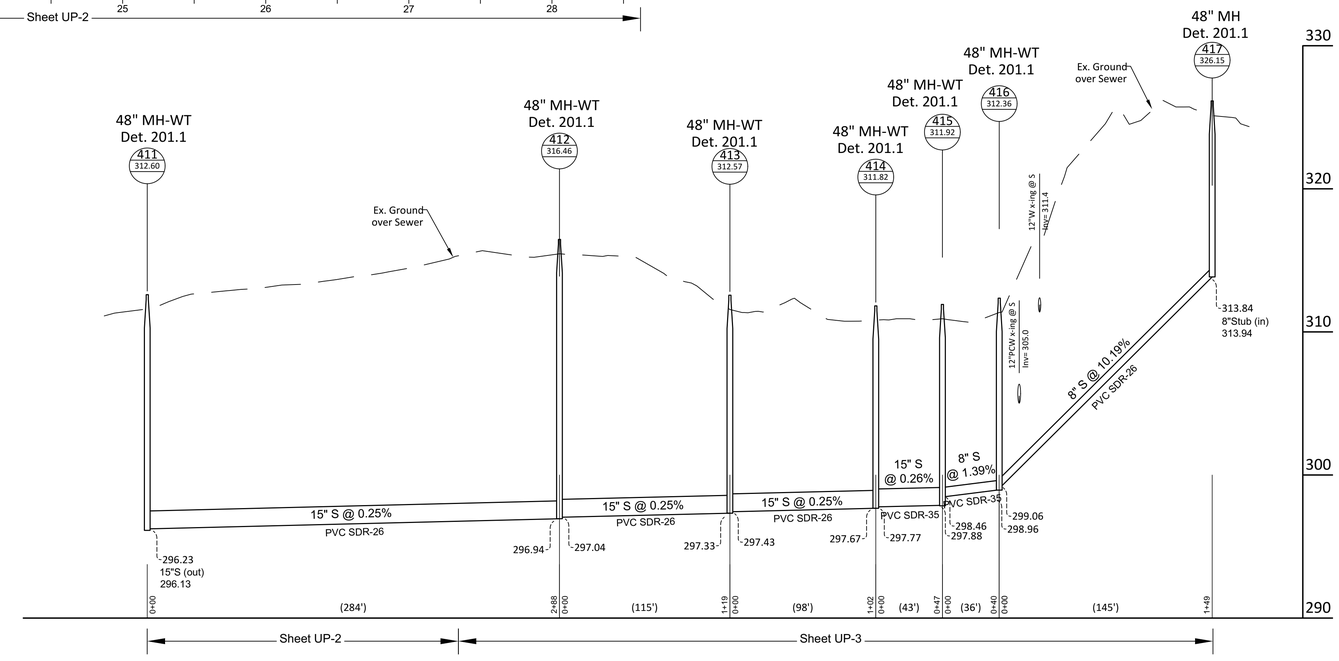
Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

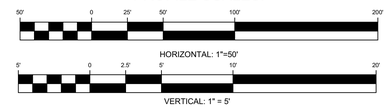
Signature:



12"W & 16" PCW- West Loop
Profile Baseline= C/L of Water



PROFILE SCALES:



PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND · PHILLIP THOMAS WAGNER · 29782 · PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR
BY DATE

5/15/2023
4/24/2023

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. 603D-SW

Water & Potable Cooling Water Profile

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Liber 15038 Folio 393
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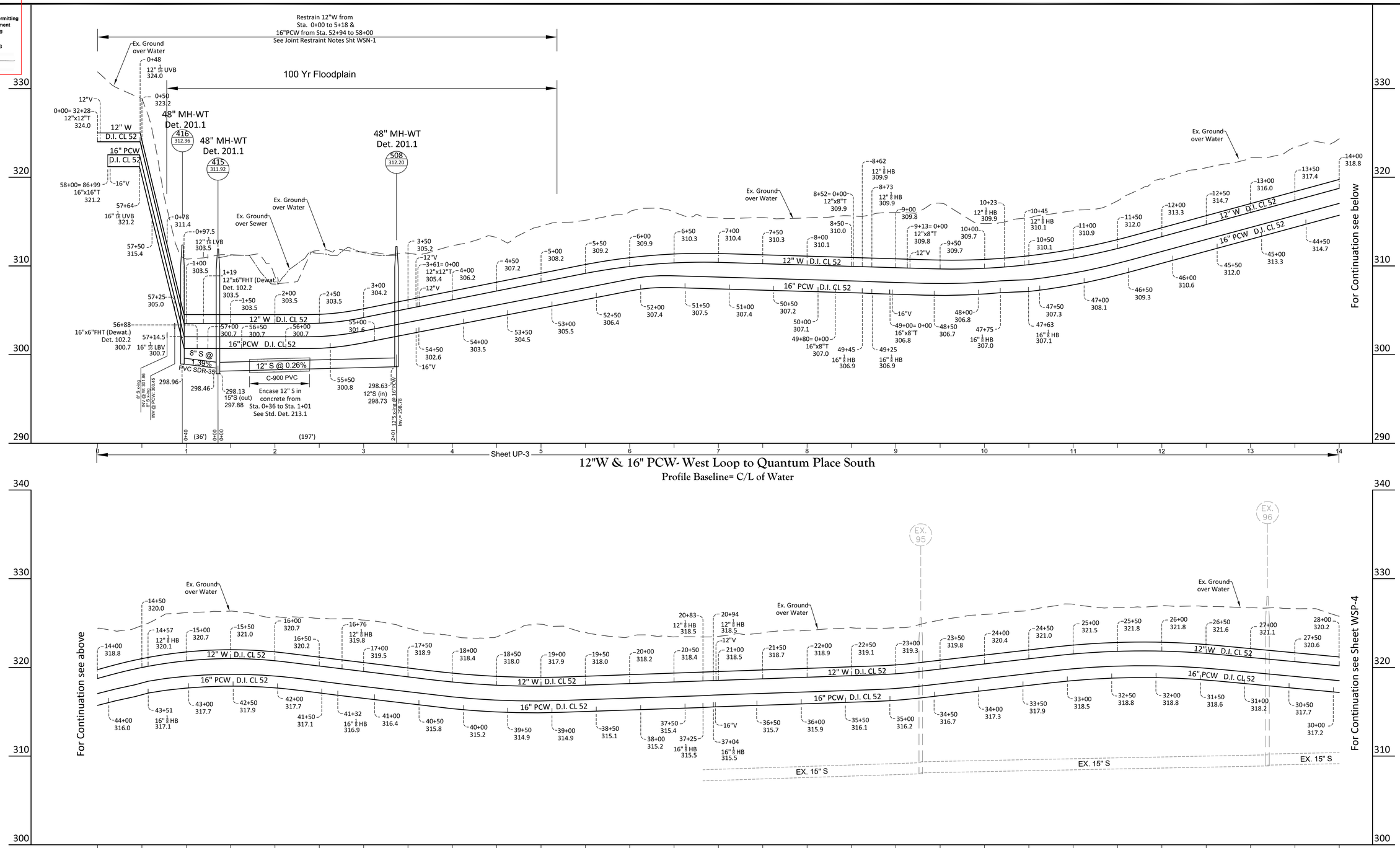
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A2
	April, 2023
INDEX No.	WSP-2
SHEET No.	13 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

Signature:



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STATE OF MARYLAND · PHILLIP THOMAS · 29782 · PROFESSIONAL ENGINEER

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Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

QUANTUM FREDERICK

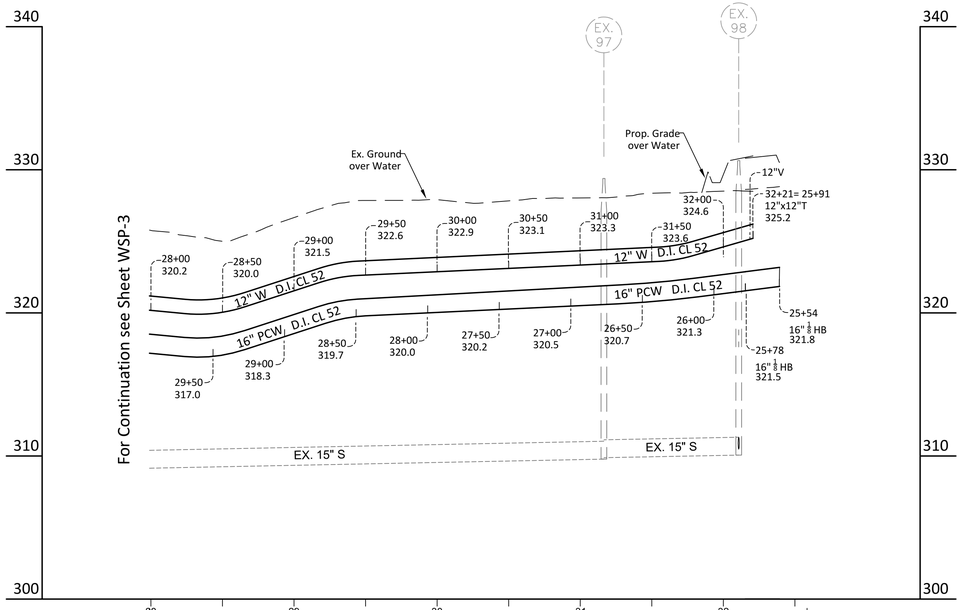
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A2
	April, 2023
INDEX No.	WSP-31
SHEET No.	14 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

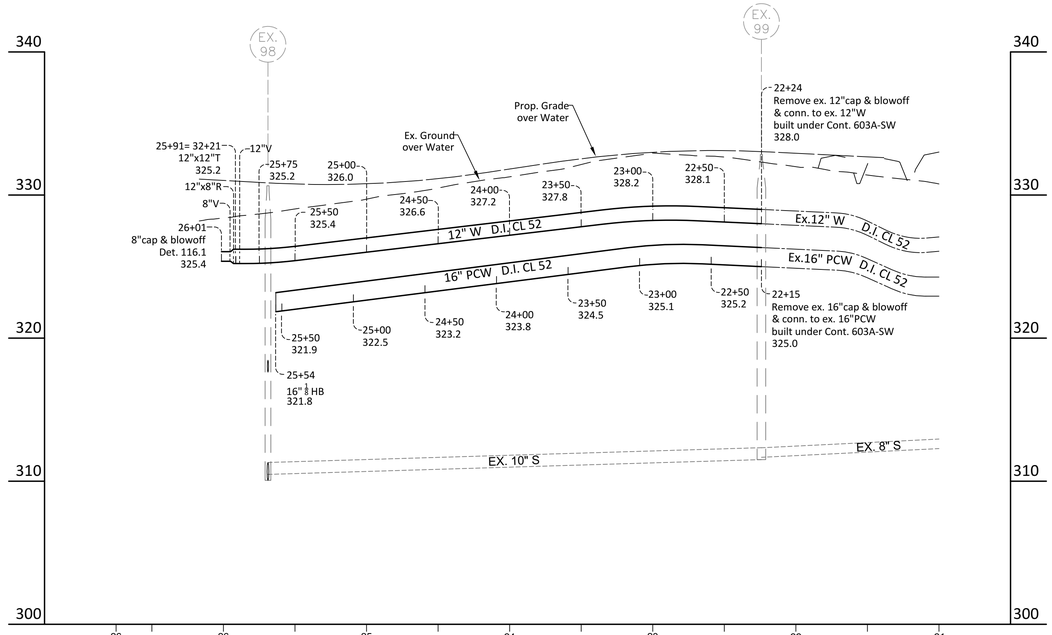
APPROVED: 06/1/23

Signature:



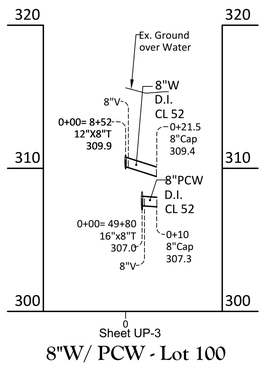
12"W & 16" PCW- West Loop to Quantum Place South

Profile Baseline= C/L of Water



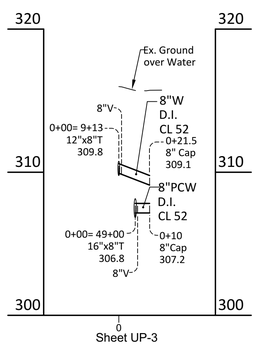
12"W & 16" PCW- Clean Energy Lane

Profile Baseline= C/L of Water



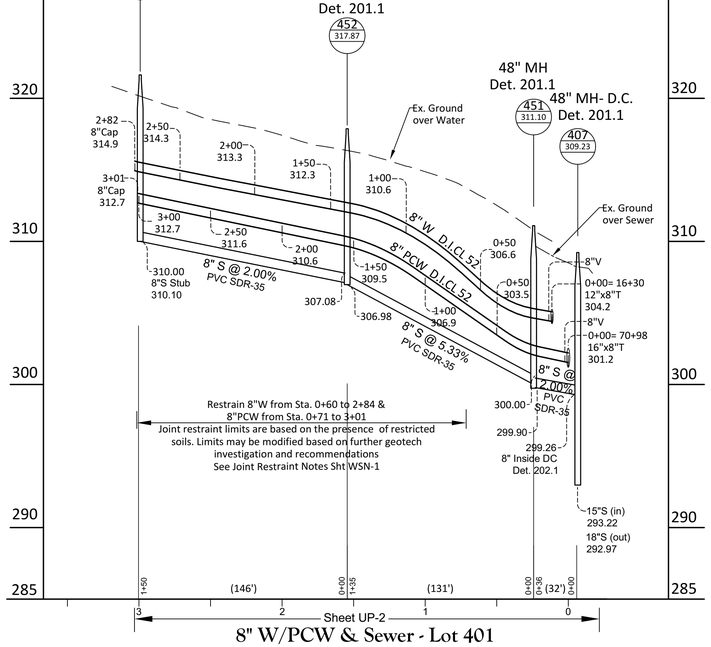
8"W/ PCW - Lot 100

Profile Baseline= C/L of Water



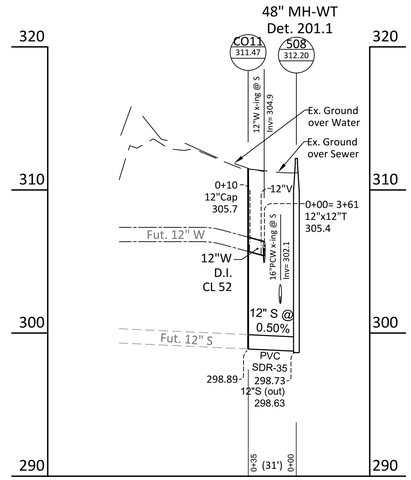
8"W/ PCW - Lot 101

Profile Baseline= C/L of Water



8" W/PCW & Sewer - Lot 401

Profile Baseline= C/L of Potable Cooling Water



12"W/ 12"S Conn. for Future Ballenger Creek W/S

Profile Baseline= C/L of Sewer

PROFILE SCALES:

HORIZONTAL: 1"=50'

VERTICAL: 1" = 5'

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STATE OF MARYLAND · PHILLIP THOMAS DAGNA · 29782 · PROFESSIONAL ENGINEER

5/25/2023

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE
5/15/2023			
4/24/2023			

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE

DEVELOPER/ OWNER:
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Contract No. 603D-SW

Water & Potable Cooling Water Profile

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QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A2
	April, 2023
INDEX No.	WSP-4
SHEET No.	15 OF 17,6A&8A

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 06/1/23

Signature:

WATER & SEWER GENERAL NOTES

1. All 8" water main and larger to be Ductile Iron CL.52 -Double Cement lined unless otherwise noted. All 6" and smaller water main to be Ductile Iron, CL. 54 unless otherwise noted.
2. All sewer mains greater than 14' deep to be PVC SDR-26 per Fred. Co. specs. All other sewer mains to be PVC SDR-35 per Fred. Co. specs unless noted otherwise. Sewer main at stream crossings to be C-900 pipe as shown on plan and profiles
3. All pipe elevations shown are invert elevations unless otherwise indicated.
4. Developer shall set all property pipes and c/l stations necessary to stake out this construction.
5. All water, non-potable water and sewer construction shall be in accordance with the latest addition of Frederick County General Conditions and Standard Specifications for Water Mains, Sanitary Sewer and Related Structures, Special Provisions and amendments thereto. For details not shown on the contract drawings, see Frederick County Standard Details.
6. The contractor shall not tap or penetrate existing sewer mains without approval from Frederick County DWSU.
7. The contractor shall not operate valves on existing county owned mains.
8. Contractor to assume all responsibility in verifying locations and elevations of all existing underground utilities in the vicinity of this construction. The contractor shall locate existing utilities a minimum of two weeks in advance of construction operations in the vicinity of proposed utilities and at his own expense.
9. Existing utilities are shown from best available records. the contractor shall test pit in the area of known utilities to verify size, elevation, location and type prior to performing any work. any utility, whether shown or not, that is damaged by the contractor shall be repaired immediately at no expense to the owner. Should the contractor discover discrepancies between the plans and field conditions, the owner/ engineer is to be notified immediately. Should the contractor make field corrections or adjustments without the authorization of the owner, then the contractor assumes the responsibility for said corrections or adjustments.
10. Clear all utilities by a minimum of 1' - 0" vertically. Clear all poles by 7'-0" horizontally or tunnel as required. Cost for tunneling or bracing at poles shall be included in the unit price bid for water & sewer construction.
11. Any necessary adjustments to existing manholes, valve boxes, etc., are to be done so by the contractor. The contractor is responsible for removing and replacing any existing fences, driveways, signs, drainage pipes, mailboxes, shrubs, trees, etc. damaged or removed during construction. All disturbed areas shall be returned to their original condition or better.
12. The contractor shall notify MISS UTILITY (1-800-257-7777) 5 days prior to start of construction.
13. All material stockpiles left at the end of each work day require stabilization until the next redisturbance.
14. Contractor shall repair/ replace any damaged sediment control devices during the same working day.
15. Maintain a minimum of 10'-0" horizontal clearance between water and sewer mains.
16. For details not shown on the contract drawings, see Frederick County standard details.
17. For materials and construction methods, use Frederick County standard specifications.
18. During pumping operation, no water will be discharged directly across the ground or into any existing body of water or stream, without first being pumped to an approved temporary sediment trap/ desilting structure. See SCD approved sediment control plan.
19. For required sediment control measures see SCD approved Sediment Control plan.
20. The developer shall rough grade to within one half foot of finished subgrade in areas of water and sewer installation prior to starting any trenching work for the water and sewer lines.
21. Owner/Developer/Contractor Responsibilities for Subgrade:
    A. The Contractor shall ensure that the ground elevation over the water and/or sewer line locations, is within six (6) inches of finished grade (outside roadway) or at the road subgrade elevation (within roadway) prior to the start of any excavation or trenching of water and/or sewer lines. Cut sheets prepared by the Contractor shall be presented to the inspector sufficiently in advance of the work being done (this advance notice to be determined by the inspector during the preconstruction meeting). The inspector reserves the right to withhold payment and/or to stop work if cut sheets are not provided in a timely fashion.
    B. If after installation of water and/or sewer facilities there exists a conflict with other utilities (shown as future), the relocation, adjustment, replacement, etc. of said water and sewer will be affected pursuant to Article 16 of the General Conditions and Standard Specifications.
    C. If subgrade is shown as controlled fill or fill beneath the water and/or sanitary sewer, the mass grading Engineer of Record shall certify the entire portion of the mass graded area has been installed pursuant to the Section 2200 where water and/or sewer lines are to be installed.
22. All proposed water & sewer shown on this plan to be installed by open cut method.
23. The contractor shall maintain access to all property owners at all times. the contractor, with owner approval, will coordinate with property owners if access must be interrupted for short time periods.
24. The contractor is responsible to avoid the spillage of raw sewage. The contractor shall furnish necessary equipment (sewer plugging, pumping, containment, etc.) to prevent said spillage.
25. The contractor shall be responsible for keeping silt and debris out of the storm drainage system for the duration of the contract.
26. Waterline bacterial testing requirement: disinfection and verification testing will be performed in accordance with AWWA C651-05, or latest edition. The contractor shall be required to have bacterial testing performed on all new water mains to demonstrate bacterial levels meet State MDE requirements prior to the County granting conditional acceptance of the contract. Requirements include but are not limited to obtaining two consecutive sets of acceptable samples that are collected a minimum of 24 hours apart. One sample shall be collected for residual chlorine, total coliform, and e. coli analysis for: every 1200 feet of pipeline; at the end of each branch; and at the end of the line. After disinfection the line must be flushed. Chlorine residual samples must yield a result of 1.0 ppm or less before total coliform or e. coli analysis may be performed. All sample collections shall be performed by individuals certified for drinking water sample collection by the Maryland Department of Environment. Laboratories utilized for the analysis shall be certified by the Maryland Department of Environment for total coliform and e. coli analysis. If the contractor has allowed contaminants to enter the pipe during construction (this shall be determined by inspector) then sampling may be required at reduced distance intervals as determined by the DWSU. Disinfected water (of chlorine residual 1.0 ppm or less) will stand in the line for at least 16 hours after a final flush. Certified bacterial test results shall be provided to the DWSU and shall include certification information for both the sample collector and laboratory.
27. The Ballenger-McKinney WWTP provides sanitary sewage treatment and the New Design Water Treatment Plant provides potable water service for this project.
28. Requirements for Televising Sanitary Sewer Lines: All PUBLIC gravity sewer lines and laterals shall be televised as a condition of inspection in order to obtain conditional/operational acceptance. Televising shall be done in accordance with Section 2571. II.A.2. Televising firms must be submitted and approved by the DWSU prior to their use. The DVD must be viewed and approved by the DWSU prior to acceptance of the sewer mains and laterals and placing any portion of the system into service. The following procedures must be followed: 1) All sewer mains and laterals for the project must be installed, backfilled and compaction tests reviewed and approved by the DWSU prior to televising. 2) Complete all pressure tests, deflection tests and MH vacuum tests prior to televising. 3) All mains and laterals shall be flushed with water, dyed red, in a manner sufficient to remove all dirt and debris and provide enough water to discern any standing water. Flushing will take place no earlier than 48 hr prior to televising and will be witnessed by the DWSU inspector. Contractor shall ensure that no construction debris is flushed into the receiving sewer. 4) Stand pipes to laterals will be labeled with lot #, etc. with a bold, black, permanent marker by the contractor and verified by the inspector as correct. Pan the lot # with the camera prior to inserting camera into the cleanout stack. 5) Project name, number, date, time, type and size of pipe and MH # - MH # or lot # will be displayed on the screen at all times and not obscure the view of the sewer pipe. There will be a running count of the linear footage shown on the screen. 6) After televising and prior to Conditional Acceptance, if the DWSU determines that any infiltration, debris or damage may have occurred to any main or lateral they will be flushed and televised again. 7) All lines and laterals will be placed on one DVD if space permits (if not, place mains on one DVD and laterals on another.) in a format that can be viewed on Windows Media Player or Real Player. A written report will be provided from the televising company containing a log noting the information in item 5 above, the general condition of the line/lateral and any specific features. The main lines and laterals log will be in the same sequence as shown on the DVD. 8) Tolerances: No dirt, stone or other debris permitted in mains or laterals -No standing water in laterals -The decision to allow any standing water in mains will be determined by the DWSU based on pipe diameter, % slope and/or other factors as determined by the DWSU.
29. In compliance with COMAR 09.20.01.3 and the Safe Drinking Water Act (Section 1417(a)(4)(8), materials that come in contact with water intended for use in public water supply shall comply with the Reduction of Lead in Drinking Water Act, which went into effect in Maryland in January 2012.
30. In accordance with Code of Maryland Regulations (COMAR) 26.04.01.33, Direct and Indirect Additives, suppliers of water shall only use products (any materials that come in contact with water intended for use in public water supply) that meet the applicable American National Standards Institute/ NSF International (ANSI / NSF) standards for direct or indirect drinking water additives. The products can also be certified by an organization accredited by the ANSI for such testing (i.e., International Association of Plumbing and Mechanical Officials Research and Testing, Ontario CA, Underwriters Laboratory, Northbrook, IL, and Water Quality Association, Lisle, IL).

THRUST BEARING/RESTRAINT NOTES- WATER SYSTEMS

1. Restrain all fire hydrants with Duc-Lugs. Refer to Frederick County Std. Detail 107.1. Do not block fire hydrants and fire hydrant tee's with concrete.
2. Block all horizontal and lower vertical bends with concrete per Frederick County Std Detail 102.1.
3. Block all upper vertical bends with concrete per Frederick County Std Detail 105.1.
4. Block all other fittings with concrete per Frederick County Std. Detail 103.1.
5. All public fittings and valves are to be restrained by use of 'Mega-Lugs' or equal. If no restrained joint length is shown on the drawings, install concrete buttresses/ anchors at fittings per the Standard Details or submit an RFI to the engineer to have restrained joint length clarified.

MATERIALS/QUANTITIES LIST

WATER	UNIT	QTY.	AS-BUILT (To be completed by the county)	SUPPLIER/MATERIAL (To be completed by the county)
16" DUCTILE IRON PIPE CL 52	LF	6793		
12"DUCTILE IRON PIPE CL 52	LF	6806		
8" DUCTILE IRON PIPE CL 52	LF	853		
16" 1/8 HB	EA	11		
16" 1/16 HB	EA	1		
12" 1/8 HB	EA	10		
12" 1/16 HB	EA	1		
8" 1/16 HB	EA	2		
16" 1/16 UVB	EA	1		
16" 1/16 LVB	EA	1		
12" 1/16 UVB	EA	1		
12" 1/16 LVB	EA	1		
16"x 16"T	EA	1		
16"x8"T	EA	3		
12"x12"T	EA	3		
12"x8"T	EA	3		
16"V	EA	7		
12"V	EA	12		
8"V	EA	9		
16"x8"R	EA	1		
12"x8"R	EA	2		
12" CAP	EA	1		
8" CAP	EA	5		
8" CAP & BLOWOFF	EA	4		
2" AIR RELEASE VALVE IN 48" MH- DET. 115.1	EA	2		
16"X6" DEWATERING FHT/ FIRE HYDRANT ASSEMBLY (INCL. 6"VALVE, VALVE BOX, LEAD & PIPE. FIRE HYDRANT AS MFG BY AMERICAN DARLING CORP.)- FRED. CO. DET. 108.2	EA	1		
12"X6" DEWATERING FHT/ FIRE HYDRANT ASSEMBLY (INCL. 6"VALVE, VALVE BOX, LEAD & PIPE. FIRE HYDRANT AS MFG BY AMERICAN DARLING CORP.)- FRED. CO. DET. 108.2	EA	1		

MATERIALS/QUANTITIES LIST

SEWER	UNIT	QTY.	AS-BUILT (To be completed by the county)	SUPPLIER/MATERIAL (To be completed by the county)
18" PVC PIPE SDR-35	LF	1029		
18" PVC PIPE SDR-26	LF	533		
18" C-900 PVC PIPE - DR-18	LF	378		
15" PVC PIPE SDR-35	LF	245		
15" PVC PIPE SDR-26	LF	1338		
12" PVC PIPE SDR-35	LF	31		
12" C-900 PVC PIPE	LF	197		
8" PVC PIPE SDR-35	LF	345		
8" PVC PIPE SDR-26	LF	145		
48" SEWER MH	EA	10		
48" SEWER MH W/ 8" INSIDE D.C. DET 202.1	EA	1		
48" SEWER MH- W/ WATERTIGHT FRAME & COVER	EA	11		
CLEANOUT	EA	1		

** MAY UTILIZE A WATERTIGHT FRAME AND COVER MANUFACTURED BY EAST JORDAN IRON WORKS IN ADDITION TO THOSE ALREADY LISTED ON THE FREDERICK COUNTY "PRE-APPROVED" LIST. THE FRAME MENTIONED IS A STRAIGHT WALL DESIGN. CONTACT: MARK BAUM AT EAST JORDAN IRON WORKS AT (800) 418-3549 OR WWW.EJIW.COM FOR MORE INFORMATION.

SERVICE CONNECTIONS		[COUNTY USE ONLY]	
TYPE	ESTIMATED	AS-BUILT	REMARKS
8" WSC - NEW	3		
8" PCW - NEW	3		

WATER / POTABLE COOLING WATER CONNECTIONS BUILT UNDER THIS CONTRACT SERVE LOTS 100, 101 & 401

SERVICE CONNECTIONS		[COUNTY USE ONLY]	
TYPE	ESTIMATED	AS-BUILT	REMARKS
8" SSC - NEW	1		

SEWER CONNECTION BUILT UNDER THIS CONTRACT TO SERVE LOT 401.

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STATE OF MARYLAND · PHILLIP THOMAS LAND · 29782 · PROFESSIONAL ENGINEER

5/25/2023

5/15/2023

4/24/2023

CALL "MISS UTILITY" AT 1-800-257-7777 72 Hours Before Start Of Construction

Contract No. 603D-SW

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

DEVELOPER/ OWNER:
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AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Water & Sewer Notes

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QUANTUM FREDERICK

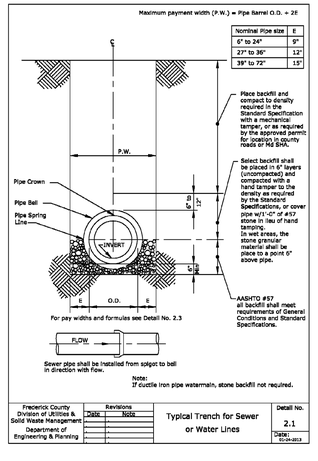
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: As Shown
JOB No. 1339A2
April, 2023
INDEX No. WSN-1
SHEET No. 16 OF 17,6A&8A

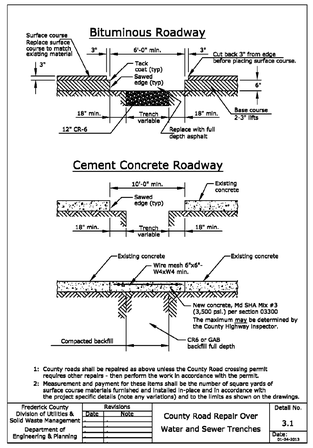
Division of Land and Permitting
Department of Development
Review Engineering

APPROVED: 06/13/23

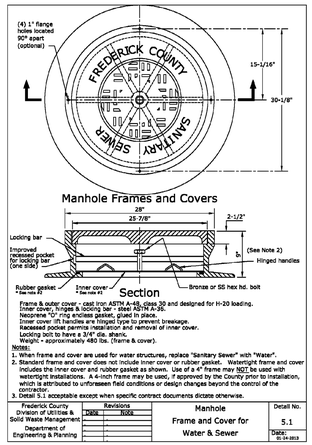
Signature:



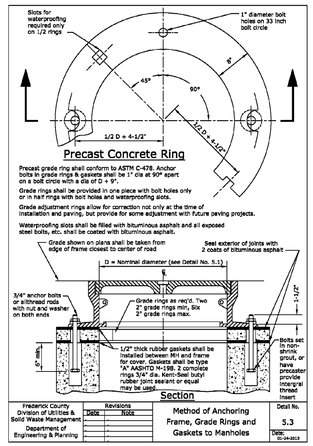
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Typical Trench for Sewer or Water Lines	Detail No. 2.1 Date: 01-24-2013



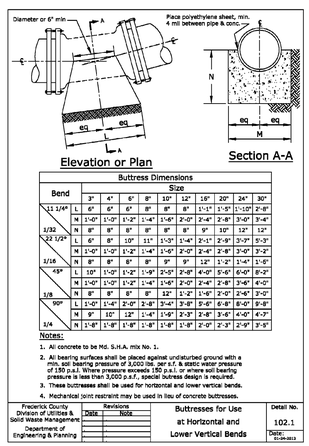
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	County Road Repair Over Water and Sewer Trenches	Detail No. 3.1 Date: 01-24-2013



Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Manhole Frame and Cover for Water & Sewer	Detail No. 5.1 Date: 01-24-2013



Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Method of Anchoring Frame, Grade Rings and Gaskets to Manholes	Detail No. 5.3 Date: 01-24-2013

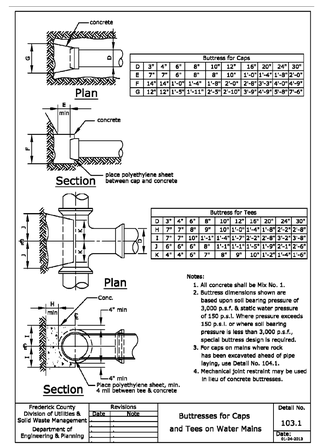


Buttress Dimensions

Bend		Size 3"	4"	6"	8"	10"	12"	15"	20"	24"	30"
11 1/4°	L	6"	6"	6"	8"	8"	1'-1"	1'-5"	1'-10"	2'-8"	
	N	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-0"	3'-4"
1/32	N	8"	8"	8"	8"	8"	9"	10"	12"	12"	12"
22 1/2°	L	6"	8"	10"	11"	1'-3"	1'-4"	2'-1"	2'-9"	3'-7"	5'-3"
	N	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-0"	3'-2"
1/16	N	8"	8"	8"	8"	9"	12"	1'-2"	1'-6"	1'-9"	2'-0"
45°	L	10"	1'-0"	1'-2"	1'-9"	2'-5"	2'-8"	4'-0"	5'-5"	6'-0"	8'-2"
	N	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-6"	4'-0"
1/8	N	8"	8"	8"	8"	12"	1'-2"	1'-6"	2'-0"	2'-6"	3'-0"
90°	L	1'-0"	1'-4"	2'-0"	2'-4"	3'-3"	5'-5"	6'-8"	8'-0"	9'-8"	
	N	1'-0"	1'-0"	1'-2"	1'-4"	1'-6"	2'-0"	2'-4"	2'-8"	3'-6"	4'-0"
1/4	N	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	1'-8"	2'-0"	2'-3"	2'-9"	3'-5"

Notes:
1. All concrete to be Md. S.H.A. mix No. 1.
2. All bearing surfaces shall be placed against undisturbed ground with a min. soil bearing pressure of 3,000 lbs. per s.f. & static water pressure of 150 p.s.i. Where pressure exceeds 150 p.s.i. or where soil bearing pressure is less than 3,000 p.s.f., special buttress design is required.
3. These buttresses shall be used for horizontal and lower vertical bends.
4. Mechanical joint restraint may be used in lieu of concrete buttresses.

Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Buttresses for Use at Horizontal and Lower Vertical Bends	Detail No. 102.1 Date: 01-24-2013



Buttress for Caps

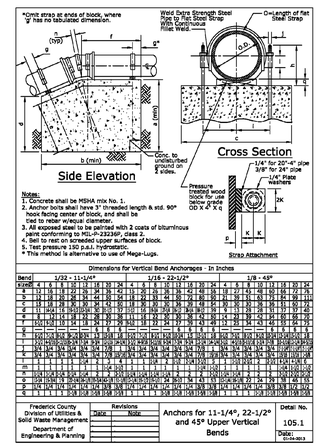
	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
D	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
E	7"	7"	6"	8"	8"	10"	1'-0"	1'-4"	1'-8"	2'-0"
F	14"	14"	1'-0"	1'-4"	1'-8"	2'-0"	2'-8"	3'-4"	4'-0"	4'-9"
G	12"	12"	1'-3"	1'-11"	2'-3"	2'-10"	3'-8"	4'-6"	5'-5"	6'-7"

Buttress for Tees

	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
D	3"	4"	6"	8"	10"	12"	16"	20"	24"	30"
I	7"	7"	6"	8"	8"	10"	1'-0"	1'-4"	1'-8"	2'-0"
J	7"	7"	10"	1'-1"	1'-4"	1'-7"	2'-2"	2'-8"	3'-3"	3'-8"
K	4"	4"	6"	7"	8"	9"	10"	1'-1"	1'-4"	1'-8"

Notes:
1. All concrete shall be Mix No. 1.
2. Buttress dimensions shown are based upon soil bearing pressure of 3,000 p.s.f. & static water pressure of 150 p.s.i. Where pressure exceeds 150 p.s.i. or where soil bearing pressure is less than 3,000 p.s.f., special buttress design is required.
3. For caps on mains where rock has been excavated ahead of pipe laying, use Detail No. 104.1.
4. Mechanical joint restraint may be used in lieu of concrete buttresses.

Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Buttresses for Caps and Tees on Water Mains	Detail No. 103.1 Date: 01-24-2013

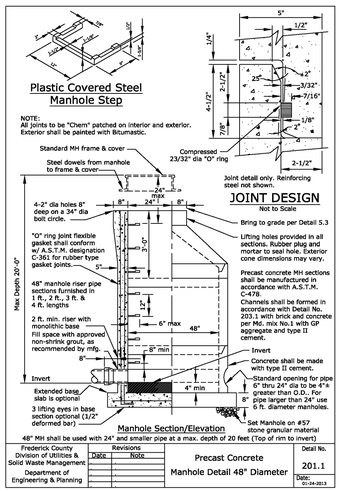


Notes:
1. Concrete shall be MSHA mix No. 1.
2. Anchor bolts shall have 3" threaded length & std. 90° hook facing center of block, and shall be tied to reber w/equal clearance.
3. All exposed steel to be painted with 2 coats of bituminous coating conforming to AASHTO M-243(69), Type 2.
4. Bolt to rest on unexcavated upper surfaces of block.
5. Test press. is 150 p.s.i. hydrostatic.
* This method is alternative to use of Mega-Lugs.

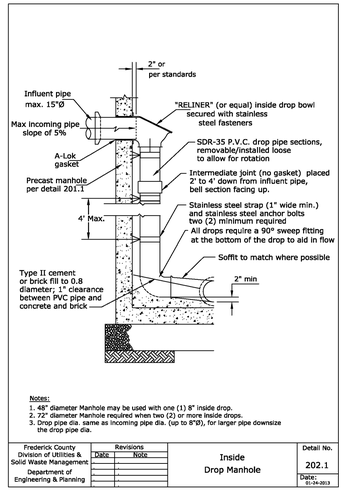
Dimensions for Vertical Bend Anchorages - In Inches

Bend	1/32 - 11-1/4°				16	22-1/2°				18	45°				20
Pipe	D	E	F	G		D	E	F	G		D	E	F	G	
4	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
6	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
8	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
10	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
12	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
16	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
18	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
20	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
24	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
27	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
30	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
36	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
42	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
48	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
54	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
60	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
66	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24
72	12	16	3	12	24	12	20	3	16	24	12	24	3	20	24

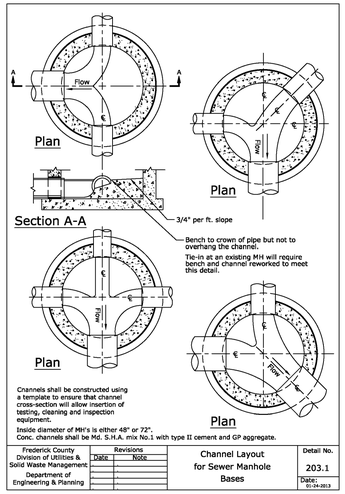
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Anchors for 11-1/4°, 22-1/2° and 45° Upper Vertical Bends	Detail No. 105.1 Date: 01-24-2013



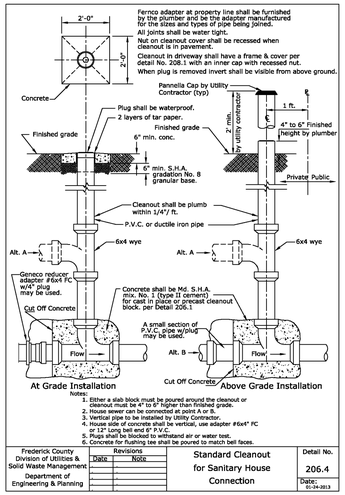
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Precast Concrete Manhole Detail 48" Diameter	Detail No. 201.1 Date: 01-24-2013



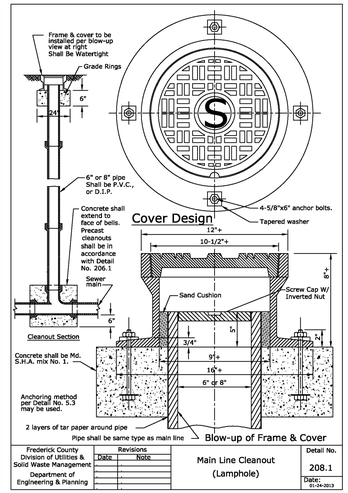
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Inside Drop Manhole	Detail No. 202.1 Date: 01-24-2013



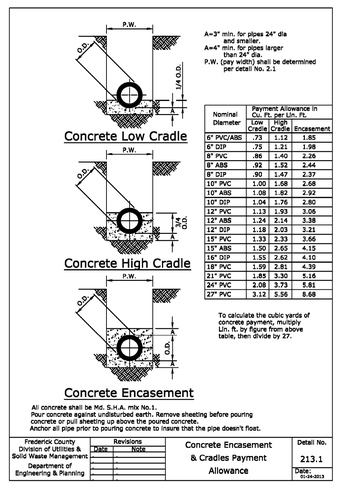
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Channel Layout for Sewer Manhole Bases	Detail No. 203.1 Date: 01-24-2013



Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Standard Cleanout for Sanitary House Connection	Detail No. 206.4 Date: 01-24-2013



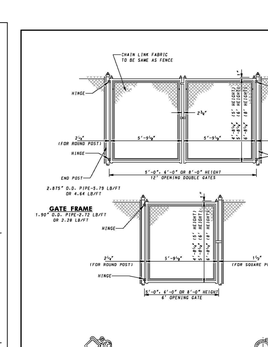
Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Main Line Cleanout (Lamphole)	Detail No. 208.1 Date: 01-24-2013



Nominal Diameter	Payment Allowance in Cu. Yr. per Lin. Ft. Low Cradle	High Cradle	Encasement
6" PVC/ABS	.73	1.12	1.85
6" DIP	.75	1.21	1.98
8" PVC	.86	1.40	2.26
8" ABS	.92	1.52	2.44
8" DIP	.90	1.47	2.37
10" PVC	1.00	1.68	2.68
10" ABS	1.08	1.82	2.92
10" DIP	1.04	1.76	2.80
12" PVC	1.13	1.93	3.06
12" ABS	1.24	2.14	3.38
12" DIP	1.18	2.03	3.21
15" PVC	1.33	2.33	3.66
15" ABS	1.50	2.65	4.15
16" DIP	1.55	2.62	4.10
18" PVC	1.59	2.81	4.39
21" PVC	1.85	3.30	5.16
24" PVC	2.08	3.73	5.81
27" PVC	3.12	5.56	8.68

To calculate the cubic yards of concrete payment, multiply Lin. ft. by figure from above table, then divide by 27.

Frederick County Division of Utilities & Solid Waste Management Department of Engineering & Planning	Revisions: Date / Note	Concrete Encasement & Cradles Payment Allowance	Detail No. 213.1 Date: 01-24-2013



Buttress Dimensions in Inches						
B	4	6	8	10	12	16
C	17	17	23	29	34	45
D	10	12	16	20	24	32

SPECIFICATION 615	CATEGORY CODE ITEMS	Maryland Department of Transportation STATE HIGHWAY ADMINISTRATION STANDARDS FOR HIGHWAY AND INCIDENTAL STRUCTURES CHAIN LINK FENCE GATE DETAILS STANDARD NO. MD 692.01
APPROVED	DIVISION CHIEF, OFFICE OF HIGHWAY DEVELOPMENT	
	DIVISION CHIEF, OFFICE OF HIGHWAY ADMINISTRATION	

Detail No. 116.1 Date: 01-24-2013

NOTE:
ALL DETAILS AS SHOWN ON THIS PLAN ARE REFERENCED TO FREDERICK COUNTY STANDARD DETAILS UNLESS OTHERWISE NOTED.

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, and NRCS Standard for Ponds 378.

License No. 29782 , Expiration Date: 01/16/2025 ".

STATE OF MARYLAND PHILLIP THOMAS LYND 29782 PROFESSIONAL ENGINEER
5/25/2023

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

5/15/2023

4/24/2023

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. 603D-SW

Water & Sewer Details

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
Water, Potable Cooling Water and Sewer
West Loop to Quantum Place South

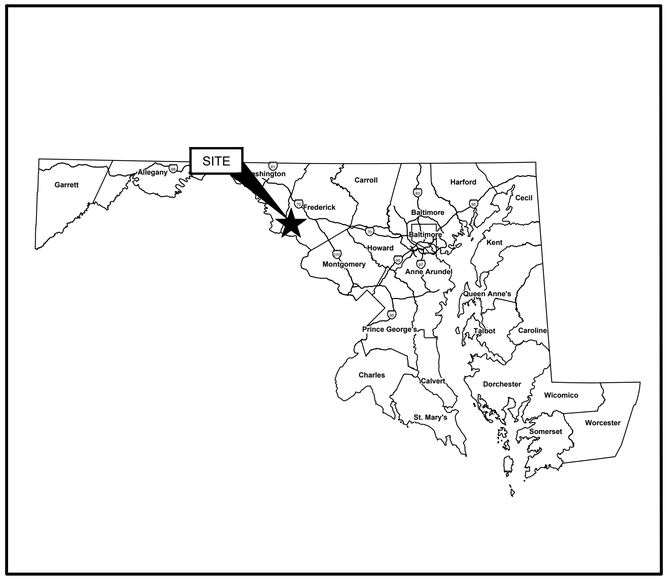
QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

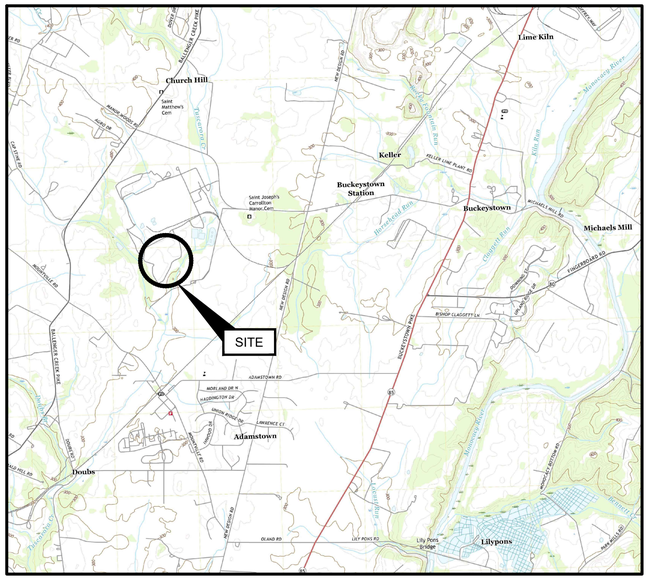
SCALE:	As Shown
JOB No.	1339A2
	April, 2023
INDEX No.	WSD-1
SHEET No.	17 OF 17,6A&8A

QUANTUM LOOP MARYLAND WEST WATER LOOP NORTHERN CROSSING

HDD DESIGN OF 12 INCH WATER AND 16 INCH POTABLE COOLING WATER LINES FREDERICK, MARYLAND



STATE or COUNTY MAP
(NOT TO SCALE)



SOURCE:
MAP TAKEN FROM USGS.GOV.

SITE LOCATION MAP
(NOT TO SCALE)

SHEET INDEX

SHEET NO.	DRAWING NO.	TITLE
1	G-01_WWLN	COVER SHEET
2	G-02_WWLN	GENERAL NOTES
3	C-01_WWLN	EXISTING PLAN AND PROFILE OF WATER LINES
4	C-02_WWLN	PROPOSED PLAN AND PROFILE OF WATER LINES
5	C-03_WWLN	BORING LOGS
6	HDD-01_WWLN	HDD SECTION AND DETAILS
7	IDFR-01_WWLN	INADVERTENT DRILLING FLUID RETURN CONTINGENCY DETAILS

QUANTUM LOOP WEST WATER NORTHERN LOOP NOMENCLATURE:

WWLN - WEST WATER LOOP NORTHERN CROSSING HDD DESIGN SET

PREPARED FOR:

STO MISSION CRITICAL
330 W 34th ST
NEW YORK, NY 10001

PREPARED BY:

6010 EXECUTIVE BLVD.
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

GEI Consultants

NOT FOR CONSTRUCTION

NO.	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

SHEET NO.
G-01_WWLN
DWG. NO.
1 OF 7

GENERAL NOTES

1. THESE DRAWINGS CORRESPOND TO THE DESIGN AND CONSTRUCTION OF THE 12 INCH COOLING WATER AND 16 INCH POTABLE COLD WATER LINES BY HORIZONTAL DIRECTIONAL DRILLING (HDD).
2. THE DRAWINGS DO NOT ADDRESS SAFETY ISSUES RELATED TO THE WORK. SITE SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE DESIGN OF THE HORIZONTAL DIRECTIONALLY DRILLED WATERLINES IS BASED ON INFORMATION PRESENTED IN THE FOLLOWING:
   a. GEOTECHNICAL BASELINE REPORT BY GEI CONSULTANTS, INC (GEI) DATED APRIL 5, 2024.
   b. GEOTECHNICAL DATA REPORT BY GEI CONSULTANTS, INC (GEI) DATED MARCH 15, 2024.
   c. QUANTUM PERMIT MODIFICATION PACKAGE K-LINE DATED MARCH 15, 2024 AND APPROVED ON APRIL 23, 2024 BY MDE WITH AUTHORIZATION NUMBER 22-NT-3124/202260907.
   d. 12 INCH W AND 16 INCH PCW WEST LOOP FROM LOT 400 TO QUANTUM PLACE SOUTH BY RODGERS CONSULTING DATED APRIL 26, 2024.
   e. GEO 201536 FORMER ALCOA EASTALCO WORKS PROPERTY GEOTECHNICAL REPORT BY GTA DATED JANUARY 5, 2021.
   f. EMAIL APPROVAL FROM FREDERICK COUNTY DEPARTMENT OF WATER AND SEWER UTILITIES FOR HDPE PIPE USE VIA EMAIL ON APRIL 1, 2024.
   g. MINIMUM CLEAR DIMENSIONS PROVIDED BY HDD CONTRACTOR FOR THE HORIZONTAL DIRECTIONAL DRILLING EQUIPMENT.
4. IF SITE CONDITIONS DIFFER FROM THOSE PRESENTED IN THE GTA GEOTECHNICAL REPORTS, THE DRAWINGS OR INFORMATION PROVIDED, IT SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER OF THE HORIZONTAL DIRECTIONAL DRILLED (HDD) WATER LINES, GEI.
5. IF SITE CONDITIONS DIFFER FROM THOSE PRESENTED IN THE GEI GEOTECHNICAL REPORTS, THE DRAWINGS OR INFORMATION PROVIDED, IT SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER OF THE HORIZONTAL DIRECTIONAL DRILLED (HDD) WATER LINES, GEI.
6. GENERAL CONTRACTOR IS TO ENSURE THAT ALL EXISTING UTILITIES ARE LOCATED AND REMOVED/RELOCATED PRIOR TO THE INSTALLATION OF THE HORIZONTAL DIRECTIONALLY DRILLED WATERLINES. HDD WATERLINES ARE NOT DESIGNED TO INTERFACE WITH ANY EXISTING UTILITIES OTHER THAN THOSE SHOWN ON THE DRAWINGS.
7. SITE TO BE MODIFIED TO CREATE A STABLE WORKING PLATFORM FOR ALL HDD EQUIPMENT. ENSURE THAT THE BACKFILL MATERIAL, COMPACTION EFFORTS AND GEO-REINFORCING, IF REQUIRED, WILL PROVIDE A SAFE AND STABLE PLATFORM FOR THE ANTICIPATED EQUIPMENT NEEDED TO PERFORM THE WORK. DESIGN OF THE WORKING PLATFORM IS THE RESPONSIBILITY OF OTHERS.
8. SURVEY COORDINATES PROVIDED ARE MD NAD83 COORDINATES.
9. SURVEY LAYOUT IS TO BE PERFORMED BY OTHERS.
10. THE HDD WATERLINES SHOWN ON THE DRAWINGS ARE DESIGNED BY GEI USING THE CONSTRUCTION SEQUENCE INDICATED ON THE DRAWINGS. LOADING CONDITIONS PRODUCED BY A DIFFERENT TRENCHLESS INSTALLATION SCHEME OR SEQUENCE, OR OTHER DESIGN COMPONENTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF GEI FOR REVIEW AND ACCEPTANCE.
11. ITEMS DEFINED AS TEMPORARY CONSIST OF OR MATERIALS, STRUCTURES, OR SEQUENCES USED TO FACILITATE THE CONSTRUCTION OF A PERMANENT UTILITY OR PORTION OF INFRASTRUCTURE. THESE FEATURES ARE NOT PART OF THE PERMANENT STRUCTURE AND WILL BE ABANDONED IN PLACE AFTER FACILITATING THE CONSTRUCTION OF PERMANENT UTILITIES AND FEATURES. TEMPORARY FEATURES USED AT THE CROSSINGS WILL BE REMOVED AFTER FACILITATING THE CONSTRUCTION OF PERMANENT UTILITIES.
12. COMPLY WITH ALL ENVIRONMENTAL POLICIES, PROCEDURES, AND PROTOCOLS ESTABLISHED FOR THE PROJECT, INCLUDING ENVIRONMENTAL MANAGEMENT PLANS AND STORMWATER POLLUTION PREVENTION PLANS.

DESIGN CRITERIA

1. THE DESIGN OF THE HORIZONTAL DIRECTIONAL DRILL PATH WAS PERFORMED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
   a. 2018 MARYLAND BUILDING CODE.
   b. FREDERICK COUNTY DEPARTMENT OF WATER AND SEWER UTILITIES, WATER AND SEWER RULES AND REGULATIONS DATED OCTOBER 1, 2022.
   c. NASTT HDD GOOD PRACTICES MANUAL.
2. THE LOADS ON THE HDD DRILL EQUIPMENT AND WATERLINES DESIGNED BY GEI ARE THOSE FROM SOIL, ROCK, AND WATER AS NOTED HEREIN.
3. SUBGRADE ELEVATIONS TAKE INTO ACCOUNT CLEARANCES FOR HDD EQUIPMENT REQUESTED BY THE MICROTUNNELING CONTRACTOR.

SPECIFICATIONS

1. THE SPECIFICATIONS TO REFERENCE INCLUDE BUT ARE NOT LIMITED TO THE FOLLOW SPECIFICATION:
   A. SPECIFICATION 31 05 13.15.STO HORIZONTAL DIRECTIONAL DRILLING.

MATERIALS

1. THE CONTRACTOR SHALL USE PERFORMANCE PIPE 4000 SERIES DIPS PE PIPE, OR APPROVED EQUIVALENT, FOR GEI DESIGNED WATER LINES INSTALLED WITH HDD TRENCHLESS TECHNOLOGY.
2. THE CONTRACT SHALL USE HYMAX 2 CONNECTIONS AS NOTED ON THE HDD DETAILS PAGE OF THIS PLAN SET, OR APPROVED EQUIVALENT, TO CONNECT HDPE AND DI PIPES.
3. THE CONTRACTOR SHALL USE ABASCO TYPE 2 TURBIDITY CURTAIN WITH FILTER FABRIC SKIRT OR APPROVED EQUIVALENT TO PROVIDE CONTAINMENT FOR POTENTIAL IDFR DURING HDD. DEPLOY AND SECURE TURBIDITY CURTAINS AT THE UPSTREAM AND DOWNSTREAM LOCATIONS PRIOR TO THE HDD BOREPATH CROSSING UNDER THE STREAM.

CONSTRUCTION SEQUENCE

1. IDENTIFY ALL EXISTING UTILITIES AND RELOCATE OR ABANDON AS NECESSARY.
2. PERFORM SITE GRADING AS NECESSARY TO PREPARE A LEVEL WORKING AREA FOR PIPE LAYDOWN EQUIPMENT NEAR LOT 401 WHERE THE WATER LINES TURN SOUTH AND THEN RUN PARALLEL TO THE CREEK.
3. PERFORM SITE GRADING ON EAST SIDE IN THE NORTHWEST CORNER OF DRAINAGE LOT 101 AS REQUIRED TO CREATE AN HDD LAYDOWN AREA WITH DRILL FLUID PLANT TO CAPTURE DRILLING FLUID AND CUTTINGS.
4. EXCAVATE HYDROFRACTURE PITS ON BOTH SIDES OF TUSCARORA CREEK AS NEEDED AND AS DETERMINED BY THE DRILL PATH CALCULATIONS.
5. DRILL THE PILOT HOLE WITH THE HDD MACHINE. USE A GUIDANCE SYSTEM TO MAINTAIN ALIGNMENT OF THE HDD DRILL BIT AND THE TARGET MINIMUM RADIUS OF CURVATURE.
6. DEPLOY TEMPORARY TURBIDITY CURTAINS IN CREEK AND TEMPORARY STREAM BOTTOM PROTECTION IN ACCORDANCE WITH THE DRAWINGS PRIOR TO THE BOREPATH TRAVERSING THE CREEK.
7. FUSE OR WELD THE HDPE PIPE SECTIONS TOGETHER IN THE LAYDOWN AREA FULL LENGTH TO PREPARE THE PIPE FOR PULLBACK.
8. CONNECT A BOREHOLE EXPANDER AT THE DAYLIGHT POINT TO THE DOWN HOLE TOOLING AFTER THE TOOLING EXISTS THE SOIL. BACKREAM THE HOLE BACK TO THE DRILL RIG. PERFORM AN ADDITIONAL PASS IF NEEDED TO EXPAND HOLE TO A LARGER DIAMETER.
9. ON THE FINAL PASS, CONNECT THE HDPE PIPE TO THE BOREHOLE EXPANDER AND PULL THE PIPE BACK THROUGH THE BOREHOLE ALL THE WAY BACK TO THE DRILL RIG.
10. PUMP DRILLING FLUID OUT OF THE HYDROFRACTURE PITS AND DISCHARGE INTO CONTAINERS. BACKFILL PITS WITH COMPACTED SOIL WHEN COMPLETED.
11. EXCAVATE DOWN TO THE PIPE ELEVATION TO ATTACH THE CONNECTERS OF THE HDPE PIPE FOR THE DUCTILE IRON PIPE USING A MANUFACTURER APPROVED COUPLER PER THE DRAWINGS.
12. PLACE AND COMPACT PIPE BEDDING AND BACKFILL MATERIAL IN THESE TIE-IN PITS IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
13. ENSURE THAT 2 FEET OF CLEAN FILL MATERIAL IS PLACED AT THE FINAL GRADE ABOVE ALL BACKFILL MATERIALS.

MONITORING

1. AN INSTRUMENTATION PLAN CONSISTING OF OPTICAL SURVEY PRISMS OR SETTLEMENT MONITORING POINTS SHALL BE INSTALLED AND MONITORED TO VERIFY THE PERFORMANCE OF THE HORIZONTAL DIRECTIONAL DRILL..
2. SURVEY MONITORING POINTS SHALL BE INSTALLED AT THE CENTERLINE OF EACH BOREPATH AND 25 FEET NORTH AND 25 FEET SOUTH OF THE CENTERLINE APPROXIMATELY EVERY 250 FEET OF THE LENGTH OF THE BOREPATH.
3. SURVEY MONITORING POINTS SHALL BE READ TWICE WEEKLY FROM START OF BOREPATH UNTIL PULLBACK IS COMPLETE. PLOT DATA TO IDENTIFY MOVEMENT TRENDS AND PROVIDE INSTRUMENTATION READINGS TO GEI ON A WEEKLY BASIS.
4. INSTRUMENTATION PLAN SHALL BE PREPARED BY THE CONTRACTOR AND REVIEWED AND APPROVED BY GEI.

QUALITY ASSURANCE

1. GEI SHALL OBSERVE THE FOLLOWING ITEMS AND THOSE IN THE RELATED SPECIFICATIONS AND SUBMITTALS:
   a. LOCATION OF HYRDOFRACTURE PITS.
   b. FINAL DRILL PATH OF EACH CARRIER PIPE INSTALLED WITH ELEVATIONS.
   c. NUMBER OF REAM PASSES AND FINAL BOREHOLE DIAMETER.
   d. ANY INADVERTENT FLUID RETURN.
   e. HEAT WELDING OR FUSING OF ALL HDPE JOINTS.
   f. PULLBACK CONNECTION TO CARRIER PIPE.
   g. TRACKING PLACED CARRIER PIPE LENGTH.
   h. START AND STOP OF ALL HDD OPERATION.
   i. HDD INSTRUMENTATION READINGS.
   j. UNUSUAL CONDITIONS, BREAKDOWNS, OR DELAYS.
2. THE OWNER SHALL RETAIN AN INDEPENDENT TESTING AGENCY FOR THIRD PARTY INSPECTIONS FOR ALL PERMANENT WORKS.

NOT FOR CONSTRUCTION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	DE
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
NORTHERN CROSSING
HDD DESIGN

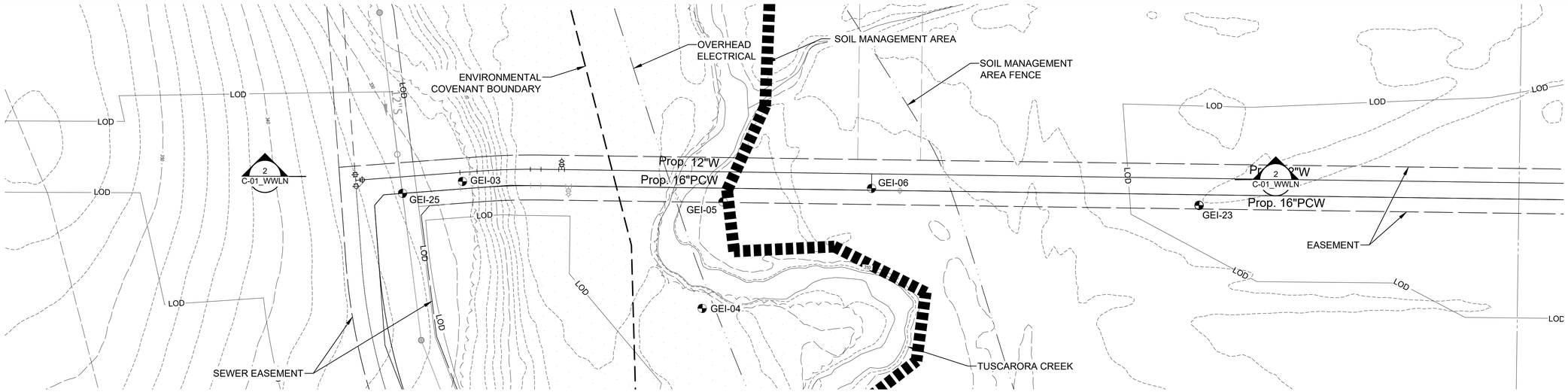
FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

SHEET NAME
GENERAL NOTES

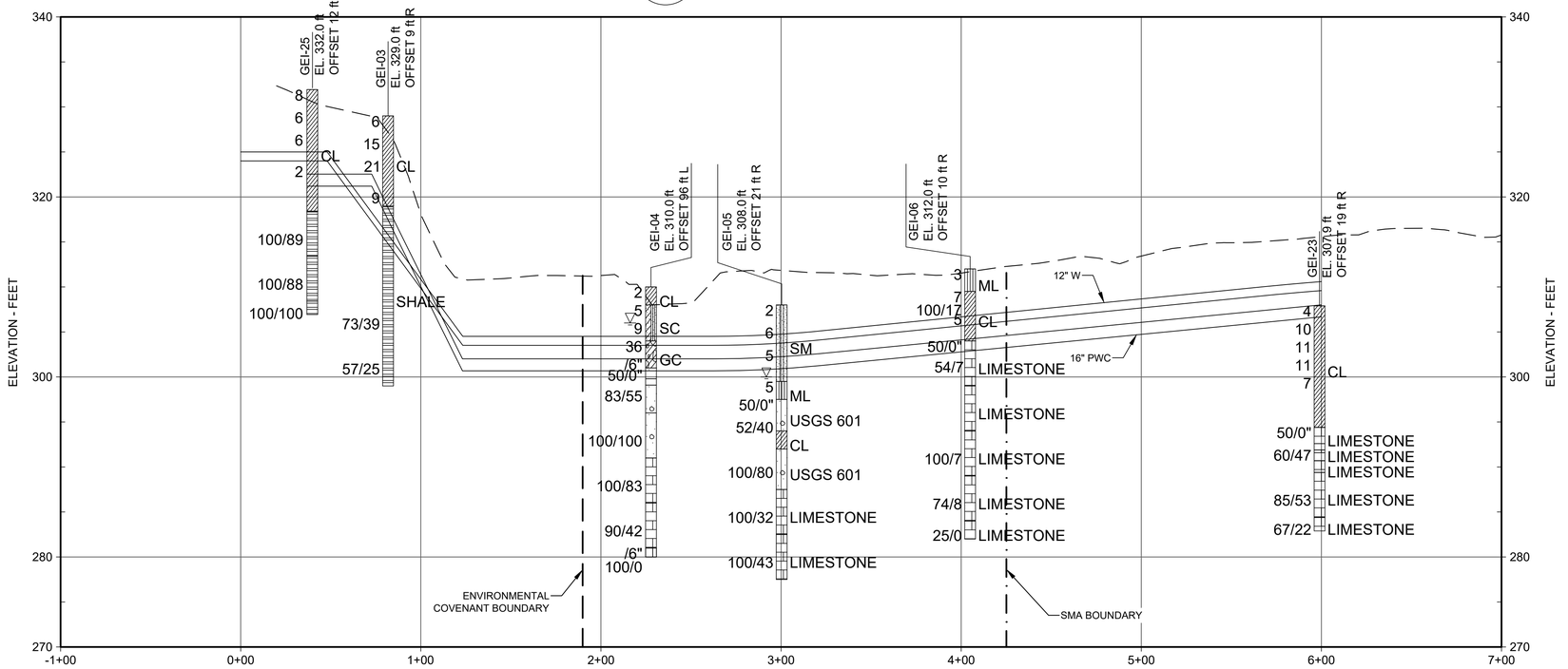
SHEET NO.
G-02_WWLN

DWG. NO.
2 OF 7



1 ORIGINAL PLAN
C-01_WWLN

SCALE: 1" = 40'



2 ORIGINAL PROFILE
C-01_WWLN

SCALE: 1" = 40' H
1"= 8' V

NOT FOR CONSTRUCTION

LEGEND:

GEI GEOTECHNICAL BORING (2023)

GEI MONITORING WELLS (2023)

HORIZONTAL SCALE, FEET
0 40 80

0 8 16
VERTICAL SCALE, FEET
NOTE: 5x VERTICAL EXAGGERATION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	DE
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

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STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
NORTHERN CROSSING
HDD DESIGN

FREDERICK, MD

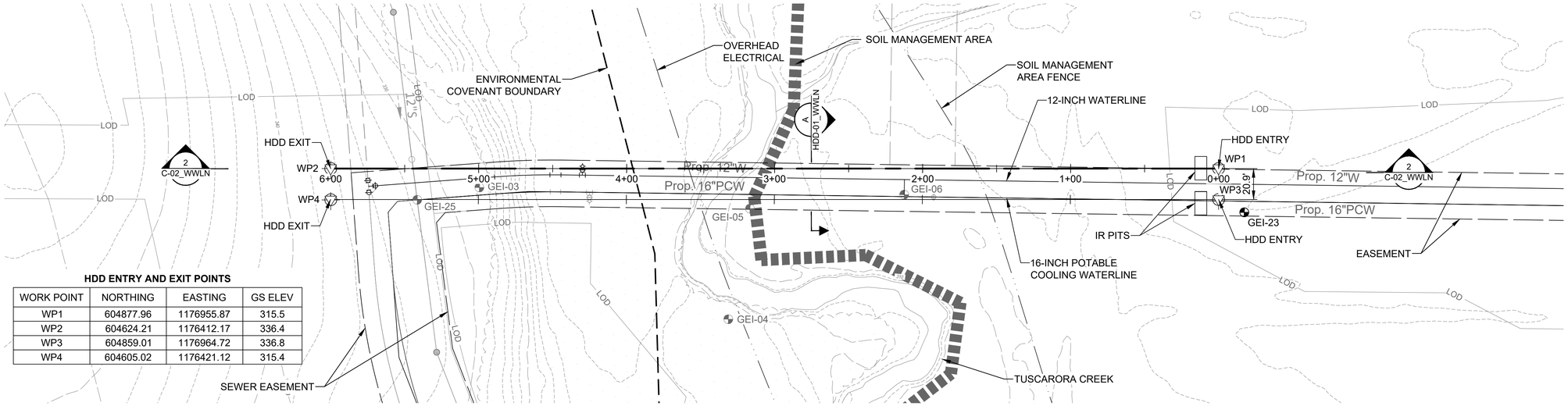
NO	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

SHEET NAME

EXISTING PLAN AND PROFILE OF WATER LINES

SHEET NO.
C-01_WWLN

DWG. NO.
3 OF 7

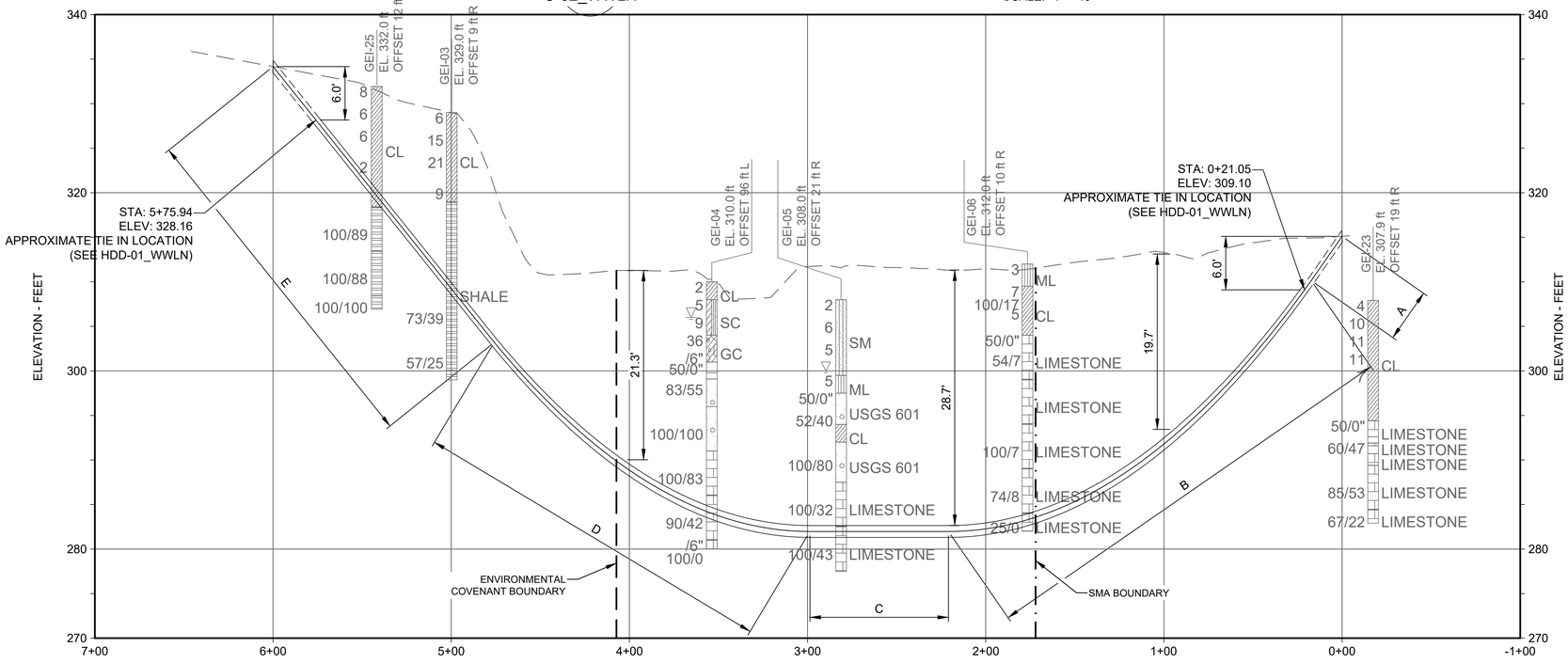


HDD ENTRY AND EXIT POINTS

WORK POINT	NORTHING	EASTING	GS ELEV
WP1	604877.96	1176955.87	315.5
WP2	604624.21	1176412.17	336.4
WP3	604859.01	1176964.72	336.8
WP4	604605.02	1176421.12	315.4

1 PROPOSED PLAN
C-02_WWLN

SCALE: 1" = 40'



2 PROPOSED PROFILE
C-02_WWLN

SCALE: 1" = 40' H
1"= 8' V

HDD BOREPATH GEOMETRY

SEGMENT	LENGTH (FT)	ANGLE / PERCENT GRADE	RADIUS (FT)
A	30	16° / 28.67%	N/A
B	248	N/A	750
C	78	0° / 0.00%	N/A
D	207	N/A	750
E	198	14° / 24.93%	N/A

12 INCH W INV

POINT NAME	STATION	INV ELEV
WP1	0+00	314.66
AB	0+17.33	309.69
BC	2+20.93	281.53
CD	2+98.65	281.53
DE	4+75.82	302.76
WP2	6+00	333.72

16 INCH PCW INV

POINT NAME	STATION	INV ELEV
WP1	0+00	314.52
AB	0+17.33	309.55
BC	2+20.93	281.39
CD	2+98.65	281.39
DE	4+75.82	302.62
WP2	6+00	333.58

NOTE:

1. PERFORMANCE PIPE DRISCOPLEX 4000 DIPS 12" & 16" SERIES PE PIPE OR APPROVED EQUIVALENT.
2. THE PIPE STAGING AND LAYDOWN AREA IS ALONG THE LOD OF HAPPY LANDING ROAD SEE RODGERS DRAWINGS REFERENCED IN THIS DRAWING SET.

LEGEND:

GEI GEOTECHNICAL BORING (2023)

GEI MONITORING WELLS (2023)

HORIZONTAL SCALE, FEET
0 80 160
0 40 80
VERTICAL SCALE, FEET
NOTE: 2x VERTICAL EXAGGERATION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	DE
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
NORTHERN CROSSING
HDD DESIGN

FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

SHEET NAME
PROPOSED PLAN AND PROFILE OF WATER LINES

SHEET NO.
C-02_WWLN

DWG. NO.
4 OF 7

NOT FOR CONSTRUCTION

EDDY, DEREK B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Design\Sheets\West Water Loop Northern Crossing\C-01 - C-02 WWLN Plan + Profile.dwg - 5/24/2024

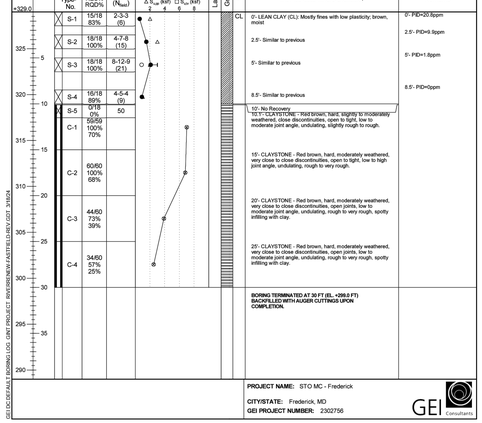
Final Boring Log
GEI-03
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 604,676.3/1,176,553.9 | LATITUDE/LONGITUDE (ft): 39.325999/-77.479970
GROUND SURFACE EL. (ft): 329 | DATE START/END: 2/7/2024 - 2/7/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.0 | DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo | RIG TYPE: D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic | CASING I.D./O.D.: NA/NA | DRILLING FLUID: NA
AUGER I.D./O.D.: NA/NA | DRILL ROD O.D.: NA | DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 2/7/2024 Dry during drilling

ABBREVIATIONS
PEN = Penetration Length; REC = Recovery Length; RQD = Rock Quality Designation; I.D. = Inside Diameter; O.D. = Outside Diameter
HSA = Hollow-Stem Auger; S:# = Split Spoon Sample and Number; U:# = Undisturbed Sample and Number; SC:# = Sonic Core and Number; WOR = Weight of Rods; WOH = Weight of Hammer
VOC = Volatile Organic Carbon; CO = Carbon Monoxide; H_2S = Hydrogen Sulfide; O_2 = Oxygen; LEL = Lower Explosive Limit; bpf = blows per foot; ppm = parts per million; N_{60} = Uncorrected SPT N-Value
NA = Not Applicable; NM = Not Measured; bgs = below ground surface; bgs = below ground surface; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System
LL = Liquid Limit; PL = Plastic Limit; MC = Moisture Content; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System



PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

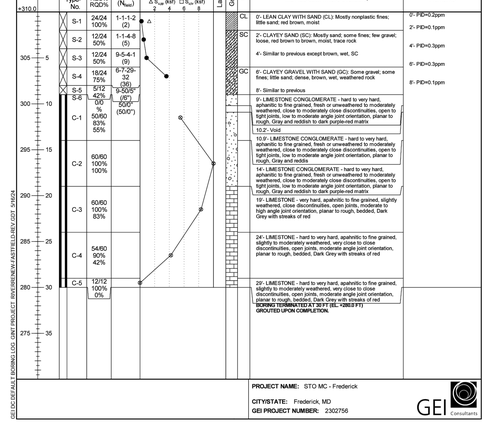
Final Boring Log
GEI-04
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 604,654.4/1,176,705.0 | LATITUDE/LONGITUDE (ft): 39.325942/-77.479436
GROUND SURFACE EL. (ft): 310 | DATE START/END: 5/8/2024 - 5/8/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.0 | DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo | RIG TYPE: Diedrich D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic | CASING I.D./O.D.: NA/NA | DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA | DRILL ROD O.D.: NA | DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: ▽ - At Time of Drilling: El. 306.0

ABBREVIATIONS
PEN = Penetration Length; REC = Recovery Length; RQD = Rock Quality Designation; I.D. = Inside Diameter; O.D. = Outside Diameter
HSA = Hollow-Stem Auger; S:# = Split Spoon Sample and Number; U:# = Undisturbed Sample and Number; SC:# = Sonic Core and Number; WOR = Weight of Rods; WOH = Weight of Hammer
VOC = Volatile Organic Carbon; CO = Carbon Monoxide; H_2S = Hydrogen Sulfide; O_2 = Oxygen; LEL = Lower Explosive Limit; bpf = blows per foot; ppm = parts per million; N_{60} = Uncorrected SPT N-Value
NA = Not Applicable; NM = Not Measured; bgs = below ground surface; bgs = below ground surface; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System
LL = Liquid Limit; PL = Plastic Limit; MC = Moisture Content; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System



PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

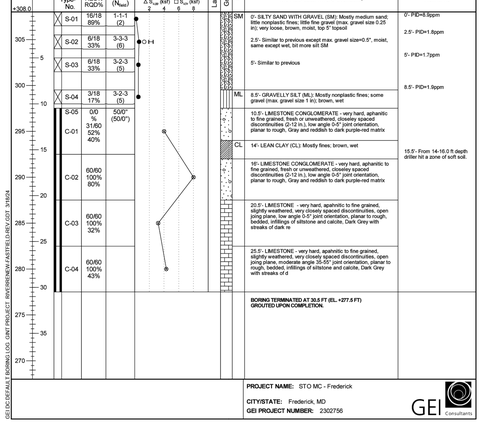
Final Boring Log
GEI-05
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 604,719.5/1,176,680.4 | LATITUDE/LONGITUDE (ft): 39.326120/-77.479524
GROUND SURFACE EL. (ft): 308 | DATE START/END: 1/26/2024 - 1/26/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.5 | DRILLER NAME: J. Lewis
LOGGED BY: A. Rosado | RIG TYPE: Diedrich D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic | CASING I.D./O.D.: NA/NA | DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA | DRILL ROD O.D.: NA | DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: ▽ - At Time of Drilling: El. 300.0

ABBREVIATIONS
PEN = Penetration Length; REC = Recovery Length; RQD = Rock Quality Designation; I.D. = Inside Diameter; O.D. = Outside Diameter
HSA = Hollow-Stem Auger; S:# = Split Spoon Sample and Number; U:# = Undisturbed Sample and Number; SC:# = Sonic Core and Number; WOR = Weight of Rods; WOH = Weight of Hammer
VOC = Volatile Organic Carbon; CO = Carbon Monoxide; H_2S = Hydrogen Sulfide; O_2 = Oxygen; LEL = Lower Explosive Limit; bpf = blows per foot; ppm = parts per million; N_{60} = Uncorrected SPT N-Value
NA = Not Applicable; NM = Not Measured; bgs = below ground surface; bgs = below ground surface; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System
LL = Liquid Limit; PL = Plastic Limit; MC = Moisture Content; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System



PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

Final Boring Log
GEI-06
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 604,772.1/1,176,770.8 | LATITUDE/LONGITUDE (ft): 39.326266/-77.479205
GROUND SURFACE EL. (ft): 312 | DATE START/END: 1/26/2024 - 1/30/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.0 | DRILLER NAME: J. Lewis
LOGGED BY: A. Rosado, N. Gallo | RIG TYPE: Diedrich D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic | CASING I.D./O.D.: NA/NA | DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA | DRILL ROD O.D.: NA | DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 1/26/2024 Dry during drilling

ABBREVIATIONS
PEN = Penetration Length; REC = Recovery Length; RQD = Rock Quality Designation; I.D. = Inside Diameter; O.D. = Outside Diameter
HSA = Hollow-Stem Auger; S:# = Split Spoon Sample and Number; U:# = Undisturbed Sample and Number; SC:# = Sonic Core and Number; WOR = Weight of Rods; WOH = Weight of Hammer
VOC = Volatile Organic Carbon; CO = Carbon Monoxide; H_2S = Hydrogen Sulfide; O_2 = Oxygen; LEL = Lower Explosive Limit; bpf = blows per foot; ppm = parts per million; N_{60} = Uncorrected SPT N-Value
NA = Not Applicable; NM = Not Measured; bgs = below ground surface; bgs = below ground surface; S_{ut} = Undrained Strength from Pocket Penetrometer; S_{ur} = Undrained Strength from Pocket Torvane; USCS = Unified Soil Classification System
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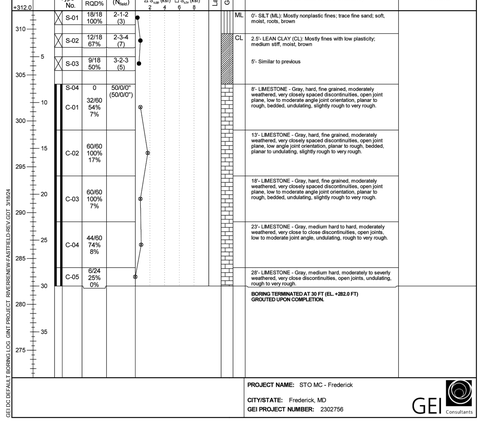

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

Final Boring Log
GEI-23
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 604,858.5/1,176,984.1 | LATITUDE/LONGITUDE (ft): 39.326506/-77.478453
GROUND SURFACE EL. (ft): 307.9 | DATE START/END: 5/13/2024 - 5/13/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 25.0 | DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo | RIG TYPE: Diedrich D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic | CASING I.D./O.D.: NA/NA | DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA | DRILL ROD O.D.: NA | DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/13/2024 Dry during drilling - Dry during drilling

ABBREVIATIONS
PEN = Penetration Length; REC = Recovery Length; RQD = Rock Quality Designation; I.D. = Inside Diameter; O.D. = Outside Diameter
HSA = Hollow-Stem Auger; S:# = Split Spoon Sample and Number; U:# = Undisturbed Sample and Number; SC:# = Sonic Core and Number; WOR = Weight of Rods; WOH = Weight of Hammer
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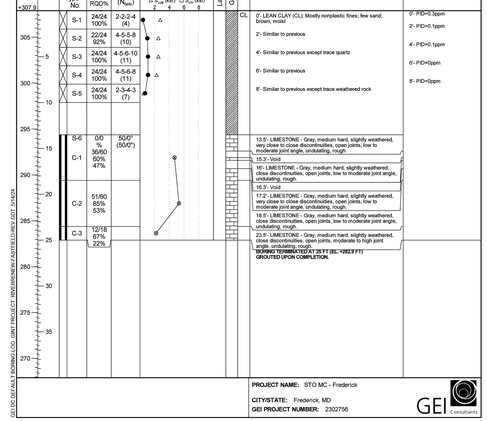

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

Final Boring Log
GEI-25
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 604,629.8/1,176,474.1 | LATITUDE/LONGITUDE (ft): 39.325871/-77.480252
GROUND SURFACE EL. (ft): 332 | DATE START/END: 2/7/2024 - 2/7/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 25.0 | DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo | RIG TYPE: D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic | CASING I.D./O.D.: NA/NA | DRILLING FLUID: NA
AUGER I.D./O.D.: NA/NA | DRILL ROD O.D.: NA | DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 2/7/2024 Dry during drilling

ABBREVIATIONS
PEN = Penetration Length; REC = Recovery Length; RQD = Rock Quality Designation; I.D. = Inside Diameter; O.D. = Outside Diameter
HSA = Hollow-Stem Auger; S:# = Split Spoon Sample and Number; U:# = Undisturbed Sample and Number; SC:# = Sonic Core and Number; WOR = Weight of Rods; WOH = Weight of Hammer
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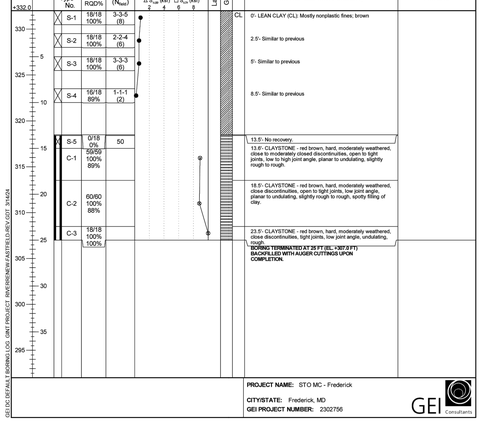


PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

NOT FOR CONSTRUCTION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	DE
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

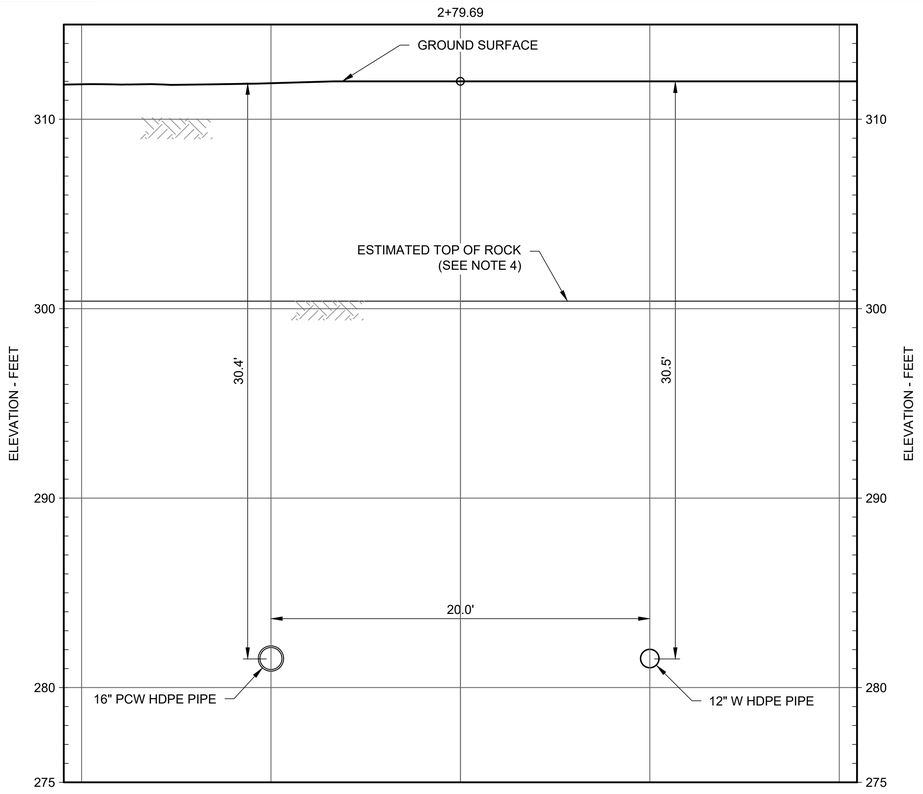
STO MISSION CRITICAL
330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
NORTHERN CROSSING
HDD DESIGN
FREDERICK, MD

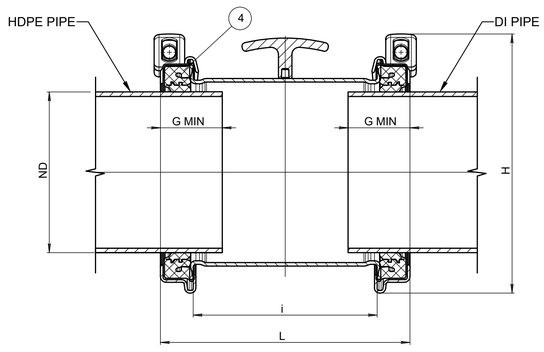
NO	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

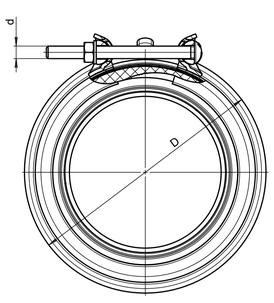
SHEET NAME: **BORING LOGS**
SHEET NO.: C-03_WWLN
DWG. NO.: 5 OF 7

EDDY, DEREK B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Design\Sheets\West Water Loop Northern Crossing\C-03 WWLN Boring Logs.dwg - 5/24/2024



A SECTION - PROPOSED HPDE WATER LINES AT STA 2+75
C-02_WWLN (SEE NOTE 1) SCALE: 1" = 4'

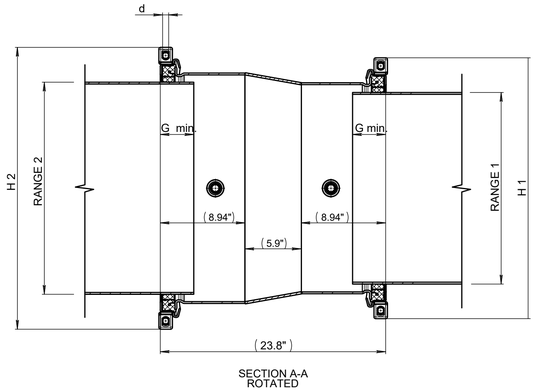




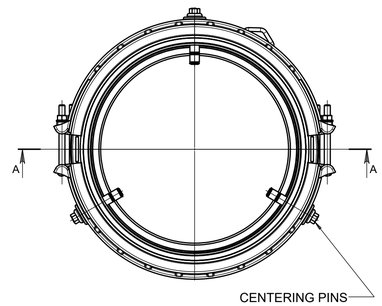
DRISCOPLEX 4000/4100 SERIES PE PIPING		
DRISCOPLEX 4000/4100 SERIES PIPE MATERIAL PROPERTIES		
PROPERTY	STANDARD	TYPICAL VALUE
MATERIAL DESIGNATION	-	PE4710
CELL CLASSIFICATION	ASTM D3350	445574C
DENISTY (4)	ASTM D1505	0.960 g/cc (BLACK)
MELT INDEX (40	ASTM D1238	0.08 g/10 MIN
FLEXURAL MODULUS (5)	ASTM D790	>140,000 PSI
TENSILE STRENGTH (5)	ASTM D638 Type IV	>3500 PSI
SCG (PENT) (7)	ASTM F1473	>500 HOURS
HDB at 73°F (23C°) (4)	ASTM D2837	1600 PSI
COLOR: UV STABILIZER C	ASTM D3350	BLACK

COMMON DIMENSION RATIOS* FOR DRISCOPLEX® 4000 DIPS SERIES PIPE							
DIPS		DR 17 PC = 125			DR 11 PC= 200		
PIPE SIZE, (IN)	OD SIZE (IN)	MINIMUM WALL THICKNESS (IN)	AVERAGE ID (IN)	WEIGHT (LBS/FT)	MINIMUM WALL THICKNESS (IN)	AVERAGE ID (IN)	WEIGHT (LBS/FT)
4	4.80	0.282	4.201	1.76	0.436	3.875	2.62
6	6.90	0.406	6.040	3.64	0.627	5.570	5.42
8	9.05	0.532	7.921	6.26	0.823	7.306	9.32
10	11.10	0.653	9.716	9.42	1.009	8.961	14.03
12	13.20	0.776	11.554	13.32	1.200	10.656	19.84
14	15.30	0.900	13.392	17.89	1.391	12.351	26.65
16	17.40	1.024	15.230	23.14	1.582	14.047	34.47
18	19.50	1.147	17.068	29.07	1.773	15.742	43.29
20	21.60	1.271	18.906	35.66	1.964	17.437	53.12

1 HDPE PIPE PROPERTIES AND SIZES
(SEE NOTE 1) NO SCALE



SECTION A-A
ROTATED



HYMAX2

PART NUMBER	NOMINAL DIAMETER (INCH)	OVERALL RANGE (INCH)	RANGE IN CLOSED GASKET POSITION (INCH)	RANGE IN OPEN GASKET POSITION (INCH)	BOLT QTY. AND SIZE (mm)	TORQUE (Ft-Lbs)	APPROX. WEIGHT (Lbs)	LENGTH (INCH)
860-54-0315-16	12	12.40-13.66	12.40-13.03	12.99-13.66	2-M14	80	39	10.8

2 DETAIL - 12" HDPE TO 12" DIP CONNECTION
C-02_WWLN (SEE NOTE 2) NO SCALE

HYMAX2 REDUCER

PART NUMBER	NOMINAL DIAMETER (INCH)	OVERALL RANGE (INCH)	BEFORE REMOVAL OF THE INNER LAYER 1 (INCH)	AFTER REMOVAL OF THE INNER LAYER 1 (INCH)	OVERALL RANGE 2 (INCH)	BEFORE REMOVAL OF THE INNER LAYER 1 (INCH)	AFTER REMOVAL OF THE INNER LAYER 1 (INCH)	BOLTS QTY. AND SIZE	H1 (INCH)	H2 (INCH)	L (INCH)	APPROX. WEIGHT (lbs)
86156037804 3416	14x16	15.00 - 17.10	15.00 - 16.10	16.02 - 17.10	17.10 - 19.20	17.10 - 18.19	18.11 - 19.20	4 - M16	23.2	25.6	23.8	142

3 DETAIL - 16" HDPE TO 16" DIP CONNECTION
C-02_WWLN (SEE NOTE 3) NO SCALE

NOT FOR CONSTRUCTION

NOTES:

1. PERFORMANCE PIPE DRISCOPLEX 4000 DIPS 12" & 16" SERIES PE PIPE OR APPROVED EQUIVALENT.
2. HYMAX 2 860-54-0316-16 OR APPROVED EQUIVALENT TO CONNECT 12" HDPE TO 12" DIP.
3. HYMAX 2 REDUCER 86150378043416 OR APPROVED EQUIVALENT TO CONNECT 16" HDPE TO 16" DIP.
4. THE TOP SURFACE OF KARSTIC LIMESTONE CAN BE HIGHLY VARIABLE.

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	DE
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
NORTHERN CROSSING
HDD DESIGN

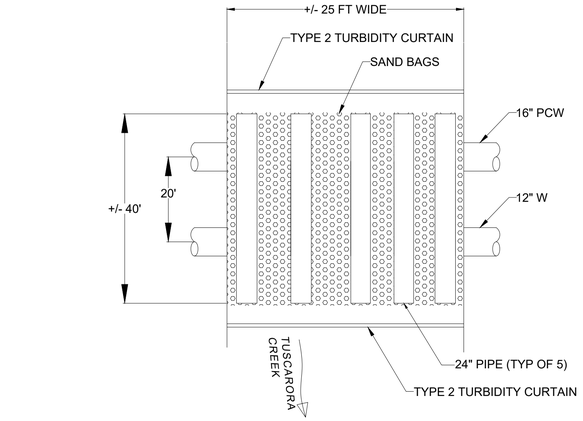
FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

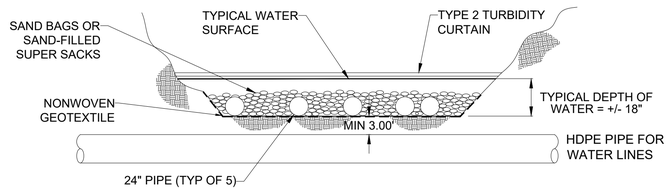
SHEET NAME
HDD SECTION AND DETAILS

SHEET NO.
HDD-01_WWLN

DWG. NO.
6 OF 7



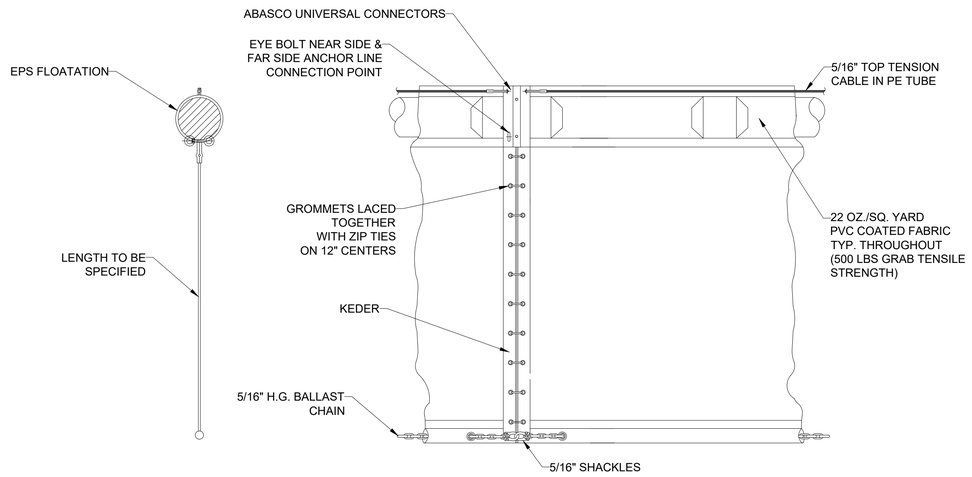
PLAN VIEW



SECTION VIEW

1 - TEMPORARY STREAM BOTTOM PROTECTION DETAIL

(SEE NOTES) NO SCALE



2 - TYPE 2 TURBIDITY CURTAIN DETAIL

(SEE NOTE 3) NO SCALE

TYPE 2	FABRIC	FLOAT	CHAIN	CABLE	OPTIONS
EC-DOT	18 OZ PVC POLYESTER	6", 8", 10"	5/16"	5/16"	FLOAT, CHAIN
WC-DOT	22 OZ PVC POLYESTER	6", 8", 10"	5/16"	5/16"	FLOAT, CHAIN
HEAVY DUTY	22 OZ PVC POLYESTER	6", 8" 10, 12"	5/16" – 3/8"	5/16"	FLOAT, CHAIN
FILTER FABRIC SKIRT	WOVEN OR NONWOVEN	6" – 12"	5/16" – 3/8"	5/16"	FLOAT, CHAIN, SKIRT FABRIC

TEMPORARY STREAM PROTECTION:

1. ITEMS DEFINED AS TEMPORARY CONSIST OF MATERIALS, STRUCTURES, OR SEQUENCES USED TO FACILITATE THE CONSTRUCTION OF A PERMANENT UTILITY OR PORTION OF INFRASTRUCTURE. THESE FEATURES ARE NOT A PART OF THE PERMANENT STRUCTURE, AND WILL BE REMOVED FROM THE STREAM AFTER FACILITATING THE CONSTRUCTION OF PERMANENT UTILITIES AND FEATURES AT THE CROSSING.
2. TEMPORARY ADDITIONAL OVERBURDEN TO BE INSTALLED FOR ADDITIONAL DOWNPRESSURE FOR TUNNELING AND HDD CROSSING UNDER TUSCARORA CREEK.
3. ABASCO TYPE 2 TURBIDITY CURTAIN WITH FILTER FABRIC SKIRT OR APPROVED EQUIVALENT TO PROVIDE CONTAINMENT FOR POTENTIAL IDFR DURING HDD. DEPLOY AND SECURE TURBIDITY CURTAINS AT THE UPSTREAM AND DOWNSTREAM LOCATIONS PRIOR TO THE HDD BOREPATH CROSSING UNDER THE STREAM. MAINTAIN AND SERVICE THE TURBIDITY CURTAINS UNTIL PULLBACK IS COMPLETE FOR BOTH THE 12 INCH AND 16 INCH HDPE PIPES.

NOT FOR CONSTRUCTION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	DE
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
NORTHERN CROSSING
HDD DESIGN

FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
0	5/24/2024	PROGRESS SET	GAB

SHEET NAME

INADVERTENT DRILLING FLUID RETURN CONTINGENCY DETAILS

SHEET NO.

IDFR-01_WWLN

DWG. NO.

7 OF 7

Appendix D

West Loop Water South Improvement Plan Drawings

1. **Submitted Drawing Set (4/22/2024)**
2. **HDD Crossing Final Design**

Quantum Frederick

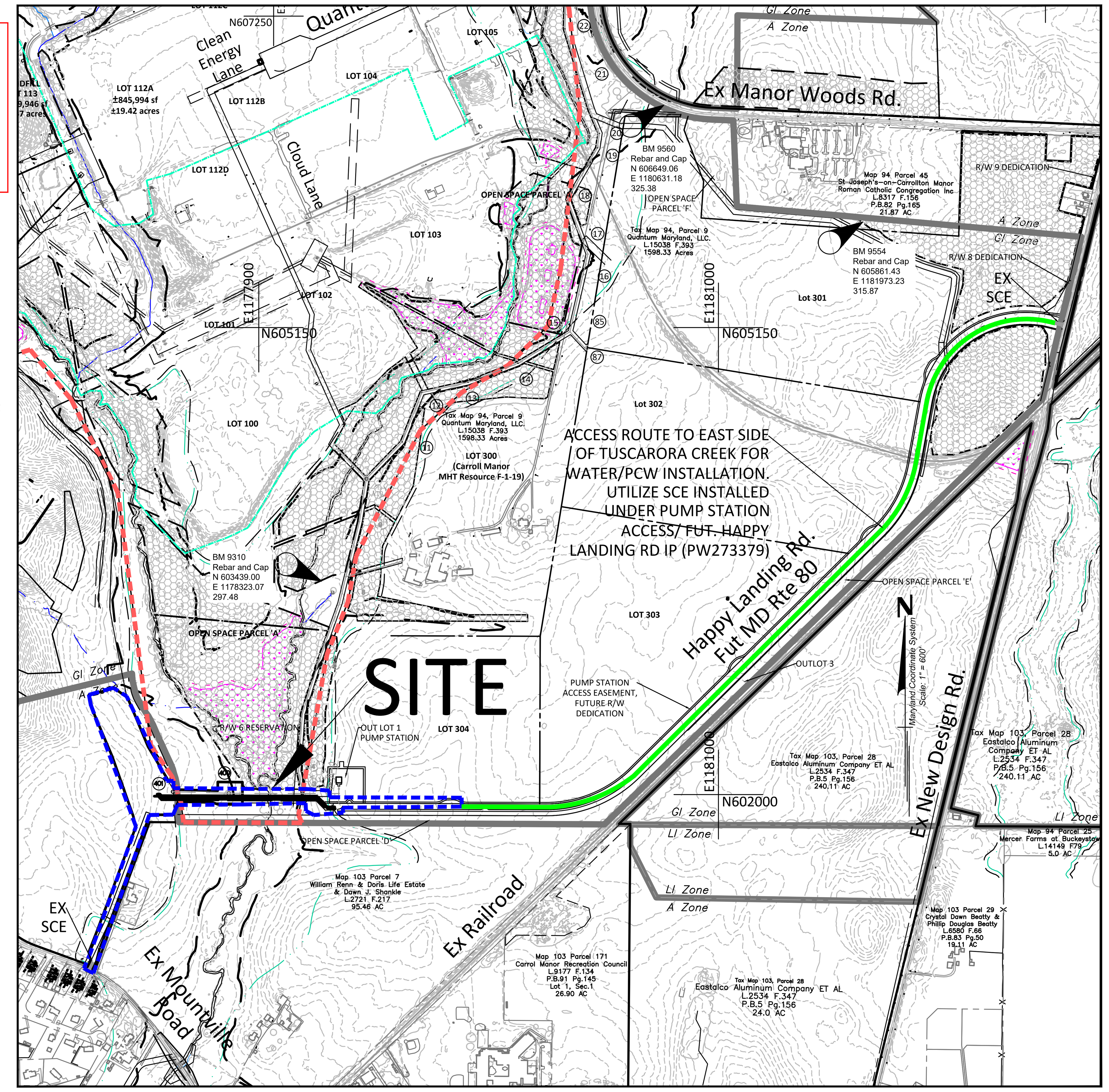
12" Water and 16" Potable Cooling Water Crossing Tuscarora Creek at Happy Landing Rd.

Combined Stormwater Management Development and Improvement Plan

GENERAL NOTES:

1. Total site area approved under Section 1 Preliminary Plan (PP266504) = ±1,053.78 Acres and Section 2 Preliminary Plan (PP273777) = ±258.67 Acres. The property is zoned LI, GI and A and is in the Adamstown Planning Region with a land use designation of General Industrial and Agriculture/Rural and Natural Resource per the 2010 Comprehensive Plan.
2. The Preliminary Plan is comprised of Parcels 70, 71 and part of Parcel 9, Tax Map 94 recorded in Liber 15038 at folio 393.
3. The property is located on Frederick County Tax Maps 94 and Frederick County Soils Maps 94.
4. Boundary information as shown on this plan was taken from August 2021 field boundary surveys conducted by Rodgers Consulting, Inc., and other available deed and plat information.
5. Topography is shown hereon at 2 foot contour intervals per photogrammetric mapping compiled by McKenzieSnyder, Inc., based on aerial photography and LiDAR data collected in April 2021.
6. Survey datum is the Maryland Coordinate System [NAD83(2011), SPCS zone 1900(MD), U.S. Survey Feet], based on static GPS observations post-processed by the National Geodetic Survey's Online Positioning User Service (OPUS). Measured points include RCI control points 9501 and 9504. The average combined (map scale x elevation) factor for the site is 0.99997061.
   9501 N 609450.579 E 1184241.605
   9504 N 604476.704 E 1174468.799
   Vertical datum is NAVD88, based on static GPS observations post-processed by the National Geodetic Survey's Online Positioning User Service (OPUS). Measured points include RCI control points 9501 and 9504.
   9501 NAVD88 orthometric height 300.656
   9504 NAVD88 orthometric height 377.729
7. This property is to be served by public water & sewer. The current water & sewer classification for the GI zoned property is W1/W3 and S1/S3. Property zoned A is not designated for public water and sewer. Parcels 70 & 71 are S1/W1, Parcel 9 is partly S1/W1 and partly S3/W3.
8. This property is within the Tuscarora Creek Watershed and is a Class I-P watershed. **In-stream work may not be conducted between March 1st and June 15th inclusive of any year. There is no in-stream work proposed with this plan.**
9. The 100 Year Floodplain noted as 'Former FEMA 100 YR FP still in effect for JPA' reflects the FEMA 100-year floodplain that was in effect when the JPA was issued for the project. This floodplain is no longer in effect for County purposes, but remains the effective delineation for the JPA. A minimum setback of 25 feet shall be provided from all Floodplain district boundaries, except as otherwise approved through the mitigation process described in § 1-19-9.110(B)(7), or a minimum setback of 50 feet shall be provided from the bank of any perennial or intermittent stream, whichever is greater. All setback areas shall be maintained or planted with natural vegetation. This plan includes work within the floodplain and is approved under Permit no. **22-NT-3124/202260907, expiration date 2/15/2028. NOI CP20 permit application will be submitted upon approval of sediment control by Frederick SCD.**
10. Wetlands were delineated in September of 1996 and reconfirmed in Spring 2021 by RCI staff, in conformance with the 1987 U.S. Corps of Engineers' delineation manual. **There are no wetlands present within the limits of this plan**. Some wetland delineations were revised in Summer 2022 in conjunction with MDE review.
12. The project scope of work consists of linear trenching and horizontal directional drilling for installation of 12" waterline to provide domestic and fire service and parallel 16" potable cooling water line. Stormwater Management shall be addressed through the use of vegetative filtering and other Best Management Practices in accordance with the Maryland 2000 Stormwater Design Manual & 2007 Supplement including all revisions and amendments. The Quantum Frederick Stormwater Management Concept Plan, PW 266568, was approved by Frederick County.
13. Quantum Frederick 1st Amended Final FRO Plan for Section 2, Phase 1 (F276196) was approved on 2024.03.15. 1st Amended Final FRO Plan for Section 2, Phase 2 (F276429) was approved on 2024.04.05.
14. The Ballenger-McKinney Sewage Treatment Plant provides sanitary sewage treatment for this project & the New Design Water Treatment Plant provides potable water service for this project.
15. The location, orientation, grading through and around all water and sewer easements outside of the public right of way are subject to approval by the Division of Water and Sewer Utilities with the Improvement Plan.
16. Non-governmental users shall dedicate the floodplain areas to a Lot Owners Association in open space parcels.
17. This site is subject to APFO requirements for roads, water and sewer, this site is exempt from schools.
18. Lot 300 contains Carrollton Manor designated to the National Register of Historic Places and identified on the Maryland Inventory of Historic Properties (MIHP) as inventory number F-1-19.
19. The Landfills on-site are considered closed by the Maryland Dept. of the Environment (MDE). No disturbances are proposed. Any disturbance will require MDE approval. Contact #410-537-3315.
20. No buildings, structures, or impervious surfaces, and no activities requiring clearing or grading over 5,000 square feet will be permitted in waterbody buffers, except for stormwater management facilities, structures and appurtenant conveyances; environmental restoration or mitigation projects; utilities; public and private roads; driveways; bikeways, and trails unless otherwise permitted per 1-19-9.400.
21. The waterbody buffers shown on this plan were delineated based on Section 1-19-9.400(C) of the Frederick County Code (the waterbody buffer ordinance). First, a minimum 100' buffer was delineated on each side of intermittent and perennial streams. Second, 175-foot cross-sections were taken at 50-foot intervals along each stream. The buffer was expanded to 150 feet along these cross sections when 60% of the cross-section contained slopes between 15%- >25%. The buffer was expanded to 175 feet along these cross sections when 60% of the cross-section contained slopes 25% and greater. The buffer was adjusted to the top of the crest per the waterbody buffer ordinance when applicable. After the cross-sections were taken the waterbody buffer was expanded to include wetlands and floodplains that extend outside of the calculated waterbody buffer area. Waterbody buffer floodplain includes the greatest extent of FEMA floodplain that went into effect 8/1/2024 and County flooding areas.
22. No subsurface investigation has been performed by Rodgers Consulting, Inc. to determine ground water, rock or any other natural or manmade existing feature.
23. Certain areas of Frederick County are located within the Monocacy Valley Region which is historically considered to contain subsurface limestone formations with inherent solution cavities commonly referred to as sinkholes. Engineers recommend that the party responsible for the construction of this development retain the services of a professional geotechnical engineer to investigate the site's suitability for construction and make recommendations for site development and corrective measures if subsurface conditions affecting the site are discovered.
24. Any attempts to estimate costs associated with rock handling / removal and/or subsurface must be based on geotechnical reports and recommendations. Geotechnical reports may include information pertinent to the development of the site which is not included on these plans. The contractor must consult any existing geotechnical or other consultant's reports in conjunction with this set of plans.
25. Engineers are not responsible for the contractor's means or methods for construction, including, but not limited to the contractor's utilization of men, materials, equipment or safety measure in the performance of any work for this construction. The contractor assumes all responsibility for performing the work correctly and in conformance with all federal, state, and local code and/or regulatory requirements.
26. The contractor shall notify Miss Utility at 1-800-257-7777, at least 72 hours before the start of construction and shall not commence any excavation work until all utilities are located.
27. The contractor shall notify the applicable county and/or state authorities at least 48 hours before beginning any work within public rights of way.
28. All contractors must comply with all applicable County, State and Federal safety, labor and industry regulations to include MOSHA, OSHA, etc, all work will comply with the Maryland Handicap code.
29. The contractor shall be responsible for obtaining all necessary permits and for complying with all applicable legal and regulatory requirements.
30. The contractor shall note that in case of a discrepancy between the scaled and figured dimensions shown on these plans the figured dimensions shall govern.
31. Contractor shall be responsible for notifying the engineers in the event of any discrepancies in the plans or in the relationships of finished grades to existing grade prior to beginning work.
32. It shall be distinctly understood that failure to mention specifically any work which would normally be required to complete the project shall not relieve the contractor of his responsibility to perform such work.
33. All existing paving disturbed by the contractor's operation shall be replaced in accordance with the County Inspector's direction.
34. All benchmarks shall be maintained for the duration of construction until County has granted final approval of project.
35. The Contractor shall not (1) stage work, (2) store materials or (3) permit parking of equipment and/or construction-related vehicles in the public rights-of-way or publicly-owned property without prior approval of the County Traffic Engineer or designee. Where practical and to the degree possible, the Engineer shall designate on these plans appropriate space that can be utilized for the above purposes. It is the Contractor's ultimate responsibility to ensure that proper and appropriate areas are secured for these uses for the duration of the project.
36. Contractor shall be responsible for preventing dust, debris and mud from entering all roadways. If dust, dirt and/or mud happen to override the prevention measures and enter the roadway or sidewalk, the contractor shall be required to clean the roadway or sidewalk as soon as possible, at his/her expense. The contractor shall be responsible for the elimination of dust in the air by the required watering of the ground as needed.
37. Any necessary adjustments of sewer appurtenances, manholes, etc. will be in accordance with the Frederick County General Conditions and Standard Specifications for Water Mains, Sanitary Sewers and Related Structures, Standard Details, and Special Provisions and Amendments thereto. No adjustments to DWSU facilities is to be made without written authorization from Frederick County DWSU.
38. All utilities outside of right-of-ways or public utility easements to be owned and maintained by property owner.
39. When working in the area of an existing gas line, the Contractor shall have the Washington Gas Company (301)662-2151 verify that no leaks exist prior to any work in the area. A Gas Company representative must be present at the project site before any blasting within 20 feet of gas lines. Any excavation within 5' of a gas line shall be done by hand (no machinery). The Developer, or the Developer's Representative shall get approval from the Gas Company for any work within a gas line easement area.
40. Contractor is responsible for maintenance of traffic on existing roadways in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) and the Maryland Sate Highway Administration (SHA) Book of Standards, latest editions.
41. Developer is responsible for all cost related to temporary and permanent traffic control (pavement markings, signage, signalization, traffic barriers, flaggers, etc.)
42. If temporary parking, ingress/egress or pedestrian restrictions shall be required during project, the Contractor shall be responsible for installing signs and notifying all affected residents/businesses at least 1 day in advance. Contractor is responsible for contacting the appropriate County authorities before any of the above modifications are enacted.
43. All easements necessary to provide public access/maintenance/etc will be recorded and referenced on the final plats.
44. See Sheet 6 (SND-1) for Sewer General Notes.
45. Construction activities shall conform to provisions set forth in the Environmental Covenant L.12205 F.01. It is recommended that borings be performed prior to construction to determine groundwater and suitable backfill materials.
46. **This site is subject to an MDE Environmental Management Plan (EMP). Any disturbance on site must comply with requirements of the most current Environmental Management Plan, Prepared by GEI, Ph: (856)291-5723. The EMP addresses or references contractor Health and Safety Plan (HASP) requirements and other on-site requirements before, during, and after construction activities.**
47. An Appropriation or Use Permit (groundwater) is required for construction if dewatering of groundwater:
- The dewatering is greater than 10,000 GPD as an annual average (calculated over the course of 1 year) OR
- The dewatering lasts more than 30 days.
- Dewatering operations over 30 days, but less than 5,000 GPD (as an annual average) may qualify to file a notice of exemption if they are pumping groundwater COMAR 26.17.06.03A and 26.17.06.03B (3)

48. In compliance with COMAR 09.20.01.3 and the Safe Drinking Water Act (Section 1417(a)(4)(8), materials that come in contact with water intended for use in public water supply shall comply with the Reduction of Lead in Drinking Water Act, which went into effect in Maryland in January 2012.
49. In accordance with Code of Maryland Regulations (COMAR) 26.04.01.33, Direct and Indirect Additives, suppliers of water shall only use products (any materials that come in contact with water intended for use in public water supply) that meet the applicable American National Standards Institute/ NSF International (ANSI/NSF) standards for direct or indirect drinking water additives. The products can also be certified by an organization accredited by the ANSI for such testing (i.e., International Association of Plumbing and Mechanical Officials Research and Testing, Ontario CA, Underwriters Laboratory, Northbrook, IL, and Water Quality Association, Lisle, IL).

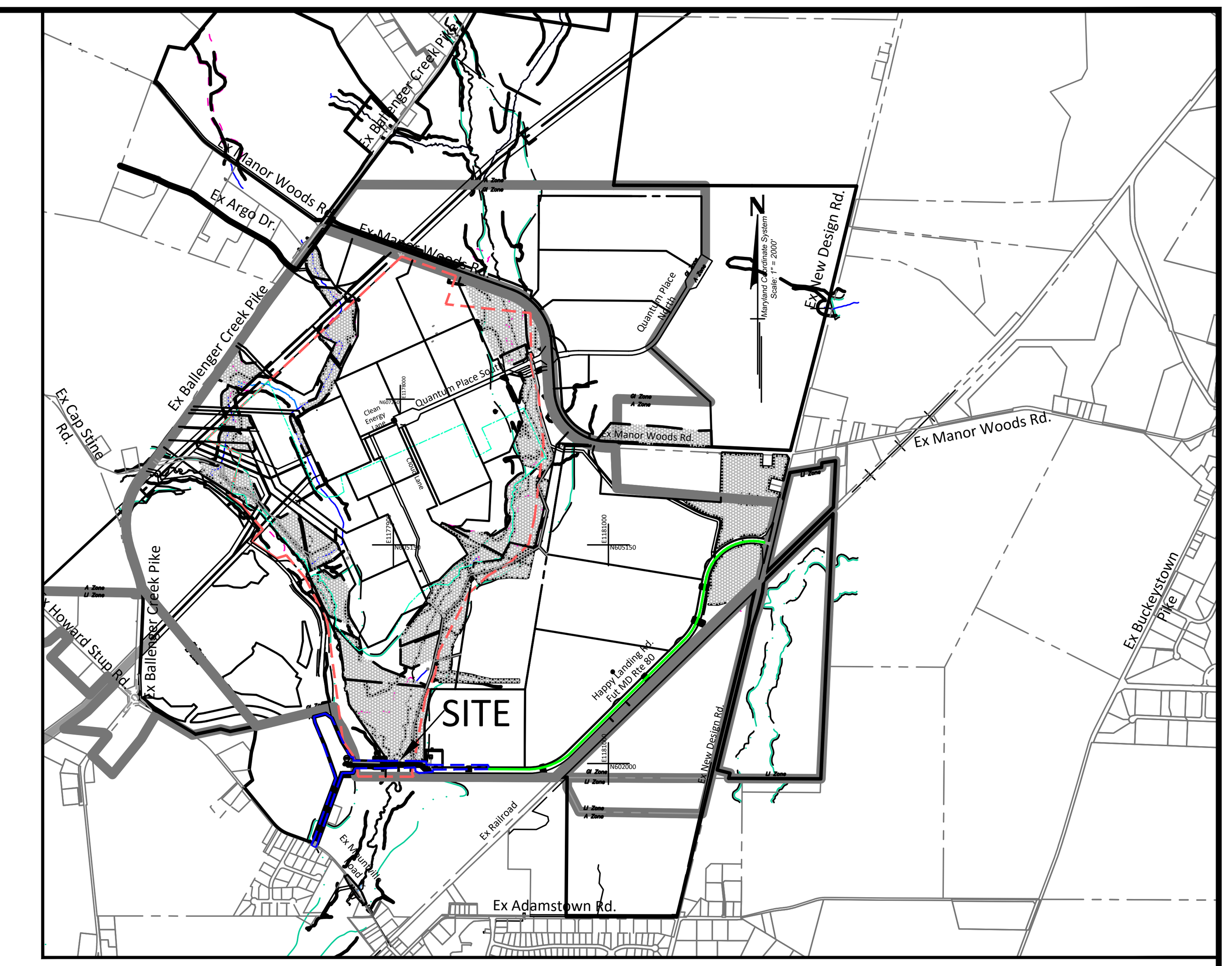


LOCATION MAP

Scale: 1"=600'

GRAPHIC SCALE

1 INCH = 600 FT



VICINITY MAP: 1"=2000'

Tax Map 94

Parcel 9 (Tax Acct. #01-005405)

Parcel 70 (Tax Acct. #01-000152)

Parcel 71(Tax Acct. #01-005383)

LEGEND

- LIMITS OF PLAN
- WATERBODY BUFFER
- WETLANDS
- WETLAND 25' B.R.L.
- FORMER FEMA 100 YEAR FLOOD PLAIN STILL IN EFFECT FOR JPA
- 100 YEAR FLOOD PLAIN
- 100 YEAR FLOOD PLAIN B.R.L.
- SOILS LINES
- SOIL TEXT TYPE — GdB
- 30" > DBH TREE
- EXISTING TREE LINE
- FOREST CONSERVATION EASEMENT
- FOREST PLANTING AREA
- STREAMS
- ENVIRONMENTAL COVENANT BOUNDARY L.12205 F.001
- SOIL MANAGEMENT AREA L.12205 F.001
- CONSTRUCTION ACCESS ROUTE TO EAST SIDE OF TUSCARORA CREEK

SEWER OUTFALL SWM NOTES:

1. THE PROJECT SCOPE OF WORK CONSISTS OF LINEAR TRENCHING FOR INSTALLATION OF PROPOSED WATER/ POTABLE COOLING WATER LINE IMPROVEMENTS.
2. THERE IS NO INCREASE IN IMPERVIOUS AREA PROPOSED BY THIS PLAN.
3. "BEST MANAGEMENT PRACTICES" ARE TO BE FOLLOWED FOR SITE STORMWATER MANAGEMENT:
   A. STORMWATER QUALITY MANAGEMENT SHALL BE ADDRESSED THROUGH THE USE OF VEGETATIVE FILTERING AND OTHER BEST MANAGEMENT PRACTICES AS OUTLINED IN CHAPTER 5 OF THE "2000 MARYLAND STORMWATER DESIGN MANUAL."
   B. THE AREA DISTURBED DOES NOT IMPACT ADDITIONAL WOODED AREA BEYOND THE SEWER EASEMENT LIMITS OR DEGRADE THE CURRENT LAND USE.
   C. ALL DISTURBED AREAS SHALL BE RETURNED TO A COMPARABLE OR BETTER CONDITION THAN WHAT PREVIOUSLY EXISTED.
   D. REGRADED AREAS SHALL NOT FURTHER IMPACT OTHER PROPERTIES WITH RESPECT TO DRAINAGE.
   E. THE TOP 6-INCH BACKFILL LAYER LOCATED WITHIN GRASS AND/OR OTHER PERVIOUS AREAS IS NOT TO BE COMPACTED.

Division of Water and Sewer Utilities Notes:

1. A waste fixture count must be prepared by the Frederick County DWSU, Division of Engineering and Planning before a building permit can be approved.
2. Each tenant or owner shall complete an industrial waste survey and comply with the Frederick County industrial waste ordinance. Furnishment and installation of monitoring manholes, grease taps and other pre treatment devices shall be the responsibility of the owner or contract purchaser of the lot. The final location of said devices are subject to review and approval by Frederick County DWSU as part of the site improvement plan.

TAX MAP #:	94
TAX ACCOUNT #:	01-000152 01-005405
COUNTY FILE	S-1179
PRELIMINARY FRO SECTION 1	F266567
PRELIMINARY PLAN SECTION 1	PP273774
PRELIMINARY FRO SECTION 2	F273779
PRELIMINARY PLAN SECTION 2	PP273777
SWM CONCEPT PLAN	PW266568 PW273817
FINAL FRO PHASE 1	F271158
FINAL FRO PHASE 2	F274907
IMPROVEMENT PLAN	PW276493

SHEET INDEX

Sheet 1	Cover Sheet	CS-1
Sheet 2	Sediment Control Plan	SC-1
Sheet 3	Sediment Control Plan	SC-2
Sheet 4	Sediment Control Plan	SC-3
Sheet 5	Sediment Control Notes & Details	ND-1
Sheet 6	Water/ PCW Plan	UP-1
Sheet 7	12" Water Profile	WP-1
Sheet 8	16" Potable Cooling Water Profile	WP-2
Sheet 9	Water/ PCW Notes & Details	WND-1

INTERNAL USE ONLY
DEVELOPMENT REVIEW
FILE #: S-1179
A/P #: PW276493
DUE DATE:

CERTIFICATION OF THE QUANTITIES

I hereby certify that the estimated total amount of excavation and fill as shown on these plans has been computed to 1650 c.y. of excavation, 1650 c.y. of fill and the total area to be disturbed as shown on these plans has been determined to be 392,500 square feet.

Signature: [signature] Date: 4/22/2024

Phillip Thomas Wagner — Printed Name; 29782 — Registration Number

Note: These figures are estimated quantities for Sediment Control purposes only.

ENGINEER/ARCHITECT DESIGN CERTIFICATION

"I hereby certify that the plans have been designed in accordance with local ordinances, COMAR 26.17.01, and 2011 Maryland Standards and Specifications for Soil and Sediment Control and is contingent upon issuance of all applicable regulatory permits. If applicable, this plan is also designed in accordance with the requirements contained within USDA, NRCS "Standards and Specifications for Ponds MD-378" and the policies and procedures of the Maryland Department of the Environment Dam Safety program.

Signature: [signature] Reg. No.: 29782 Date: 4/22/2024

Print Name: Phillip Wagner

OWNER'S/DEVELOPER'S CERTIFICATION

I certify that this plan of Sediment Control will be implemented to the fullest extent, and all structures will be installed to the design and specifications as spelled out in this plan and that any responsible personnel involved in construction project will have a certification of attendance at a Department of Natural Resources approved training program for the control of sediment and erosion before beginning the project. I also authorized periodic on site evaluation by the Frederick Soil Conservation District personnel and cooperating agencies.

Owner/Developer Certificate
Quantum Maryland, LLC

Date: 4/22/2024 By: [signature]
A.D Robison
Authorized Person

SWM Concept Plans

- Section 1 & Part of Sections 2 & 3 (PW266568) Approved 11/30/2021
- Section 2 (PW273817) Approved 11/29/2022

FREDERICK COUNTY DIVISION OF WATER AND SEWER UTILITIES

REVIEWED:______________________ ________
DIRECTOR DATE

REVIEWED:______________________ ________
DEPARTMENT HEAD, ENGINEERING AND PLANNING DATE

THE ABOVE SIGNATURES ARE FOR THE COUNTY'S PURPOSE INDICATING THE DESIGN COMPLIES WITH THE PROGRAM OBFICTIVES AND TO AUTHORIZE THE PROJECT TO PROCEED TO THE NEXT STAGE IN THE CONSTRUCTION PROCUREMENT PROCESS. THIS REVIEW DOES NOT IN ANY WAY RELIEVE THE ARCHITECT/ENGINEER OF THEIR RESPONSIBILITY FOR THE PROFESSIONAL QUALITY, TECHNICAL ADEQUACY, AND COORDINATION OF ALL DESIGNS, DRAWINGS, SPECIFICATIONS AND OTHER SERVICES FURNISHED UNDER THIS AGREEMENT.

Frederick County Soil Conservation District
Erosion and Sediment Control Plan Approval

BY ______________________
District Manager or Designee

DATE ______________________
Plan is valid for 2 years from date of approval

SCD approval for sediment and erosion control is in accordance with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control and is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND — PHILLIP THOMAS WAGNER — 29782 — PROFESSIONAL ENGINEER

For Review Only

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

Contract No. -W

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR ______________
BY __________ DATE ____

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Cover Sheet

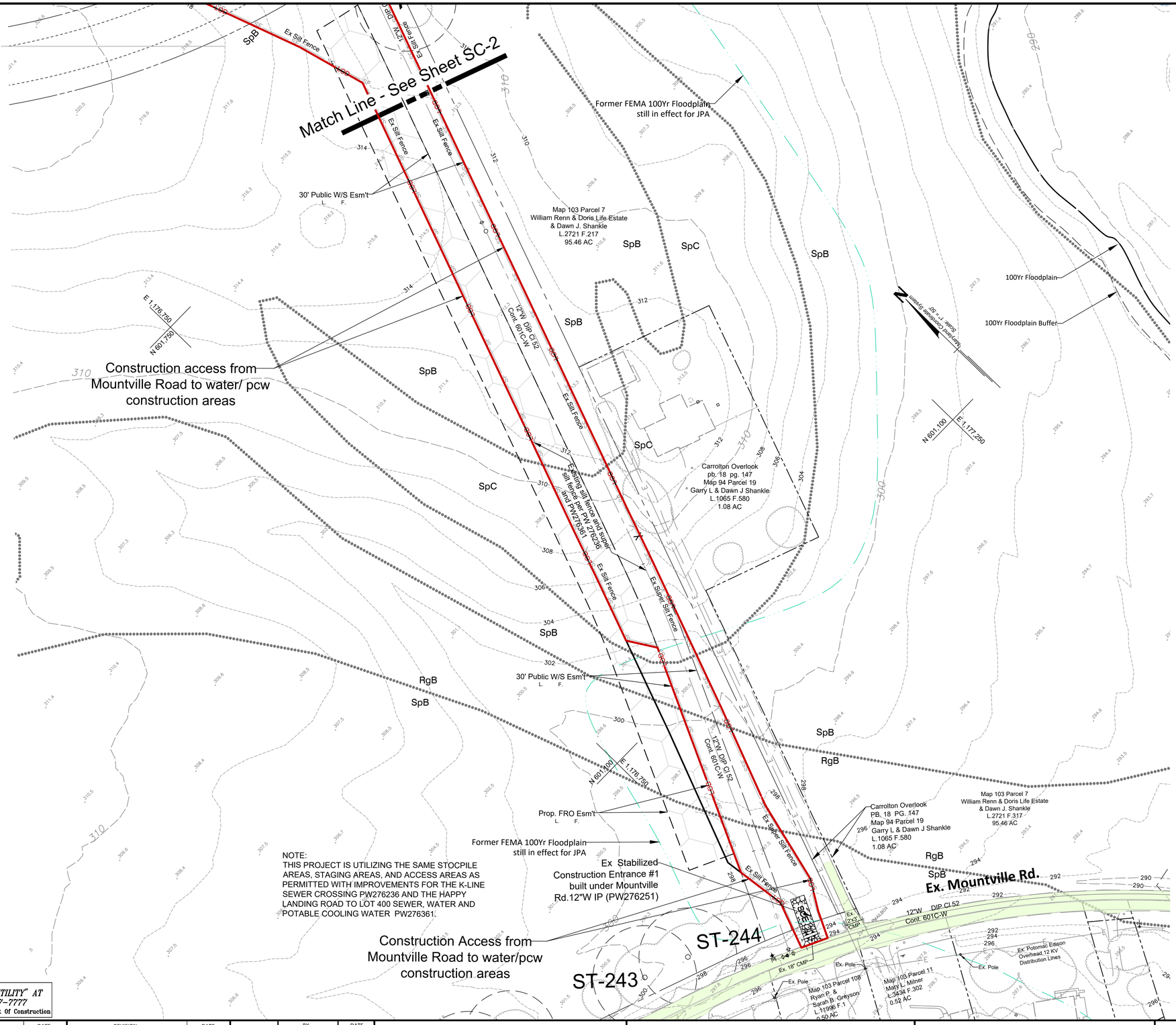
RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
12"W & 16"PCW Crossing Tuscarora Creek at Happy Landing Rd

QUANTUM FREDERICK
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: As shown
JOB No. 1339A8
April, 2024
INDEX No. CS-1
SHEET No. 1 OF 9

2024-04-26



LEGEND

- EXISTING TREE
- EXISTING TREE - TO BE REMOVED
- TREE PROTECTION (ARMOR)
- EXISTING TREELINE
- EXISTING WETLAND
- EXISTING WETLAND BUFFER
- FORMER FEMA EXISTING 100 YEAR FLOODPLAIN IN EFFECT FOR JPA
- EXISTING 100 YEAR FLOODPLAIN
- EXISTING STREAMS
- EXISTING STREAM VALLEY BUFFER
- ENVIRONMENTAL COVENANT ESM'T
- EXISTING TOPO w/ CONTOUR LABEL
- SOILS LINES
- GdB — SOIL TYPE
- EXISTING DRAINAGE DIVIDE
- FOREST CONSERVATION EASEMENT
- FOREST CONSERVATION AREA
- LOD — LIMIT OF DISTURBANCE
- SSF — SSF — SUPER SILT FENCE
- SSF — SSF — SUPER SILT FENCE 'J HOOK' (5' LENGTH OF SSF PLACED AT 45° ANGLE UPSLOPE
- SF — SF — SILT FENCE
- SF — SF — SILT FENCE 'J HOOK' (5' LENGTH OF SF PLACED AT 45° ANGLE UPSLOPE
- SCE — STABILIZED CONSTRUCTION ENTRANCE

HYDROLOGIC SOIL GROUPS

SOIL NAME	DESCRIPTION	HSG
AfB	Adamstown-Funkstown complex (0-8% slopes)	C
DtB	Duffield-Ryder silt loam (3-8% slopes)	B
LsA	Lindside silt loam (0-3% slopes)	C
MaA	Melvin-Lindside silt loam (0-3% slopes)	B/D
RgB	Readington silt loam, smooth, (3-8% slopes)	C
SpB	Springwood gravelly loam (3-8% slopes)	C
SpC	Springwood gravelly loam (8-15% slopes)	C

Frederick County Soil Conservation District
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GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

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STATE OF MARYLAND — PHILLIP THOMAS WRIGHT — 29782 — PROFESSIONAL ENGINEER

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SCALE:	1"=50'
JOB No.	1339A8
	April, 2024
INDEX No.	SC-1
SHEET No.	2 OF 9

2024-04-26

A Zone

LsA

KeC

SpB

Ex Silt Fence

Ex Super Silt Fence

LOD

STOCKPILE & STAGING AREA #1
MAX HEIGHT 15'
MAX SLOPE 2:1

LOT 402
±526,183 sf
±12.08 acres

Ex. Environmental Covenant
L. 12205 F.01

N 602,500
E 1,177,400

N 602,500
E 1,177,750

Maryland Coordinate System
Scale: 1" = 50'

HYDROLOGIC SOIL GROUPS

SOIL NAME	DESCRIPTION	HSG
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Tuscarora Creek

ST-172

100Yr Floodplain

100Yr Floodplain Buffer

Stream Protection Zone

Waterbody Buffer

Fut. FRO Esm't

Prop. FRO Esm't
L. F.

Former FEMA 100Yr Floodplain
still in effect for JPA

EX SECANT WALL
LAUNCH SHAFT FOR
MICRO-TUNNELING
OPERATIONS

Ex STOCKPILE #1
MAX HEIGHT 15'
MAX SLOPE 2:1

Existing silt fence and super
silt fence per PW 276236
and PW276361

30' Public W/S Esm't
L. F.

Prop.Public W/S Esm't
L. F.

Ex 18"S
Cont. 603F-S

Prop. 16"PCW HDPE
Prop. 12"W HDPE

Ex Super Silt Fence

Existing super silt fence per
PW 276236

Prop Super Silt Fence

Ex. Environmental Covenant
L. 12205 F.01

Water/PCW to be installed via horizontal directional drilling (HDD) - no above ground disturbance in this area

Ex 16"PCW
Ex 12"W

Prop. 16"PCW DIP Cl 52
Prop. 12"W DIP Cl 52

Ex 12"W DIP Cl 52

Match Line - See Sheet SC-1

ST-245

E 1,177,000
N 601,800

OPEN SPACE 'P'
±22,664 sf
±0.52 acres

Map 103 Parcel 7
William Renn & Doris Life Estate
& Dawn J. Shankle
L.2721 F.217
95.46 AC

OPEN SPACE PARCEL 'D'
±223,455 sf
±5.13 acres

E 1,177,600
N 601,800

OPEN SPACE PARCEL 'A'

N 602,250
E 1,178,050

Ex. FRO Esm't
L.16174 F.213

ST-169

ST-171

OPEN SPACE
PARCEL 'A'

Ex. Environmental Covenant
L. 12205 F.01

Prop. Public
W/S Esm't
L. F.

Ex 24"S
Cont. 603F-S

EX LAUNCHING SHAFT
INSTALLED UNDER PUMP
STATION IP (PW275959)
USED FOR
MICROTUNNELING
OPERATIONS

Ex Public
W/S Esm't
L.16342 F.436

Ex 3

Prop. 16"PCW HDPE
Prop. 12"W HDPE

Tuscarora Creek

ST-170

R/W RESERVATION
FUTURE MD ROUTE 80

Existing super silt fence
Location shown is combined
from multiple approved plans.
See PW271137, PW273379,
PW 273866, coordinate any
modifications with inspector.

Fut. Happy Landing Rd.
MD Rte. 80

Match Line - See Sheet SC-3

GRAPHIC SCALE
50' 0 25' 50' 100' 200'
1 INCH = 50 FT

NOTE:
THIS PROJECT IS UTILIZING THE SAME STOCPILE AREAS, STAGING AREAS, AND ACCESS AREAS AS PERMITTED WITH IMPROVEMENTS FOR THE K-LINE SEWER CROSSING PW276236 AND THE HAPPY LANDING ROAD TO LOT 400 SEWER, WATER AND POTABLE COOLING WATER PW276361.

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

Frederick County Soil Conservation District
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STATE OF MARYLAND · PHILLIP THOMAS EASTMAN · 29782 · PROFESSIONAL ENGINEER
Phillip Eastman
For Review Only

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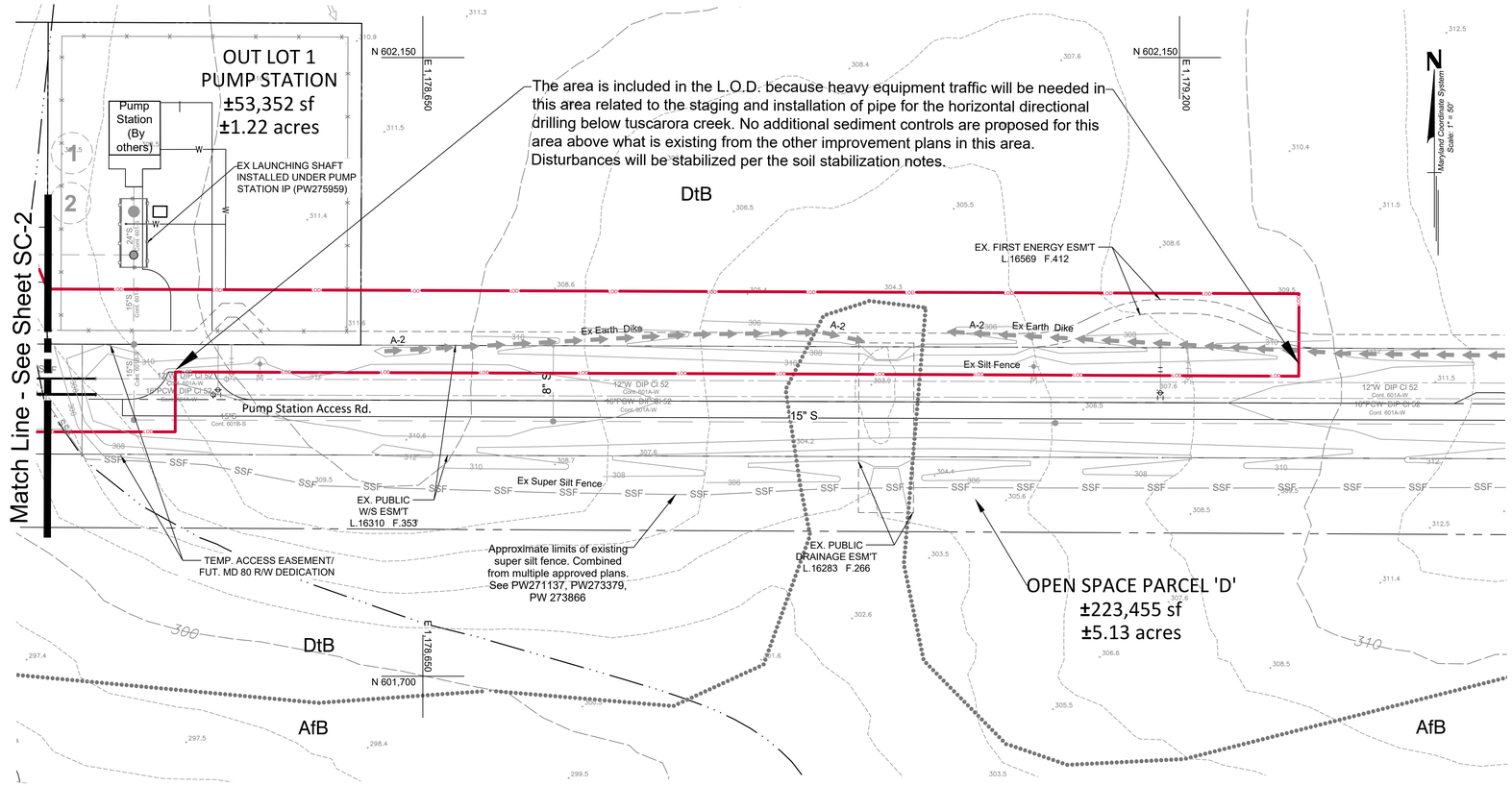
INDEX No.	SC-2
SHEET No.	3 OF 9



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STATE OF MARYLAND · PHILLIP THOMAS WAGNER · 29782 · PROFESSIONAL ENGINEER
For Review Only

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FREDERICK COUNTY, MARYLAND

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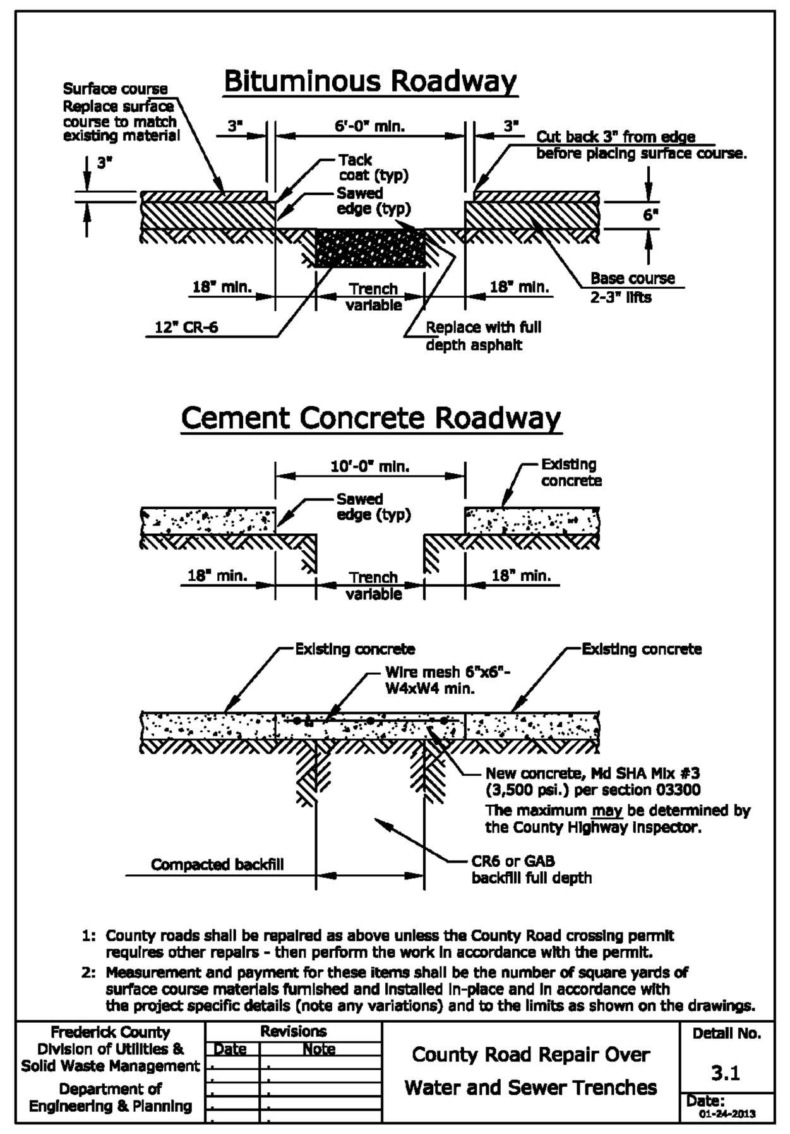
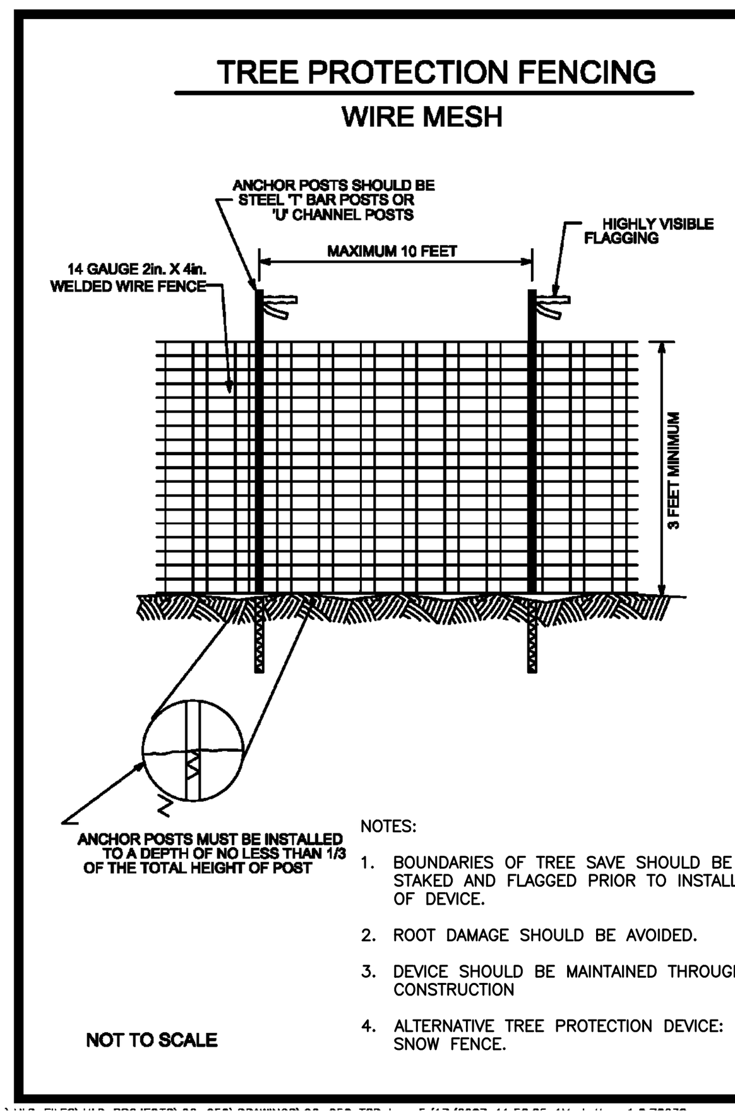
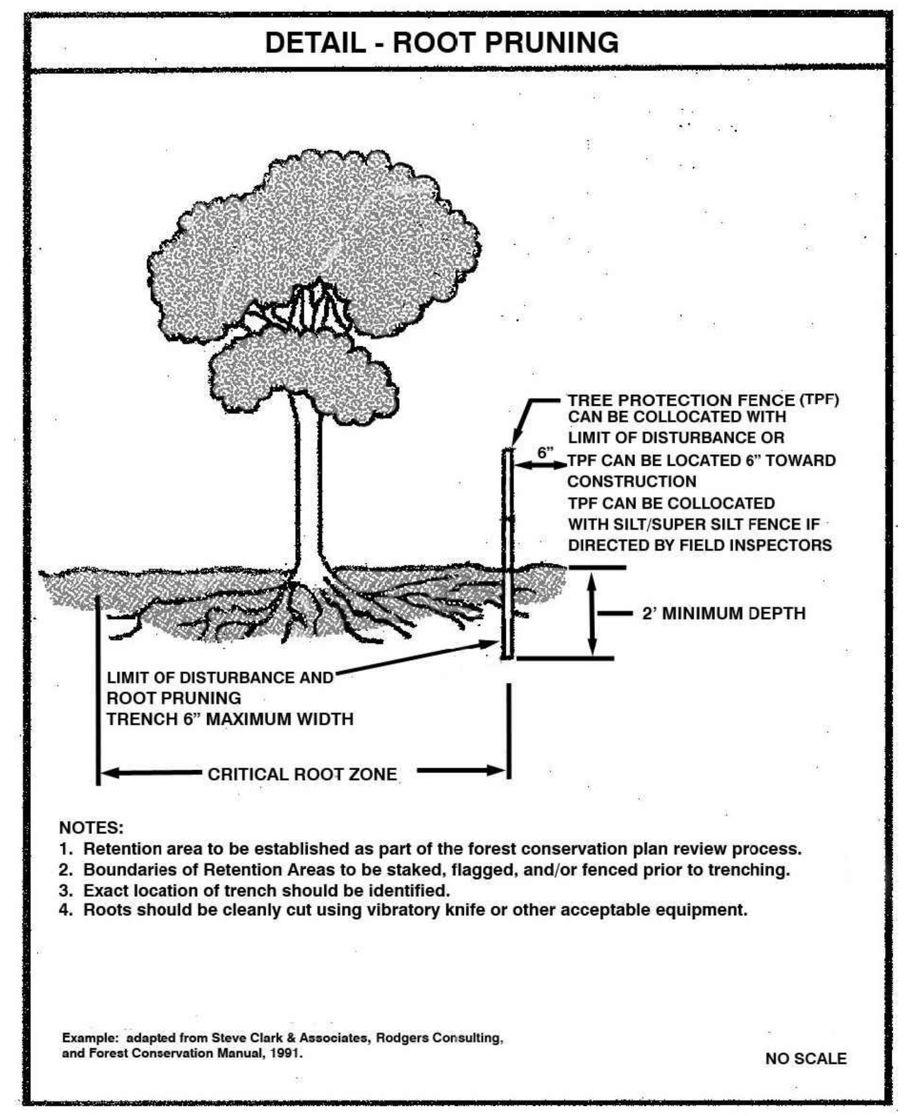
SHEET No.	4 OF 9

2024-04-26







BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

1) No excess fill, construction material, or debris shall be stockpiled or stored in nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
2) Place materials in a location and manner which does not adversely impact surface or subsurface water flow into or out of nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
3) Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.
4) Place heavy equipment on mats or suitably operate the equipment to prevent damage to nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
5) Repair and maintain any serviceable structure or fill so there is no permanent loss of nontidal wetlands, nontidal wetland buffers, or waterways, or permanent modification of the 100-year floodplain in excess of that lost under the originally authorized structure or fill.
6) Rectify any nontidal wetlands, wetland buffers, waterways, or 100-year floodplain temporarily impacted by any construction.
7) All stabilization in the nontidal wetland and nontidal wetland buffer shall consist of the following species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), Oats (Uniola sp.), and/or Rye (Secale cereale). These species will allow for the stabilization of the site while also allowing for the voluntary revegetation of natural wetland species. Other non-persistent vegetation may be acceptable, but must be approved by the Nontidal Wetlands and Waterways Division. Kentucky 31 fescue shall not be utilized in wetland or buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.
8) After installation has been completed, make post-construction grades and elevations the same as the original grades and elevations in temporarily impacted areas.
9) To protect aquatic species, in-stream work is prohibited as determined by the classification of the stream:
Use I waters: In-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year.
Use III waters: In-stream work shall not be conducted during the period October 1 through April 30, inclusive, during any year.
Use IV waters: In-stream work shall not be conducted during the period March 1 through May 31, inclusive, during any year.
10) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway.
11) Culverts shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to impound water.

SEDIMENT CONTROL/STORMWATER MANAGEMENT REQUIRED INSPECTION

YOU MUST NOTIFY THE ENVIRONMENTAL COMPLIANCE SECTION AT 301-600-3507 BEFORE 9:00 AM, 24 HOURS PRIOR TO THE REQUIRED INSPECTION. FAILURE TO NOTIFY THIS OFFICE WILL RESULT IN A STOP WORK ORDER OR OTHER PENALTIES AS OUTLINED IN FREDERICK COUNTY CODES.

••••••• NOTICE ••••••

THIS LIST IS FOR SEQUENCE OF CONSTRUCTION ONLY. THIS OFFICE ASSUMES NO RESPONSIBILITY OR LIABILITY FOR IMPROPER INSTALLATION OF ANY ITEM ON THIS CHECKLIST. THIS OFFICE RECOMMENDS THAT A PROFESSIONAL ENGINEER BE PRESENT FOR EACH OF THE REQUIRED INSPECTIONS.

TYPE OF INSPECTION	MISC. COMMENT	INITIALS
1. PRECONSTRUCTION MEETING		
2. COMPLETION OF SEDIMENT CONTROL MEASURES (IF USING BASIN SEE #6 BELOW)		
3. PRIOR TO MODIFICATION OR REMOVAL OF SEDIMENT CONTROL		
4. INFILTRATION SYSTEMS		
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION		
B. INFILTRATION AREA PROTECTED FROM SEDIMENTATION		
C. DIMENSIONS		
D. FILTERING MATERIAL (TYPE/DEPTH)		
E. FILL MATERIAL		
F. SIZE, PLACEMENT, TYPE OF PIPING (IF APPLICABLE)		
G. OBSERVATION WELL		
H. COVER/STABILIZATION		
5. OPENCHANNEL FLOW ATTENUATION		
A. SITE READINESS PER SEQUENCE OF CONSTRUCTION		
B. CROSS SECTION CONFORMANCE		
C. MATERIAL (TYPE/SIZE)		
D STABILIZATION		
6. RETENTION/DETENTION STRUCTURES (BASINS/PONDS)		
A. SUBGRADE PREPARATION		
1. CORE TRENCH		
2. SUITABLE MATERIAL/COMPACTION		
B. EMBANKMENT CONSTRUCTION		
1. SUITABLE MATERIAL/COMPACTION		
2. SLOPE GRADE		
3. DIMENSIONS		
C. BARREL AND RISER ASSEMBLY		
1. CORRECT MATERIAL ONSITE		
2. SIZING		
3. ANTI-SEEP COLLARS		
4. ANTI-FLOATATION DEVICE		
5. CONCRETE CRADLE (RCP ONLY)		
6. INSTALLATION/BACKFILL/COMPACTION		
D. CONCRETE STRUCTURES		
1. FOOTER DIMENSIONS		
2. REINFORCING MATERIAL (TYPE, SIZE, PLACEMENT)		
3. WEIR POUR/MATERIAL/SLUMP TEST		
4. FORM STRIP AND FINISHING		
E. IMPOUNDING AREA		
1. LOW FLOW CHANNELS/STABILIZATION		
2. DEWATERING DEVICE		
3. EMERGENCY SPILLWAY		
4. EXTENDED DETENTION DEVICE		
F. OUTFALL AREA (LEVEL, SPREADER, RIPRAP CHANNEL, ETC.)		
G. VEGETATIVE STABILIZATION		
H. MISCELLANEOUS		

SECONDARY UTILITY NOTES

A. ALL DISTURBANCES FROM SECONDARY UTILITIES SUCH AS PHONE CABLE, ELECTRIC CABLE, TV CABLE, ETC. WILL BE SUBCONTRACTORS RESPONSIBILITY TO BRING WORK AREA BACK TO GRADE LEVEL THAT WAS EXISTING AND SEED AND MULCH ANY DISTURBANCE FROM INSTALLATION OF LINES OR CONDUIT.

B. SUB CONTRACTORS WILL BE RESPONSIBLE FOR RE-INSTALLING OR REPAIRING ANY SILT FENCE OR SEDIMENT CONTROLS THAT WERE EXISTING TO MAINTAIN PROPER SEDIMENT CONTROL THAT MIGHT HAVE BEEN DAMAGED.

FOR UTILITY WORK ONLY OR FOR OFF-SITE UTILITY WORK

1. DISTURBANCE OUTSIDE OF LOD CAN NOT EXCEED 5000 SQUARE FEET.
2. PLACE ALL EXCAVATED MATERIAL ON HIGH SIDE OF TRENCH.
3. ONLY DO AS MUCH WORK AS CAN BE DONE ON ONE DAY SO BACKFILLING, FINAL GRADING, SEEDING AND MULCHING CAN OCCUR.
4. ANY SEDIMENT CONTROL MEASURES DISTURBED BY CONSTRUCTION WILL BE REPAIRED THE SAME DAY.

STOCKPILE NOTES

1. NO STOCKPILING ALLOWED ON ASPHALT.
2. ALL STOCKPILES LEFT AT THE END OF THE DAY NEED TO BE STABILIZED UNTIL THE NEXT RE-DISTURBANCE.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL NOTIFY THE FREDERICK COUNTY ENVIRONMENTAL COMPLIANCE SECTION (ECS) AT (301) 600-3507 AT LEAST FIVE (5) DAYS BEFORE STARTING AUTHORIZED ACTIVITIES.
2. OBTAIN ALL REQUIRED APPROVALS AND PERMITS INCLUDING NOI 20-CP. NOI MUST BE OBTAINED AND FURNISHED TO SOIL CONSERVATION DISTRICT (SCD) PRIOR TO STARTING ANY CONSTRUCTION
3. CONTACT MISS UTILITY 5 DAYS PRIOR TO PRE-CONSTRUCTION MEETING.
4. CONTRACTOR SHALL INSPECT AND REPAIR AS NECESSARY EXISTING STABILIZED CONSTRUCTION ENTRANCES, SILT FENCE AND SUPER SILT FENCE WITHIN THE PROPOSED LOD FOR THIS PLAN.
5. CONTRACTOR TO PERFORM STAKEOUT OF SEDIMENT CONTROL DEVICES PRIOR TO PRE-CONSTRUCTION MEETING.
6. HOLD PRE-CONSTRUCTION MEETING WITH FREDERICK COUNTY ECS. CALL FREDERICK COUNTY ECS 24 HOURS IN ADVANCE AT (301) 600-3507 FOR INSPECTION BEFORE ANY GRADING OR OTHER CONSTRUCTION ACTIVITIES BEGIN.
7. WITH INSPECTORS APPROVAL, CLEAR AND GRUB FOR INSTALLATION OF SEDIMENT CONTROL DEVICES ONLY - SUPER SILT FENCE. INSTALL SUPER SILT FENCE ALONG LIMITS OF DISTURBANCE AS SHOWN ON PLANS. STABILIZE PER REQUIREMENTS IN SEDIMENT CONTROL NOTES (THIS SHEET).
8. UPON COMPLETION OF INSTALLATION OF SEDIMENT CONTROL MEASURES THE SEDIMENT CONTROL INSPECTOR MUST VERIFY THE SEDIMENT CONTROL MEASURES ARE PROPERLY INSTALLED AND IN PLACE PRIOR TO BEGINNING CONSTRUCTION. SEE "FOR UTILITY WORK ONLY OR FOR OFF-SITE UTILITY WORK" NOTES (THIS SHEET).
9. INSTALL WATER AND POTABLE COOLING WATER LINES. STABILIZE PER REQUIREMENTS IN SEDIMENT CONTROL NOTES (THIS SHEET).
10. CONTRACTOR TO CONTROL DUST PER H-5 STANDARDS AND SPECIFICATIONS OF THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL
11. STABILIZE ALL DISTURBED AREAS WITH VEGETATION PER SEEDING SPECIFICATIONS.
12. UPON APPROVAL FROM SEDIMENT CONTROL INSPECTOR, REMOVE ALL SEDIMENT CONTROL DEVICES AND PERMANENTLY STABILIZE ANY REMAINING DISTURBED AREAS.
13. DEPENDING ON SITE CONDITIONS, PHASING OR CONSTRUCTION SEQUENCING, AND STABILIZATION METHODS, ADDITIONAL SEDIMENT CONTROLS (OTHER THAN AS SHOWN HEREON) MAY BE REQUIRED BY THE INSPECTOR.
14. OWNER AND CONTRACTOR ARE RESPONSIBLE FOR ANY ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES NEEDED DURING DISTURBANCE IN CONJUNCTION WITH PROPOSED PLAN IF ISSUES ARISE. (CONSULT SEDIMENT AND EROSION INSPECTOR FOR GUIDANCE.)
15. ALL EROSION/SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN CONTINUOUS COMPLIANCE WITH THE LATEST VERSION OF THE MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL.
16. ALL UTILITIES, SUCH AS; STORM DRAIN, PUBLIC WATER, SANITARY SEWER, ELECTRIC POWER, TELEPHONE, CABLE AND GAS LINES, THAT ARE NOT IN PAVED AREAS AND ARE NOT UNDERGOING ACTIVE GRADING SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 3 DAYS OF INITIAL DISTURBANCE.
17. THE OWNER/DEVELOPER OR THEIR DESIGNATE IS RESPONSIBLE FOR CONDUCTING ROUTINE INSPECTIONS AND REQUIRED MAINTENANCE. THE SITE AND CONTROLS SHOULD BE INSPECTED WEEKLY AND THE NEXT DAY AFTER EACH RAIN EVENT**. ANY ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN A SUITABLE AREA AND SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED.

**ANY PROJECT THAT HAS A STATE ISSUED N.O.I PERMIT MUST DOCUMENT EACH INSPECTION AND MAINTAIN AN INSPECTION LOG (PLEASE SEE THE N.O.I. FOR DETAILS)

SEDIMENT AND EROSION CONTROL NOTES

1. ALL EROSION/SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN CONTINUOUS COMPLIANCE WITH THE LATEST VERSION OF THE MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL.
2. ALL UTILITIES, SUCH AS; STORM DRAIN, PUBLIC WATER, SANITARY SEWER, ELECTRIC POWER, TELEPHONE, CABLE AND GAS LINES, THAT ARE NOT IN PAVED AREAS AND ARE NOT UNDERGOING ACTIVE GRADING SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED WITHIN 3 DAYS OF INITIAL DISTURBANCE.
3. THE OWNER/DEVELOPER OR THEIR DESIGNATE IS RESPONSIBLE FOR CONDUCTING ROUTINE INSPECTIONS AND REQUIRED MAINTENANCE. THE SITE AND CONTROLS SHOULD BE INSPECTED WEEKLY AND THE NEXT DAY AFTER EACH RAIN EVENT**. ANY ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN A SUITABLE AREA AND SHALL BE TEMPORARILY OR PERMANENTLY STABILIZED.

**ANY PROJECT THAT HAS A STATE ISSUED N.O.I PERMIT MUST DOCUMENT EACH INSPECTION AND MAINTAIN AN INSPECTION LOG (PLEASE SEE THE N.O.I. FOR DETAILS).

STANDARD STABILIZATION NOTE

FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION MUST BE COMPLETED WITHIN:

A. THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER 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 PROJECT SITE NOT UNDER ACTIVE GRADING.

TEMPORARY SEEDING NOTES

GENERAL
1. SCOPE: PLANTING SHORT TERM VEGETATION TO STABILIZED, CLEARED OR GRADED AREAS SUBJECT TO EROSION FOR A PERIOD OF 7 DAYS OR MORE.
2. STANDARDS: TEMPORARY SEEDING SHALL CONFORM TO ALL REQUIREMENTS OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, THE NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.
3. SEDIMENT & EROSION CONTROL: ALL PERIMETER CONTROL MUST BE STABILIZED IN 3 DAYS. ALL INTERIOR CONTROLS MUST BE STABILIZED IN 7 DAYS.

SPECIFICATIONS
1. SITE PREPARATIONS:
   A.) PRIOR TO SEEDING INSTALL ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES.
   B.) FINAL GRADING NOT REQUIRED FOR TEMPORARY SEEDING.
2. SOIL AMENDMENTS:
   A.) FERTILIZER SHALL BE APPLIED AT THE RATE OF 800 LBS/ACRES USING 10-10-10 OR EQUIVALENT.
   B.) ACID SOILS SHALL BE LIMED.
3. SEEDBED PREPARATION:
   A.) SOIL SHALL BE LOOSENED TO A DEPTH OF 3 INCHES BY RAKING, DISKING, OR OTHER ACCEPTABLE MEANS PRIOR TO SEEDING.
4. SEEDING:
   A.) SELECT A MIXTURE FROM TABLE B.1 IN THE STANDARD SPECIFICATIONS.
   B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER.
5. MULCHING:
   A.) MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING. MULCH MATERIALS AND APPLICATIONS SHALL CONFORM TO THE STANDARD SPECIFICATIONS.

PERMANENT SEEDING & SOD NOTES

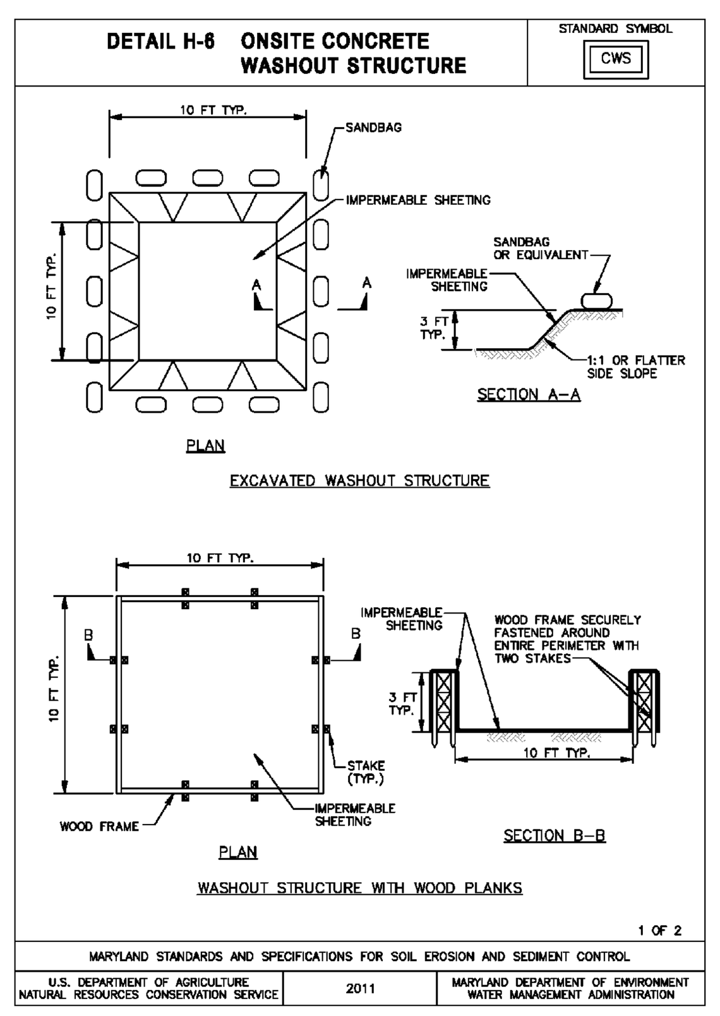
GENERAL
1. SCOPE: PLANTING PERMANENT, LONG LIVED VEGETATIVE COVER ON GRADED OR CLEARED AREAS.
2. STANDARDS: PERMANENT SEEDING SHALL CONFORM TO ALL REQUIREMENTS OF "2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY THE WATER RESOURCES ADMINISTRATION, THE NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.

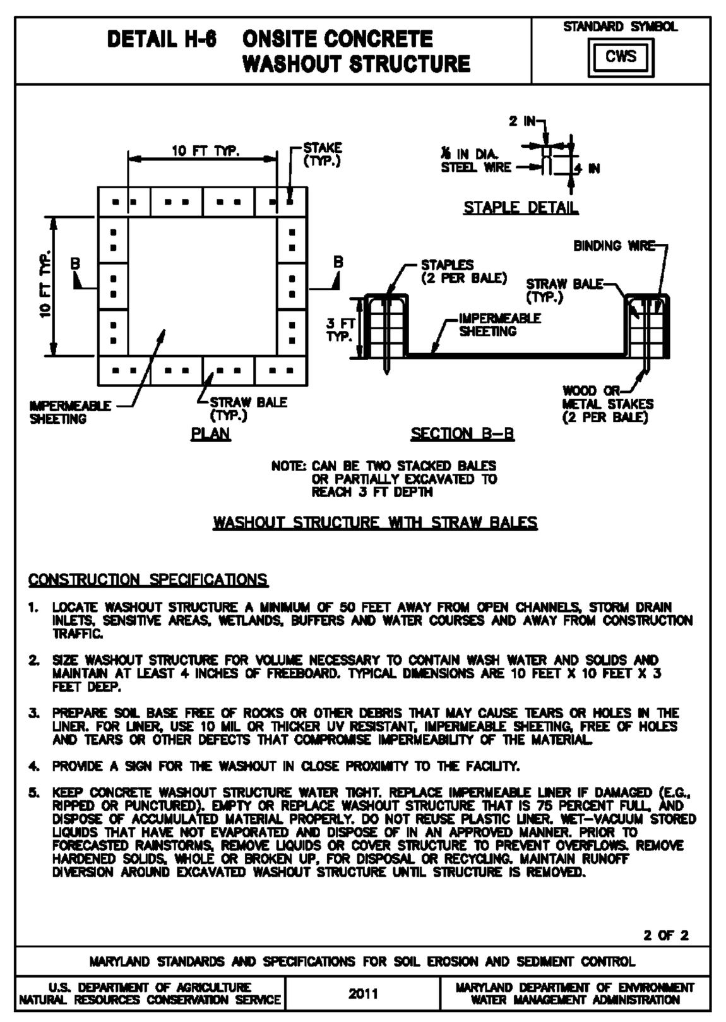
SPECIFICATIONS
1. 1. SITE PREPARATIONS:
   A.) PRIOR TO SEEDING INSTALL ALL REQUIRED SEDIMENT AND EROSION CONTROL MEASURES.
   B.) FINAL GRADING NOT REQUIRED FOR TEMPORARY SEEDING.
2. SOIL AMENDMENTS:
   A.) FERTILIZER SHALL BE APPLIED AT THE RATE OF 1000 LBS/ACRES USING 10-10-10 OR EQUIVALENT.
   B.) ACID SOILS SHALL BE LIMED.
3. 3. SEEDBED PREPARATION:
   A.) SOIL SHALL BE LOOSENED TO A DEPTH OF 3 INCHES BY RAKING, DISKING, OR OTHER ACCEPTABLE MEANS PRIOR TO SEEDING.
   B.) APPLY SEED UNIFORMLY WITH A CYCLONE SEEDER DRILL, CULTIPACKER OR HYDRO SEEDER (SLURRY INCLUDES SEED AND FERTILIZER ON A FIRM, MOIST SEEDBED.) MAXIMUM SEEDING DEPTH SHOULD BE 1/4" INCH ON CLAYEY SOILS AND 1/2 INCH ON SANDY SOILS, WHEN USING OTHER THAN HYDROSEEDER METHOD OF APPLICATION.

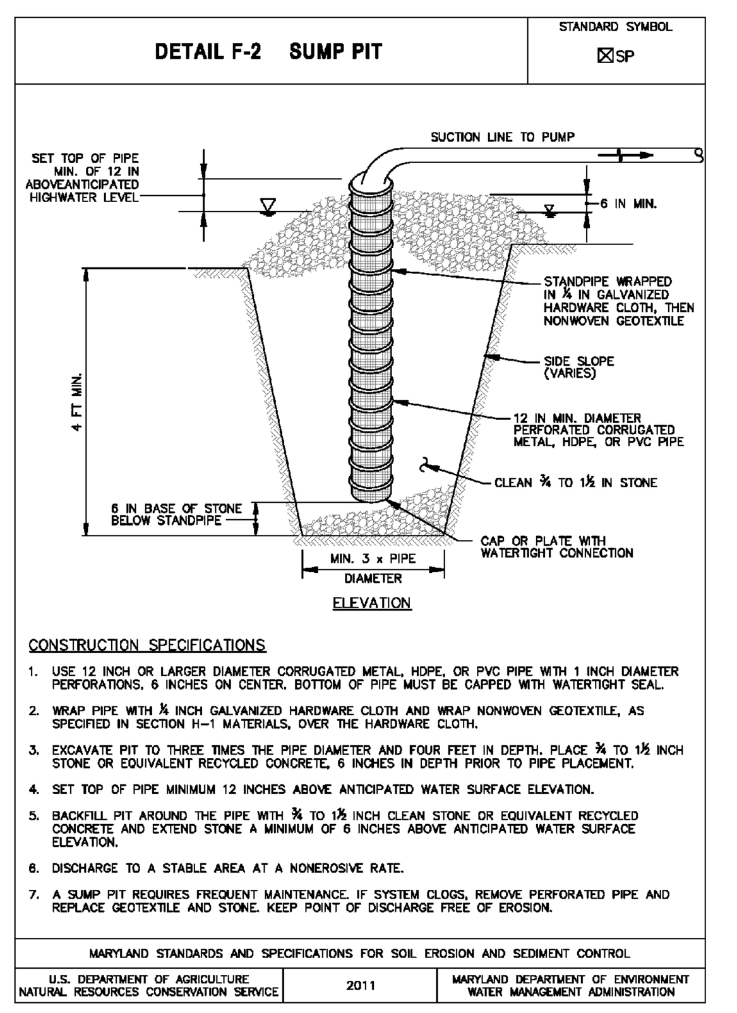
NOTE:
IF HYDROSEEDING IS USED AND THE SEED AND FERTILIZER IS MIXED, THEY WILL BE MIXED ON SITE AND THE SEEDING SHALL BE IMMEDIATE WITHOUT INTERRUPTION.

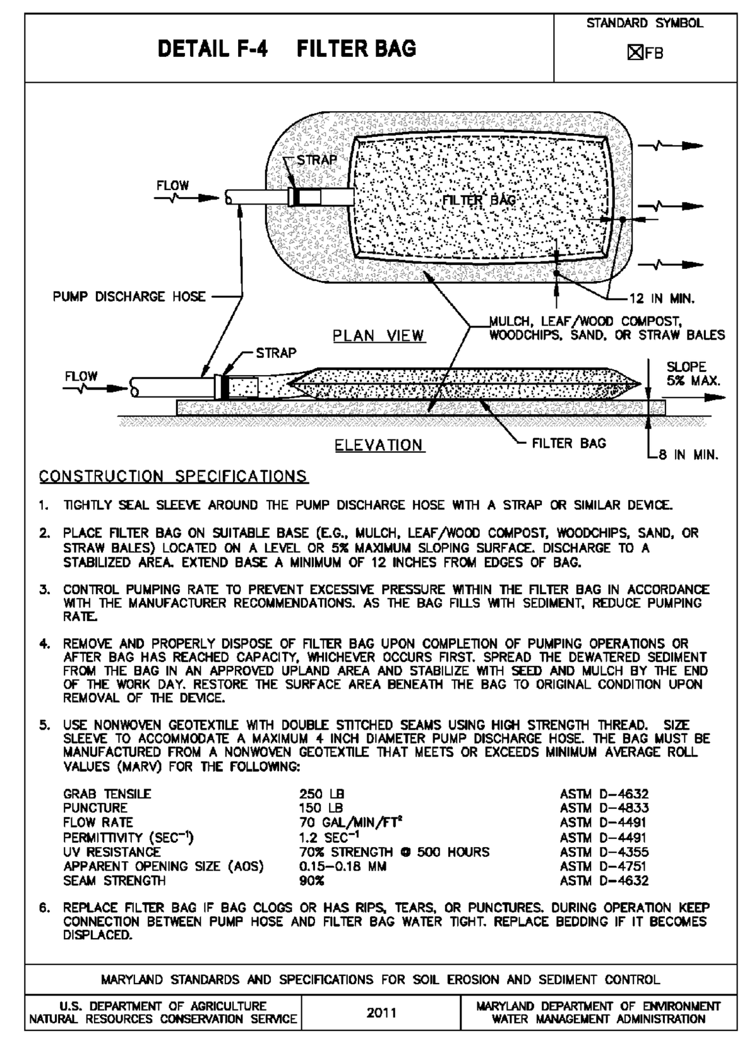
PERMANENT STABILIZATION WITH SOD

1. IF ANY SOD IS TO BE USED FOR STABILIZATION IT NEEDS TO BE MD CERTIFIED AS MDE STATED. ALL SPECIFICATIONS, SITE PREPARATION, INSTALLATION AND MAINTENANCE OF SOD FOR PERMANENT, LONG LIVED VEGETATIVE COVER SHALL CONFORM TO SECTION B-4.5B OF "2011 MARYLAND STANDARDS AND LIVED VEGETATIVE COVER SHALL CONFORM TO SECTION B OF SPECIFICATIONS FOR SOIL EROSION SEDIMENT CONTROL" PUBLISHED JOINTLY BY WATER RESOURCES ADMINISTRATION, THE NATURAL RESOURCES CONSERVATION SERVICE, AND THE STATE SOIL CONSERVATION COMMITTEE.









H-5 STANDARDS AND SPECIFICATIONS FOR DUST CONTROL

Definition

Controlling the suspension of dust particles from construction activities.

Purpose

To prevent blowing and movement of dust from exposed soil surfaces to reduce on and off-site damage including health and traffic hazards.

Condition Where Practice Applies

Areas subject to dust blowing and movement where on and off-site damage is likely without treatment.

Specifications

1. Mulches: See Section B-4-2 Soil Preparation, topsoiling and Soil Amendments, Section B-4-3 Seeding and Mulching, and Section B-4-4 Temporary Stabilization. Mulch must be anchored to prevent blowing.
2. Vegetative Cover: See Section B-4-4 Temporary Stabilization
3. Tillage: Till to roughen surface and bring clods to the surface. Begin plowing on windward side of site. Chisel-type plows spaced about 12 inches apart, spring-toothed harrows, and similar plows are examples of equipment that may produce the desired effect.
4. Irrigation: Sprinkle site with water until the surface is moist. Repeat as needed. The site must not be irrigated to the point that runoff occurs.
5. Barriers: Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing.
6. Chemical Treatment: Use of chemical treatment requires approval by the appropriate plan review authority.

Table B.1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate 1/		Seeding Depth 2/ (inches)	Recommended Seeding Dates by Plant Hardiness Zone 3/		
	lb/ac	lb/1000 ft²		5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass (*Lolium perenne ssp. multiflorum*)	40	1.0	0.5	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Barley (*Hordeum vulgare*)	96	2.2	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Oats (*Avena sativa*)	72	1.7	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Wheat (*Triticum aestivum*)	120	2.8	1.0	Mar 15 to May 31; Aug 1 to Sep 30	Mar 1 to May 15; Aug 1 to Oct 15	Feb 15 to Apr 30; Aug 15 to Nov 30
Cereal Rye (*Secale cereale*)	112	2.8	1.0	Mar 15 to May 31; Aug 1 to Oct 31	Mar 1 to May 15; Aug 1 to Nov 15	Feb 15 to Apr 30; Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet (*Setaria italica*)	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet (*Pennisetum glaucum*)	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

TABLE B.1 NOTES

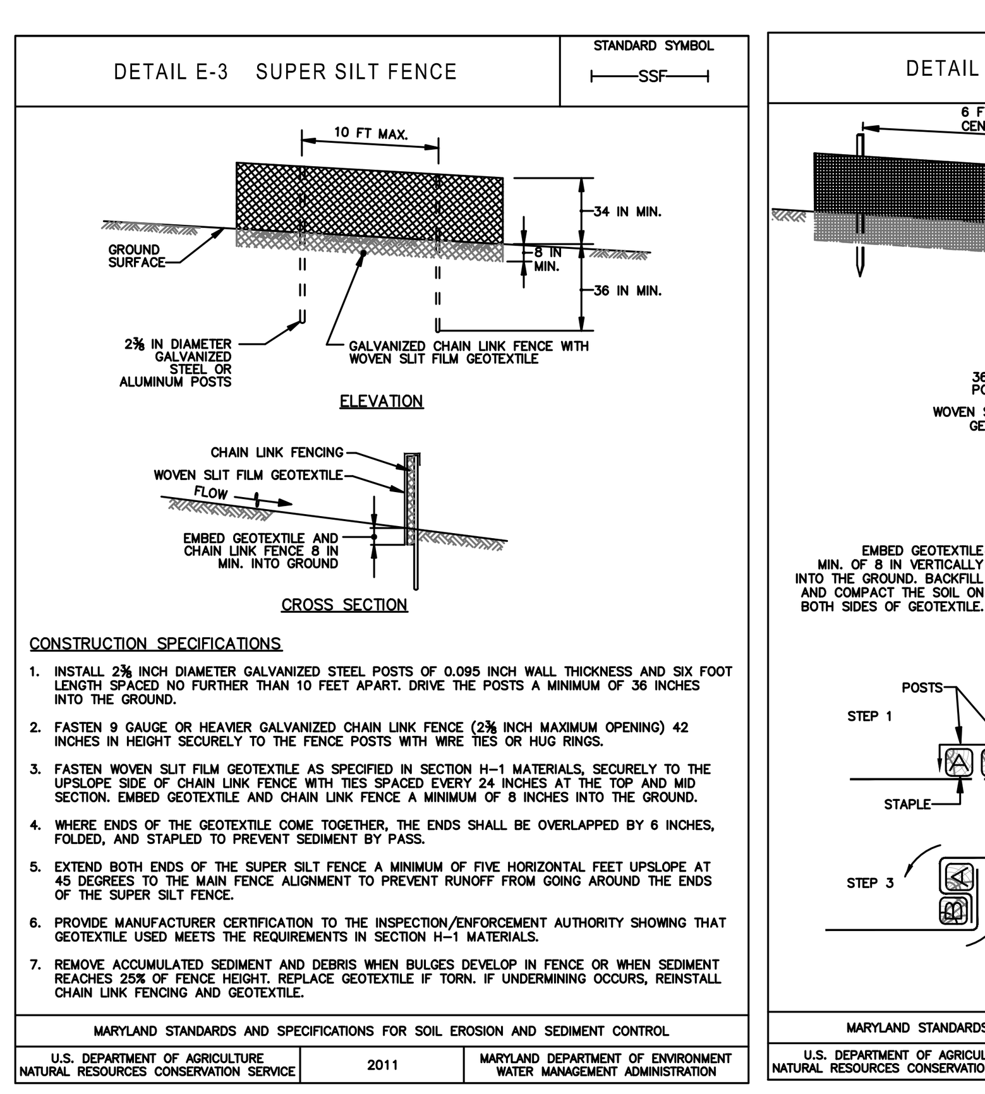
1. SEEDING RATES FOR THE WARM-SEASON GRASSES ARE IN POUNDS OF PURE LIVE SEED (PLV). ACTUAL PLANTING RATES SHALL BE ADJUSTED TO REFLECT PERCENT OF SEED GERMINATION AND PURITY, AS TESTED. ADJUSTMENTS ARE USUALLY NOT NEEDED FOR THE COOL-SEASON GRASSES.
   SEEDING RATES LISTED ABOVE ARE FOR TEMPORARY SEEDLINGS, WHEN PLANTED ALONE. WHEN PLANTED AS A NURSE CROP WITH PERMANENT SEED MIXES, USE 1/3 OF THE SEEDING RATE LISTED ABOVE FOR BARLEY, OATS AND WHEAT. FOR SMALLER-SEEDED GRASSES (ANNUAL RYEGRASS, PEARL MILLET, FOXTAIL MILLET), DO NOT EXCEED MORE THAN 5% (BY WEIGHT) OF THE OVERALL PERMANENT SEEDING MIX. CEREAL RYE GENERALLY SHOULD NOT BE USED AS A NURSE CROP, UNLESS PLANTING WILL OCCUR IN VERY LATE FALL BEYOND THE SEEDING DATES FOR OTHER TEMPORARY SEEDINGS. CEREAL RYE HAS ALLELOPATHIC PROPERTIES THAT INHIBIT THE GERMINATION AND GROWTH OF OTHER PLANTS. IF IT MUST BE USED AS A NURSE CROP, SEED AT 1/3 OF THE RATE LISTED ABOVE.
   OATS ARE THE RECOMMENDED NURSE CROP FOR WARM-SEASON GRASSES.
2. FOR SANDY SOILS, PLANT SEEDS AT TWICE THE DEPTH LISTED ABOVE.
3. THE PLANTING DATES LISTED ARE AVERAGES FOR EACH ZONE AND MAY REQUIRE ADJUSTMENT TO REFLECT LOCAL CONDITIONS, ESPECIALLY NEAR THE BOUNDARIES OF THE ZONE.

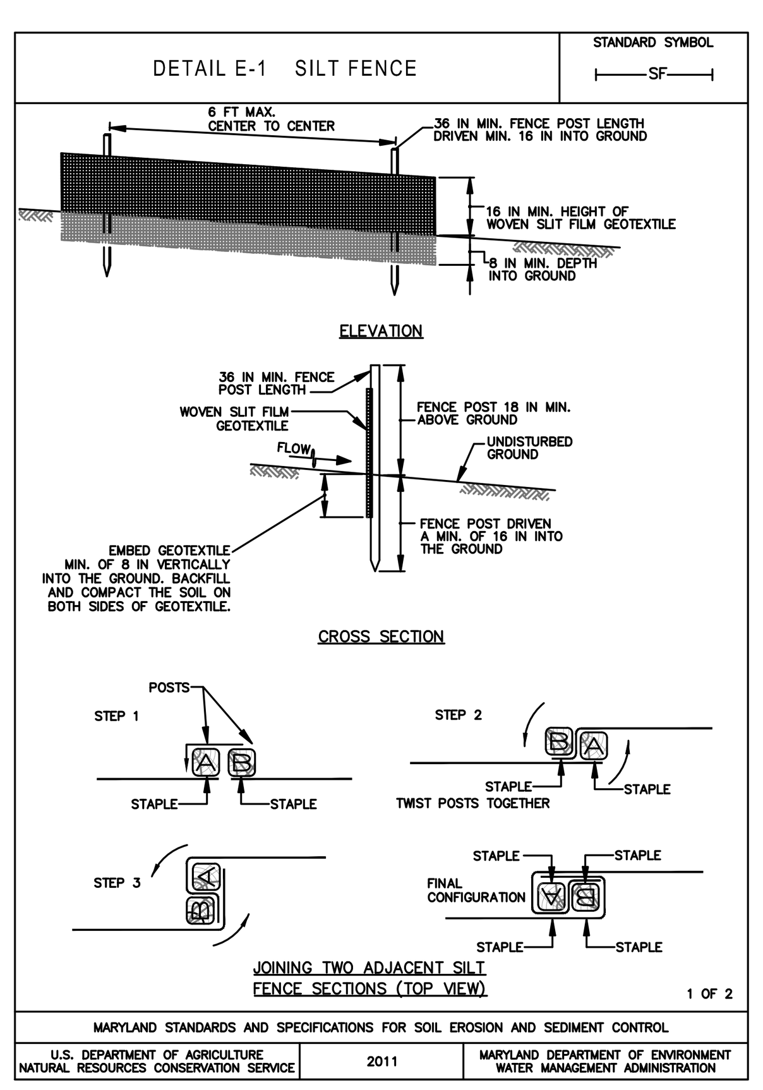
WATER/ POTABLE COOLING WATER SWM NOTES:

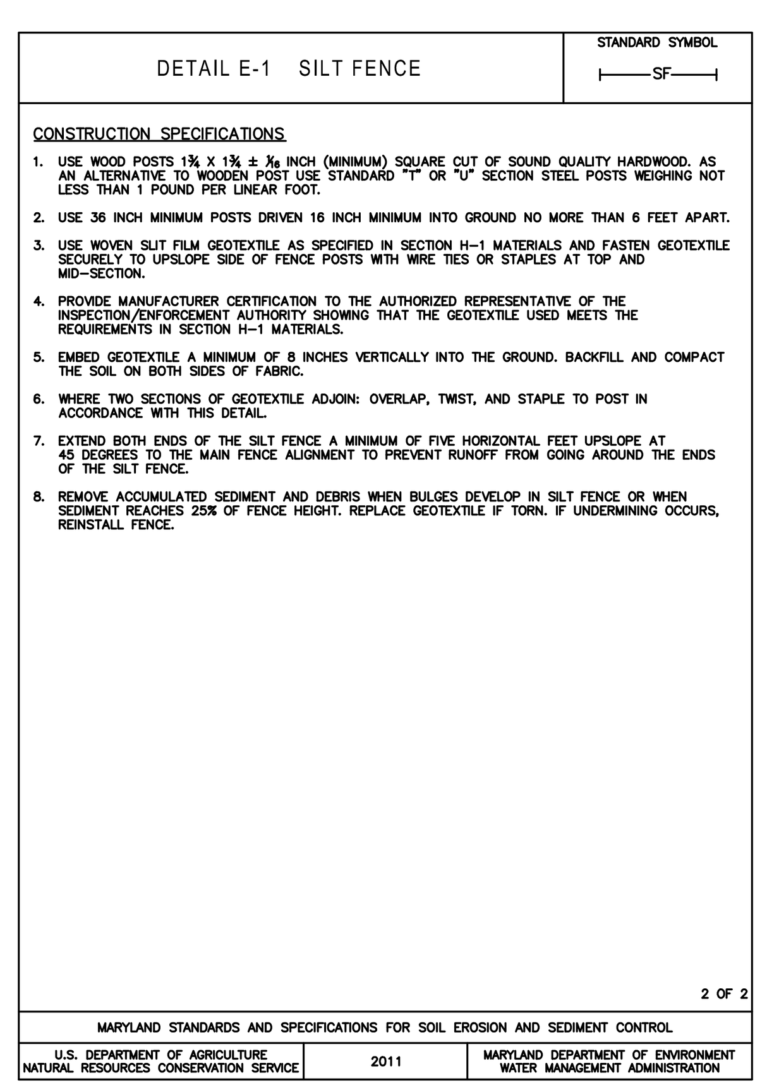
1. THE PROJECT SCOPE OF WORK CONSISTS OF LINEAR TRENCHING FOR INSTALLATION OF PROPOSED WATER & POTABLE COOLING WATER LINE IMPROVEMENTS.
2. THERE IS NO INCREASE IN IMPERVIOUS AREA PROPOSED BY THIS PLAN.
3. "BEST MANAGEMENT PRACTICES" ARE TO BE FOLLOWED FOR SITE STORMWATER MANAGEMENT:
   A. STORMWATER QUALITY MANAGEMENT SHALL BE ADDRESSED THROUGH THE USE OF VEGETATIVE FILTERING AND OTHER BEST MANAGEMENT PRACTICES AS OUTLINED IN CHAPTER 5 OF THE "2000 MARYLAND STORMWATER DESIGN MANUAL."
   B. THE AREA DISTURBED DOES NOT IMPACT ADDITIONAL WOODED AREA BEYOND THE WATER/ PCW EASEMENT LIMITS OR DEGRADE THE CURRENT LAND USE.
   C. ALL DISTURBED AREAS SHALL BE RETURNED TO A COMPARABLE OR BETTER CONDITION THAN WHAT PREVIOUSLY EXISTED.
   D. REGRADED AREAS SHALL NOT FURTHER IMPACT OTHER PROPERTIES WITH RESPECT TO DRAINAGE.
   E. THE TOP 6-INCH BACKFILL LAYER LOCATED WITHIN GRASS AND/OR OTHER PERVIOUS AREAS IS NOT TO BE COMPACTED.

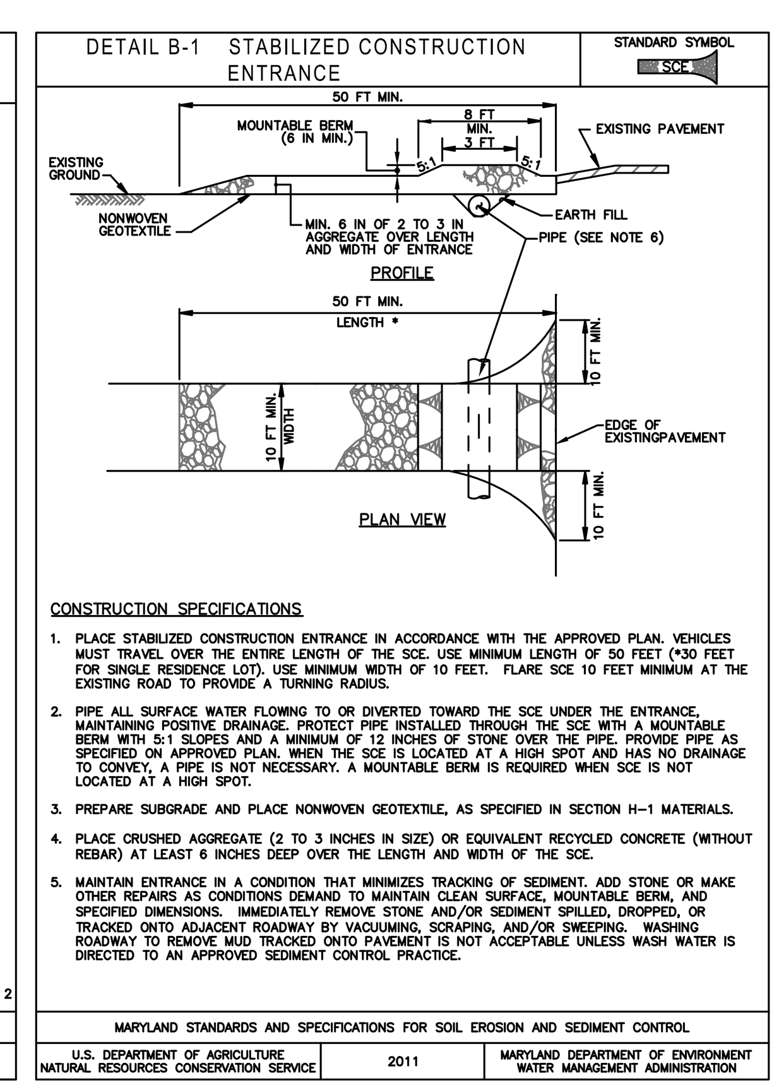
FOR SITES 1.0 ACRE OR MORE, THE FOLLOWING ARE REQUIRED:

A. MARYLAND DEPARTMENT OF THE ENVIRONMENT, GENERAL PERMIT FOR STORMWATER WITH A CONSTRUCTION ACTIVITY, NPDES PERMIT NUMBER MDR10, STATE DISCHARGE PERMIT NUMBER 09GP, OR AN INDIVIDUAL PERMIT
B. THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (GENERAL/ INDIVIDUAL PERMIT- NOTICE OF INTENT- NOI) APPLICATION AND PERMIT SHALL BE POSTED AND/OR AVAILABLE ON-SITE AT ALL TIMES.
C. DURING CONSTRUCTION, ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES (BMP'S) SHALL BE INSPECTED AND RECORDED ON THE "STANDARD INSPECTION FORM, GENERAL PERMIT FOR STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY" PER THE MARYLAND DEPARTMENT OF THE ENVIRONMENT (GENERAL/ INDIVIDUAL PERMIT- NOTICE OF INTENT- NOI).
D. ONCE ALL PORTIONS OF A SITE HAVE BEEN PERMANENTLY STABILIZED, AND ALL STORMWATER DISCHARGES FROM CONSTRUCTION SITES THAT ARE AUTHORIZED BY THE PERMIT ARE ELIMINATED, THE AUTHORIZED PERMITTEE SHALL SUBMIT THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, GENERAL/ INDIVIDUAL PERMIT- NOTICE OF TERMINATION- NOT.









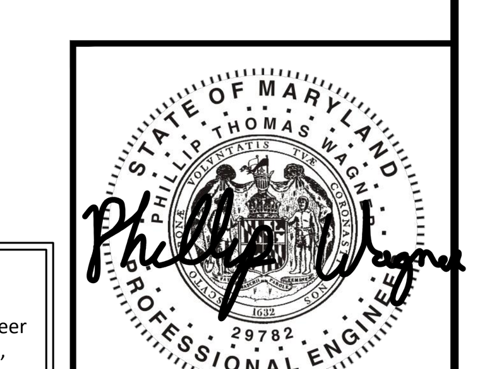
Frederick County Soil Conservation District
Erosion and Sediment Control Plan Approval

BY ______________________
District Manager or Designee

DATE ______________________
Plan is valid for 2 years from date of approval

SCD approval for sediment and erosion control is in accordance with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control and is contingent upon issuance of all applicable regulatory permits.

PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".



For Review Only

CALL "MISS UTILITY" AT
1-800-257-7777
72 Hours Before Start Of Construction

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR
____
BY ______ DATE ______

2024-04-26

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

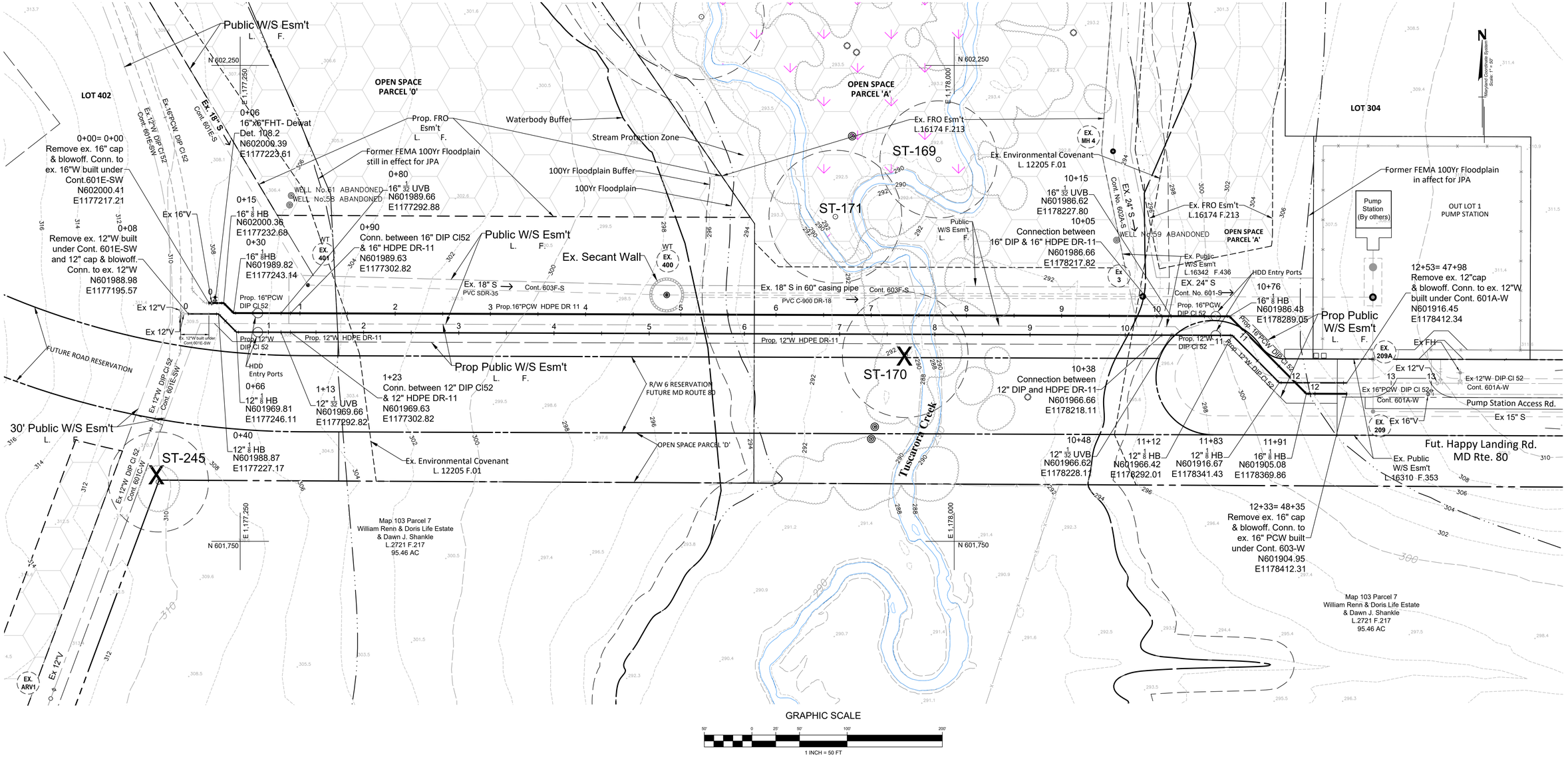
Sediment Control Plan Notes & Details

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
12"W & 16"PCW Crossing Tuscarora Creek at Happy Landing Rd

QUANTUM FREDERICK
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: NTS
JOB No. 1339A8
April, 2024
INDEX No. ND-1
SHEET No. 5 OF 9



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STATE OF MARYLAND · PHILLIP THOMAS WAGNER · 29782 · PROFESSIONAL ENGINEER

For Review Only

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE ☐

2024-04-26

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. -W

Water & Potable Cooling Water Plan

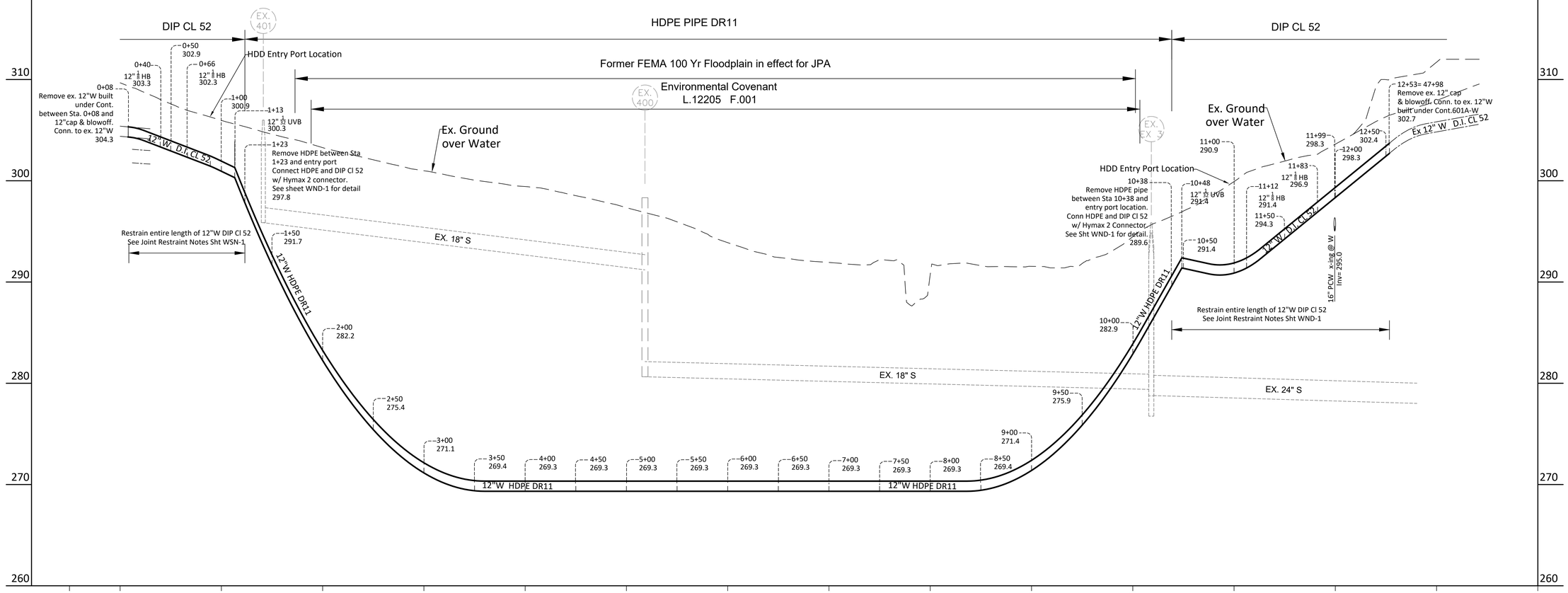
RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
12"W & 16"PCW Crossing Tuscarora Creek at Happy Landing Rd

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	1"=50'
JOB No.	1339A8
	April, 2024
INDEX No.	UP-1
SHEET No.	6 OF 9



12"W at Stream Crossing

Profile Baseline= C/L of Water

GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

Profile Scales:
Horiz:1"=50'
Vert: 1"=5'

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

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STATE OF MARYLAND · THOMAS PHILLIP WAGNER · 29782 · PROFESSIONAL ENGINEER

For Review Only

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY DATE

2024-04-26

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. -W

12" Water Profile

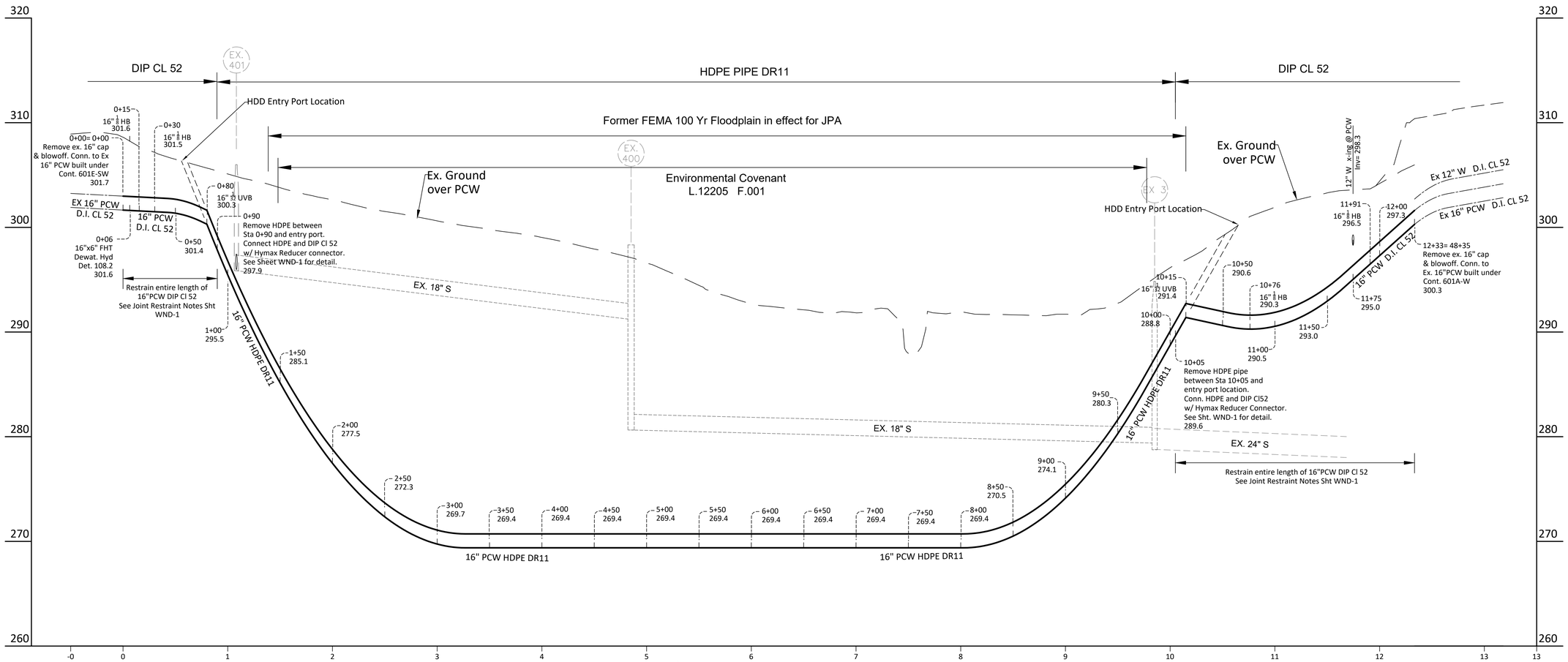
RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
12"W & 16"PCW Crossing Tuscarora Creek at Happy Landing Rd

QUANTUM FREDERICK

Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	As shown
JOB No.	1339A8
	April, 2024
INDEX No.	WP-1
SHEET No.	7 OF 9



16"PCW at Stream Crossing

Profile Baseline= C/L of PCW

GRAPHIC SCALE

50' 0 25' 50' 100' 200'

1 INCH = 50 FT

Profile Scales:
Horiz:1"=50'
Vert: 1"=5'

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STATE OF MARYLAND · PHILLIP THOMAS WRIGHT · 29782 · PROFESSIONAL ENGINEER

For Review Only

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____ BY _____ DATE _____

2024.04.26

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

Contract No. -W

16" Potable Cooling Water Profile

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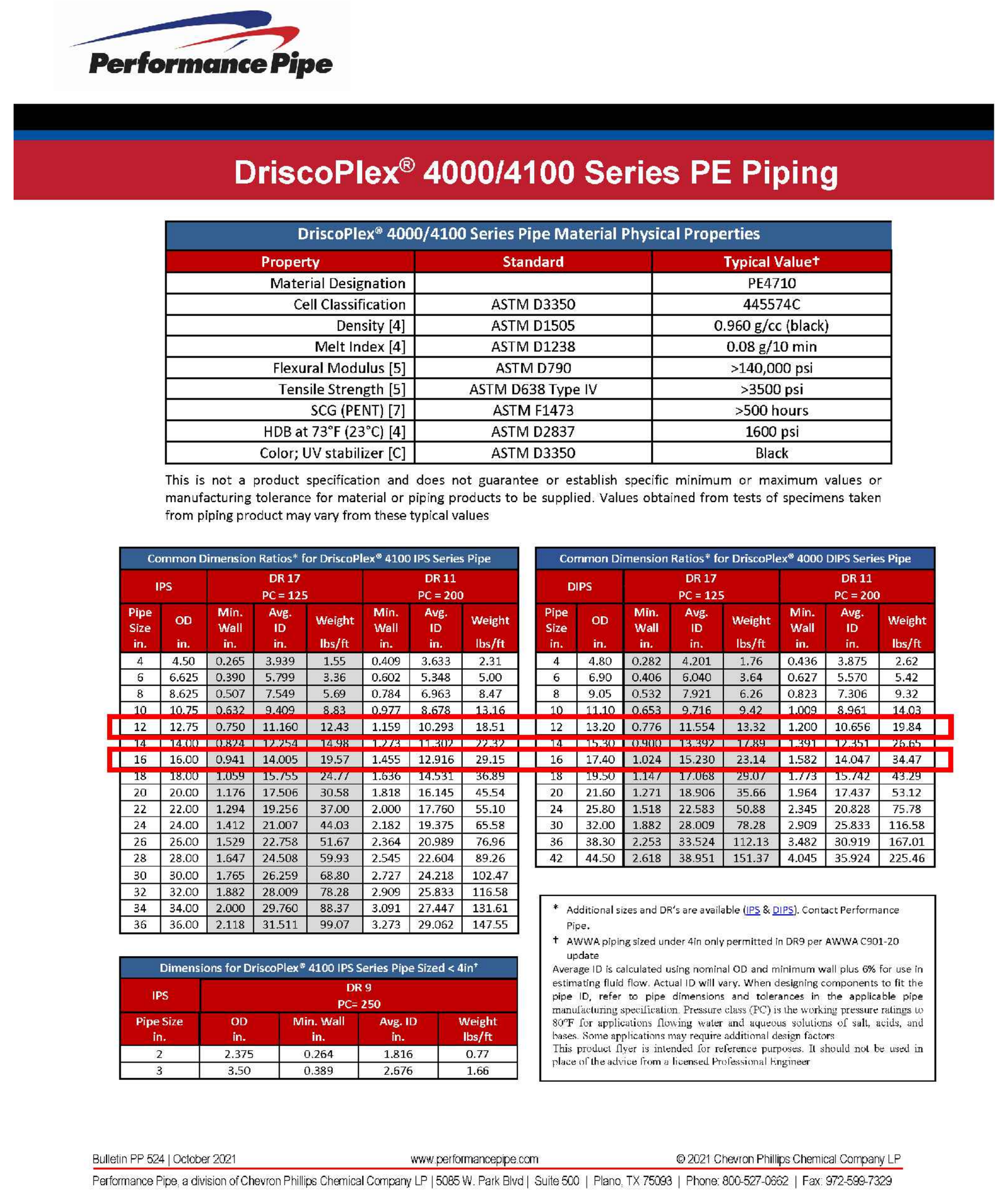
Combined Stormwater Management Development and Improvement Plan
12"W & 16"PCW Crossing Tuscarora Creek at Happy Landing Rd

QUANTUM FREDERICK
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE:	As shown
JOB No.	1339A8
	April, 2024
INDEX No.	WP-2
SHEET No.	8 OF 9



Performance Pipe

DriscoPlex® 4000/4100 Series PE Piping

DriscoPlex® 4000/4100 Series Pipe Material Physical Properties		
Property	Standard	Typical Value†
Material Designation		PE4710
Cell Classification	ASTM D3350	445574C
Density [4]	ASTM D1505	0.960 g/cc (black)
Melt Index [4]	ASTM D1238	0.08 g/10 min
Flexural Modulus [5]	ASTM D790	>140,000 psi
Tensile Strength [5]	ASTM D638 Type IV	>3500 psi
SCG (PENT) [7]	ASTM F1473	>500 hours
HDB at 73°F (23°C) [4]	ASTM D2837	1600 psi
Color; UV stabilizer [C]	ASTM D3350	Black

This is not a product specification and does not guarantee or establish specific minimum or maximum values or manufacturing tolerance for material or piping products to be supplied. Values obtained from tests of specimens taken from piping product may vary from these typical values

Common Dimension Ratios* for DriscoPlex® 4100 IPS Series Pipe

IPS		DR 17 PC = 125			DR 11 PC = 200		
Pipe Size in.	OD in.	Min. Wall in.	Avg. ID in.	Weight lbs/ft	Min. Wall in.	Avg. ID in.	Weight lbs/ft
4	4.50	0.265	3.939	1.55	0.409	3.633	2.31
6	6.625	0.390	5.799	3.36	0.602	5.348	5.00
8	8.625	0.507	7.549	5.69	0.784	6.963	8.47
10	10.75	0.632	9.409	8.83	0.977	8.678	13.16
12	12.75	0.750	11.160	12.43	1.159	10.293	18.51
14	14.00	0.824	12.254	14.98	1.273	11.302	22.32
16	16.00	0.941	14.005	19.57	1.455	12.916	29.15
18	18.00	1.059	15.755	24.77	1.636	14.531	36.89
20	20.00	1.176	17.506	30.58	1.818	16.145	45.54
22	22.00	1.294	19.256	37.00	2.000	17.760	55.10
24	24.00	1.412	21.007	44.03	2.182	19.375	65.58
26	26.00	1.529	22.758	51.67	2.364	20.989	76.96
28	28.00	1.647	24.508	59.93	2.545	22.604	89.26
30	30.00	1.765	26.259	68.80	2.727	24.218	102.47
32	32.00	1.882	28.009	78.28	2.909	25.833	116.58
34	34.00	2.000	29.760	88.37	3.091	27.447	131.61
36	36.00	2.118	31.511	99.07	3.273	29.062	147.55

Common Dimension Ratios* for DriscoPlex® 4000 DIPS Series Pipe

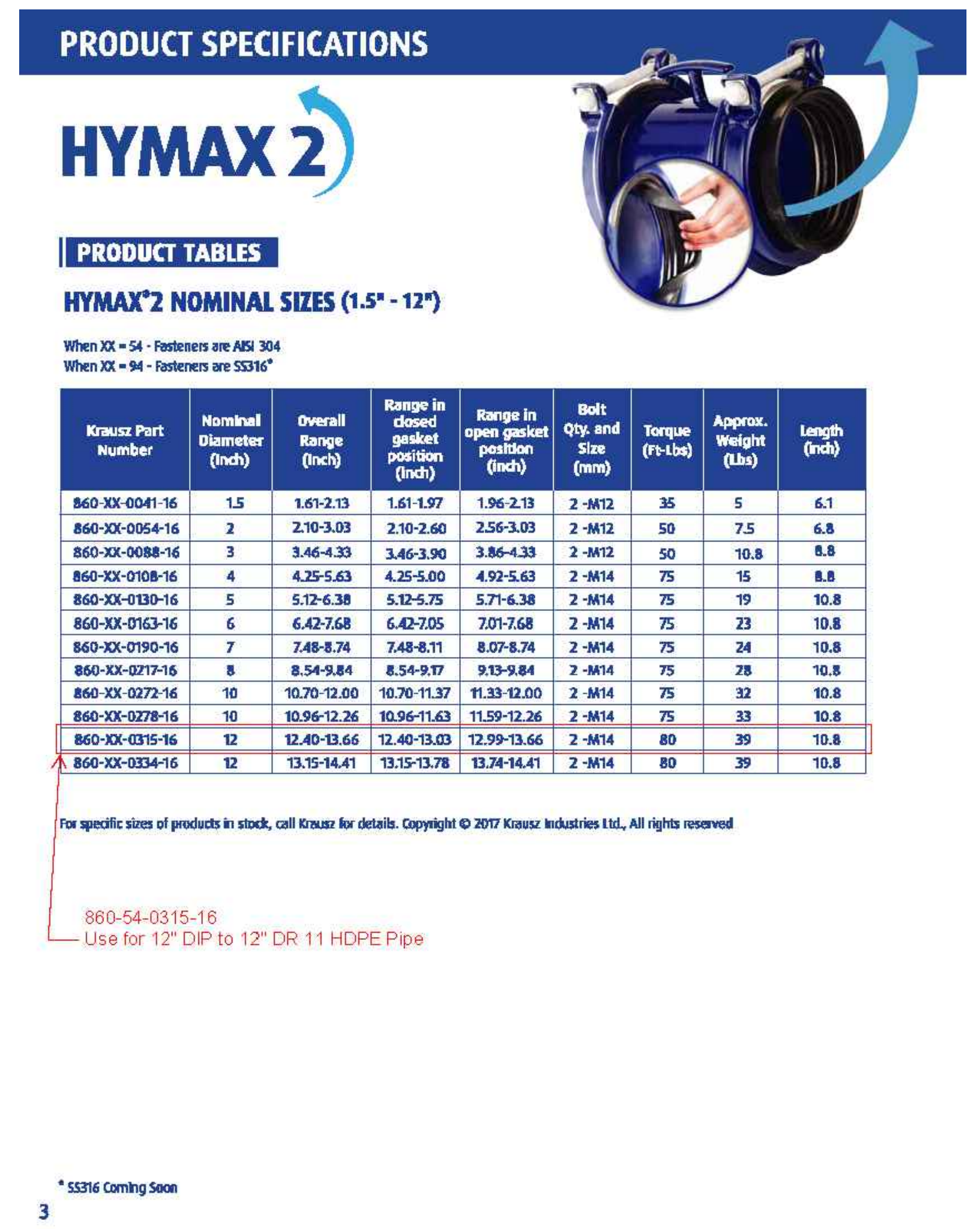
DIPS		DR 17 PC = 125			DR 11 PC = 200		
Pipe Size in.	OD in.	Min. Wall in.	Avg. ID in.	Weight lbs/ft	Min. Wall in.	Avg. ID in.	Weight lbs/ft
4	4.80	0.282	4.201	1.76	0.436	3.875	2.62
6	6.90	0.406	6.040	3.64	0.627	5.570	5.42
8	9.05	0.532	7.921	6.26	0.823	7.306	9.32
10	11.10	0.653	9.716	9.42	1.009	8.961	14.03
12	13.20	0.776	11.554	13.32	1.200	10.656	19.84
14	15.30	0.900	13.392	17.89	1.391	12.351	26.65
16	17.40	1.024	15.230	23.14	1.582	14.047	34.47
18	19.50	1.147	17.068	29.07	1.773	15.742	43.29
20	21.60	1.271	18.906	35.66	1.964	17.437	53.12
24	25.80	1.518	22.583	50.88	2.345	20.828	75.78
30	32.00	1.882	28.009	78.28	2.909	25.833	116.58
36	38.30	2.253	33.524	112.13	3.482	30.919	167.01
42	44.50	2.618	38.951	151.37	4.045	35.924	225.46

Dimensions for DriscoPlex® 4100 IPS Series Pipe Sized < 4in†

IPS	DR 9 PC= 250			
Pipe Size in.	OD in.	Min. Wall in.	Avg. ID in.	Weight lbs/ft
2	2.375	0.264	1.816	0.77
3	3.50	0.389	2.676	1.66

* Additional sizes and DR's are available (IPS & DIPS). Contact Performance Pipe.
† AWWA piping sized under 4in only permitted in DR9 per AWWA C901-20 update
Average ID is calculated using nominal OD and minimum wall plus 6% for use in estimating fluid flow. Actual ID will vary. When designing components to fit the pipe ID, refer to pipe dimensions and tolerances in the applicable pipe manufacturing specification. Pressure class (PC) is the working pressure ratings to 80°F for applications flowing water and aqueous solutions of salt, acids, and bases. Some applications may require additional design factors. This product flyer is intended for reference purposes. It should not be used in place of the advice from a licensed Professional Engineer

Bulletin PP 524 | October 2021 www.performancepipe.com © 2021 Chevron Phillips Chemical Company LP
Performance Pipe, a division of Chevron Phillips Chemical Company LP | 5085 W. Park Blvd | Suite 500 | Plano, TX 75093 | Phone: 800-527-0662 | Fax: 972-599-7329



PRODUCT SPECIFICATIONS

HYMAX 2

PRODUCT TABLES

HYMAX®2 NOMINAL SIZES (1.5" - 12")

When XX = 54 - Fasteners are AISI 304
When XX = 94 - Fasteners are SS316*

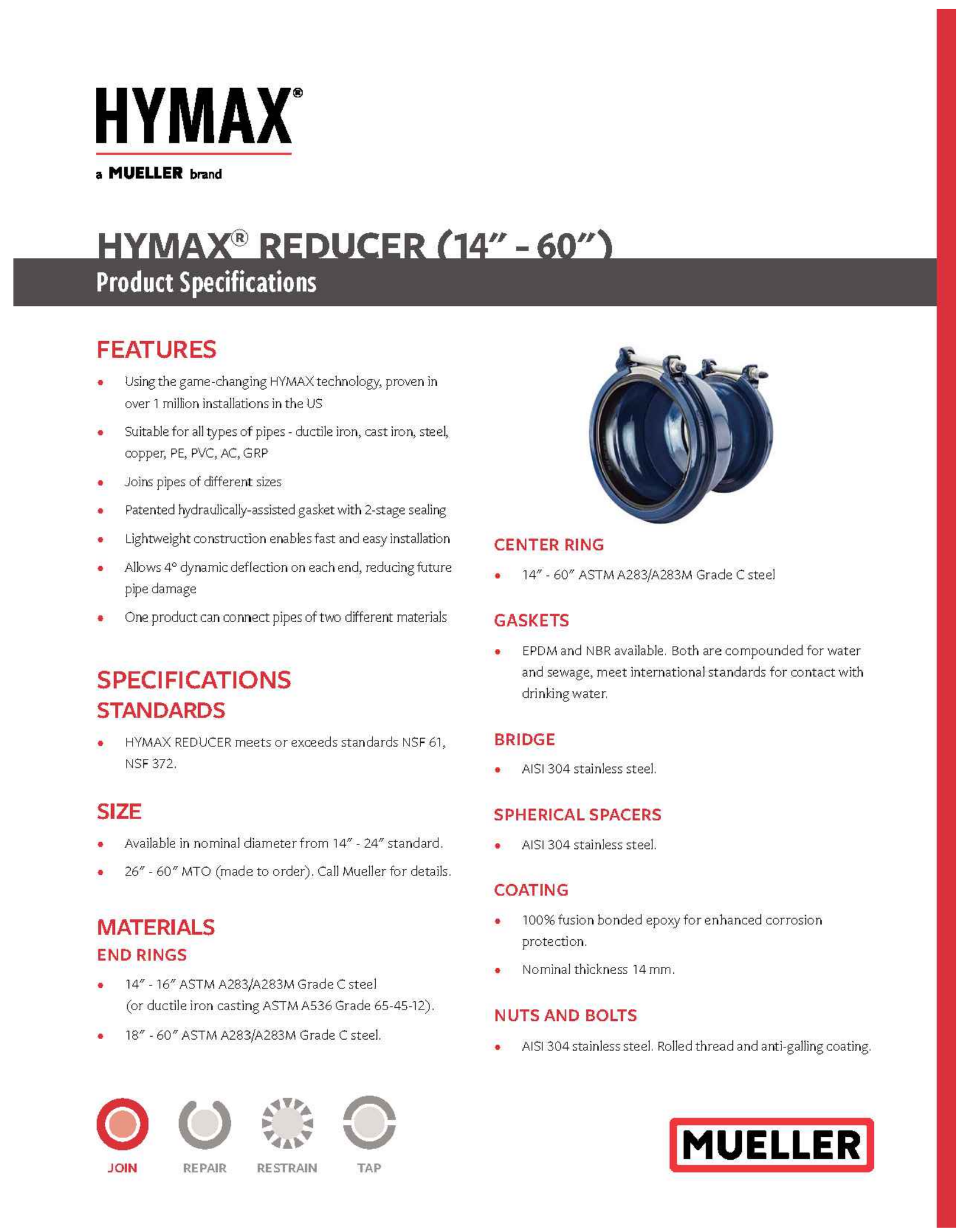
Krausz Part Number	Nominal Diameter (Inch)	Overall Range (Inch)	Range in closed gasket position (Inch)	Range in open gasket position (Inch)	Bolt Qty. and Size (mm)	Torque (Ft-Lbs)	Approx. Weight (Lbs)	Length (Inch)
860-XX-0041-16	1.5	1.61-2.13	1.61-1.97	1.96-2.13	2 -M12	35	5	6.1
860-XX-0054-16	2	2.10-3.03	2.10-2.60	2.56-3.03	2 -M12	50	7.5	6.8
860-XX-0088-16	3	3.46-4.33	3.46-3.90	3.86-4.33	2 -M12	50	10.8	8.8
860-XX-0108-16	4	4.25-5.63	4.25-5.00	4.92-5.63	2 -M14	75	15	8.8
860-XX-0130-16	5	5.12-6.38	5.12-5.75	5.71-6.38	2 -M14	75	19	10.8
860-XX-0163-16	6	6.42-7.68	6.42-7.05	7.01-7.68	2 -M14	75	23	10.8
860-XX-0190-16	7	7.48-8.74	7.48-8.11	8.07-8.74	2 -M14	75	24	10.8
860-XX-0217-16	8	8.54-9.84	8.54-9.17	9.13-9.84	2 -M14	75	28	10.8
860-XX-0272-16	10	10.70-12.00	10.70-11.37	11.33-12.00	2 -M14	75	32	10.8
860-XX-0278-16	10	10.96-12.26	10.96-11.63	11.59-12.26	2 -M14	75	33	10.8
860-XX-0315-16	12	12.40-13.66	12.40-13.03	12.99-13.66	2 -M14	80	39	10.8
860-XX-0334-16	12	13.15-14.41	13.15-13.78	13.74-14.41	2 -M14	80	39	10.8

For specific sizes of products in stock, call Krausz for details. Copyright © 2017 Krausz Industries Ltd., All rights reserved

860-54-0315-16
Use for 12" DIP to 12" DR 11 HDPE Pipe

* SS316 Coming Soon

3



HYMAX®
a MUELLER brand

HYMAX® REDUCER (14" - 60")

Product Specifications

FEATURES

- Using the game-changing HYMAX technology, proven in over 1 million installations in the US
- Suitable for all types of pipes - ductile iron, cast iron, steel, copper, PE, PVC, AC, GRP
- Joins pipes of different sizes
- Patented hydraulically-assisted gasket with 2-stage sealing
- Lightweight construction enables fast and easy installation
- Allows 4° dynamic deflection on each end, reducing future pipe damage
- One product can connect pipes of two different materials

SPECIFICATIONS

STANDARDS

- HYMAX REDUCER meets or exceeds standards NSF 61, NSF 372.

SIZE

- Available in nominal diameter from 14" - 24" standard.
- 26" - 60" MTO (made to order). Call Mueller for details.

MATERIALS

END RINGS

- 14" - 16" ASTM A283/A283M Grade C steel (or ductile iron casting ASTM A536 Grade 65-45-12).
- 18" - 60" ASTM A283/A283M Grade C steel.

CENTER RING

- 14" - 60" ASTM A283/A283M Grade C steel

GASKETS

- EPDM and NBR available. Both are compounded for water and sewage, meet international standards for contact with drinking water.

BRIDGE

- AISI 304 stainless steel.

SPHERICAL SPACERS

- AISI 304 stainless steel.

COATING

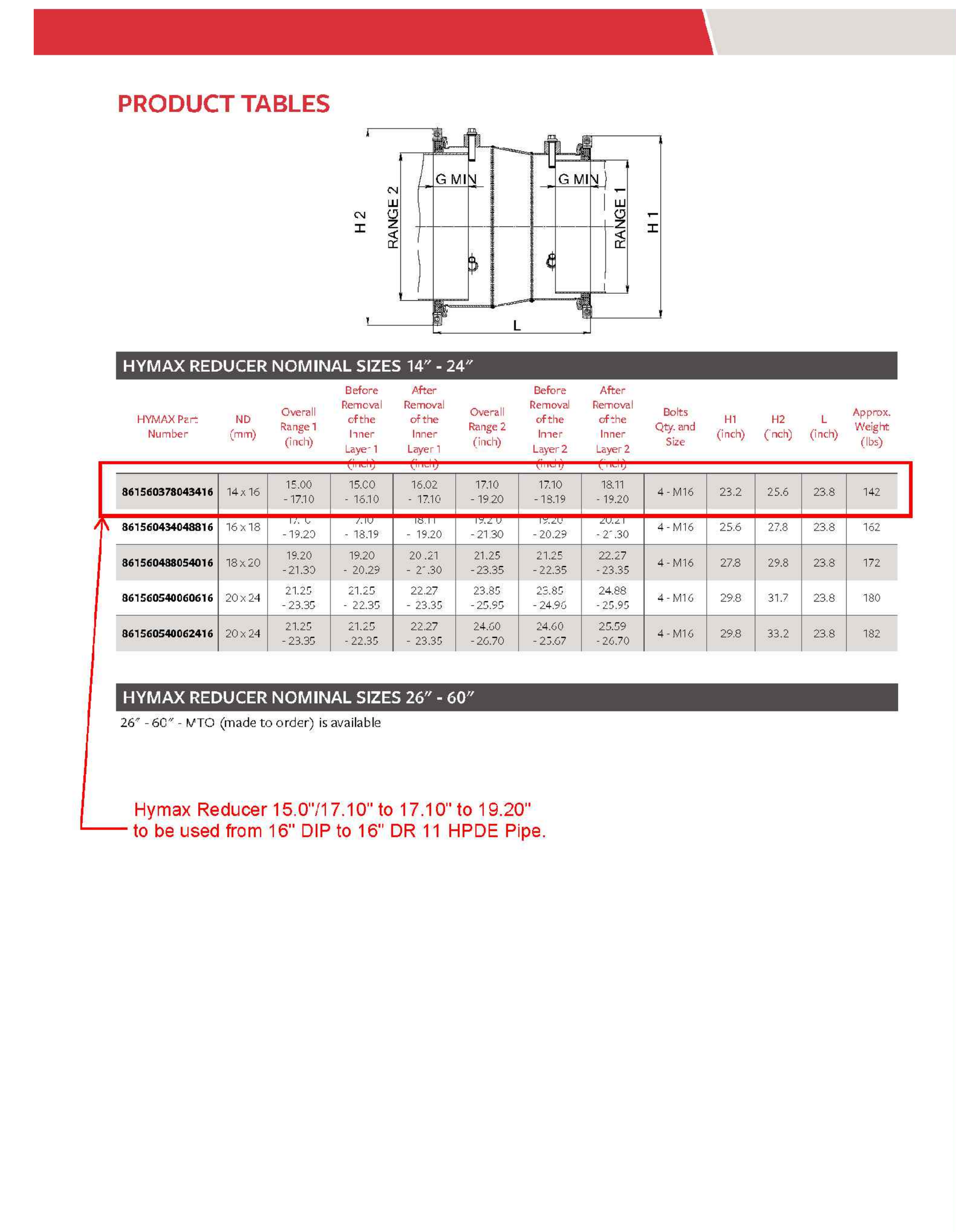
- 100% fusion bonded epoxy for enhanced corrosion protection.
- Nominal thickness 14 mm.

NUTS AND BOLTS

- AISI 304 stainless steel. Rolled thread and anti-galling coating.

JOIN REPAIR RESTRAIN TAP

MUELLER



PRODUCT TABLES

HYMAX REDUCER NOMINAL SIZES 14" - 24"

HYMAX Part Number	ND (mm)	Overall Range 1 (inch)	Before Removal of the Inner Layer 1 (inch)	After Removal of the Inner Layer 1 (inch)	Overall Range 2 (inch)	Before Removal of the Inner Layer 2 (inch)	After Removal of the Inner Layer 2 (inch)	Bolts Qty. and Size	H1 (inch)	H2 (inch)	L (inch)	Approx. Weight (lbs)
861560378043416	14 x 16	15.00 - 17.10	15.00 - 16.10	16.02 - 17.10	17.10 - 19.20	17.10 - 18.19	18.11 - 19.20	4 - M16	23.2	25.6	23.8	142
861560434048816	16 x 18	17.10 - 19.20	17.10 - 18.19	18.11 - 19.20	19.20 - 21.30	19.20 - 20.29	20.21 - 21.30	4 - M16	25.6	27.8	23.8	162
861560488054016	18 x 20	19.20 - 21.30	19.20 - 20.29	20.21 - 21.30	21.25 - 23.35	21.25 - 22.35	22.27 - 23.35	4 - M16	27.8	29.8	23.8	172
861560540060616	20 x 24	21.25 - 23.35	21.25 - 22.35	22.27 - 23.35	23.85 - 25.95	23.85 - 24.96	24.88 - 25.95	4 - M16	29.8	31.7	23.8	180
861560540062416	20 x 24	21.25 - 23.35	21.25 - 22.35	22.27 - 23.35	24.60 - 26.70	24.60 - 25.67	25.59 - 26.70	4 - M16	29.8	33.2	23.8	182

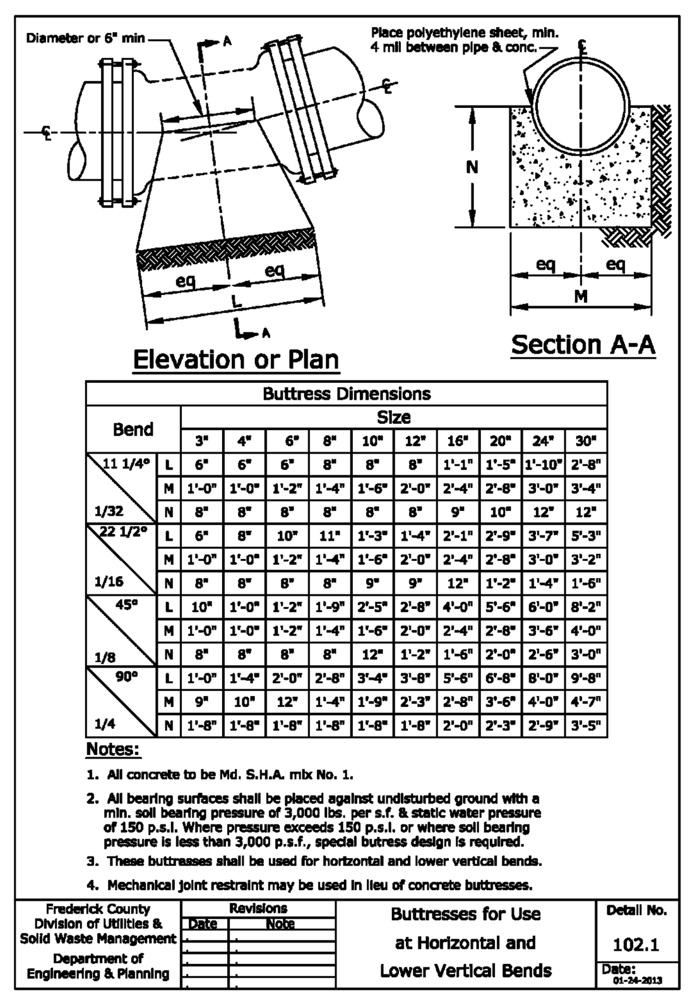
HYMAX REDUCER NOMINAL SIZES 26" - 60"

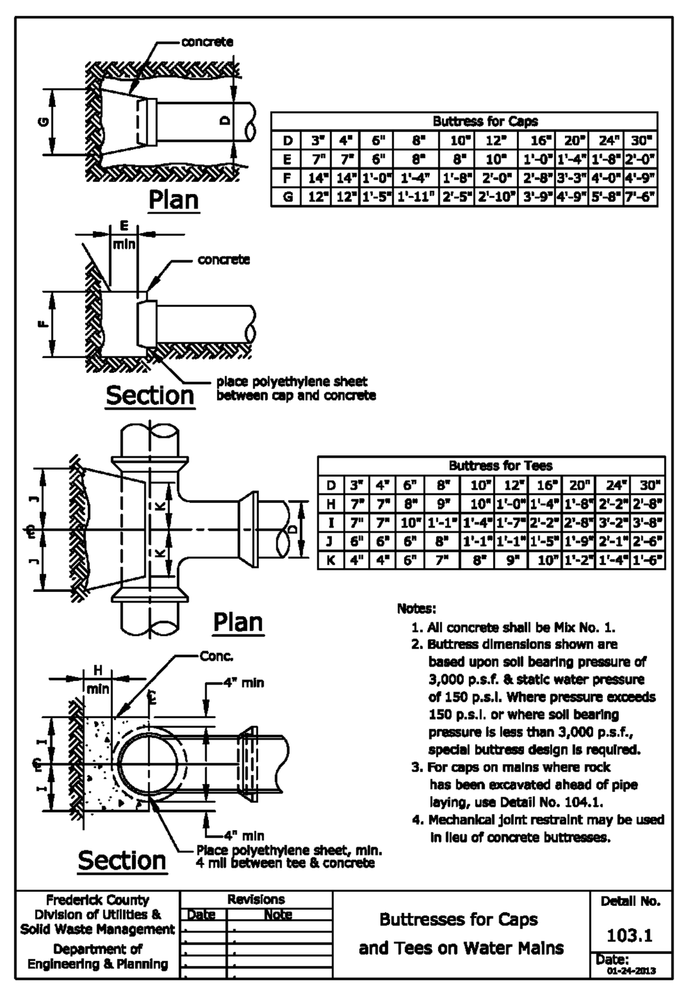
26" - 60" - MTO (made to order) is available

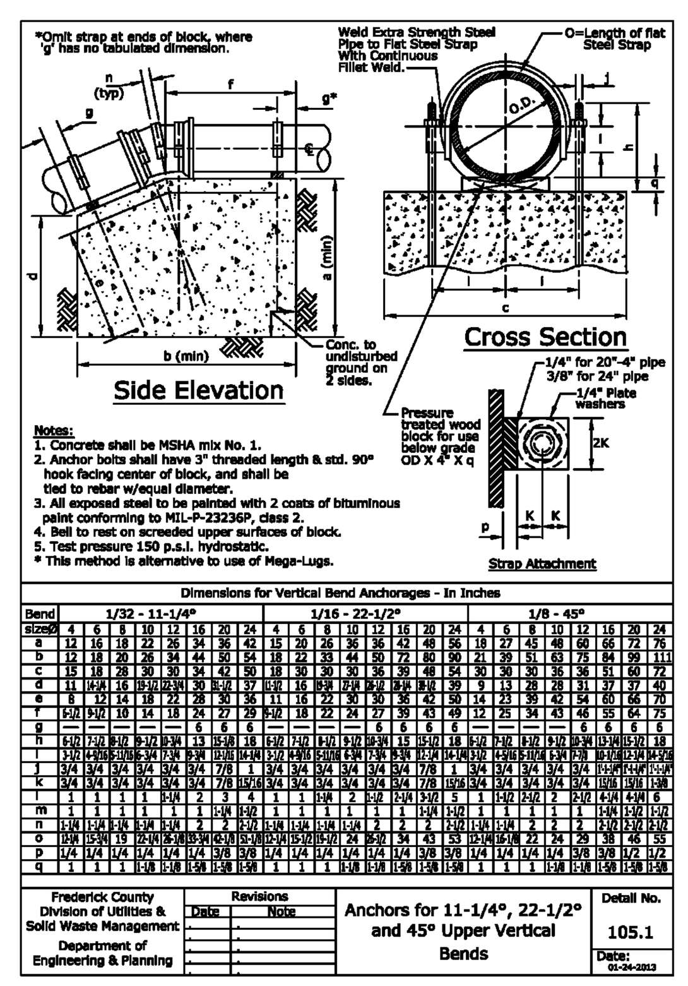
Hymax Reducer 15.0"/17.10" to 17.10" to 19.20"
to be used from 16" DIP to 16" DR 11 HPDE Pipe.

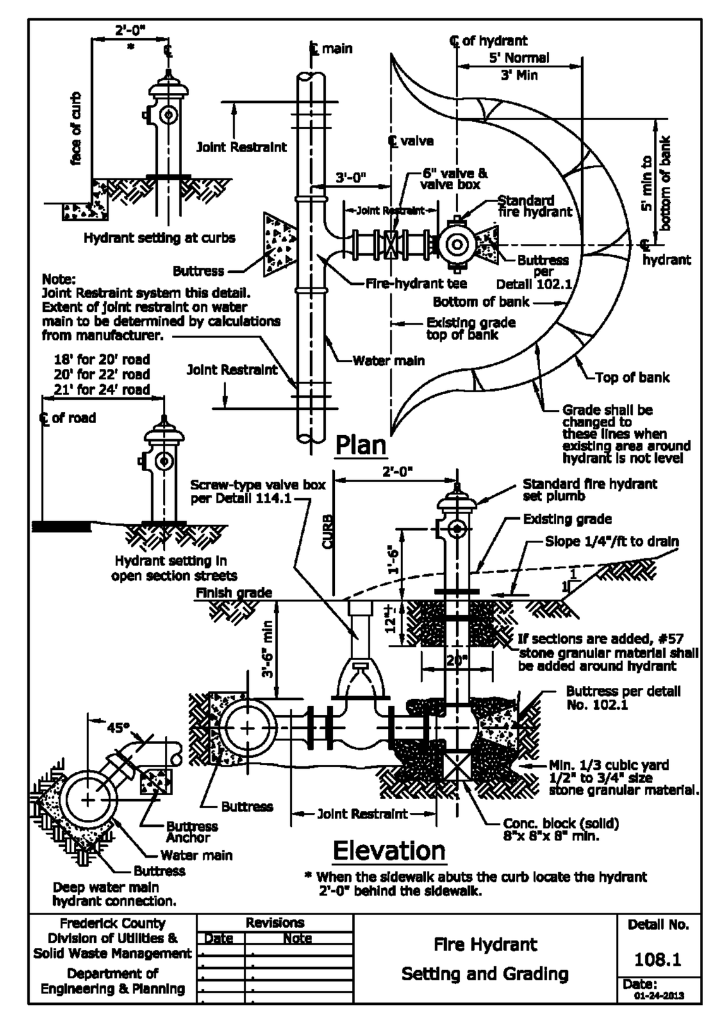
WATER GENERAL NOTES

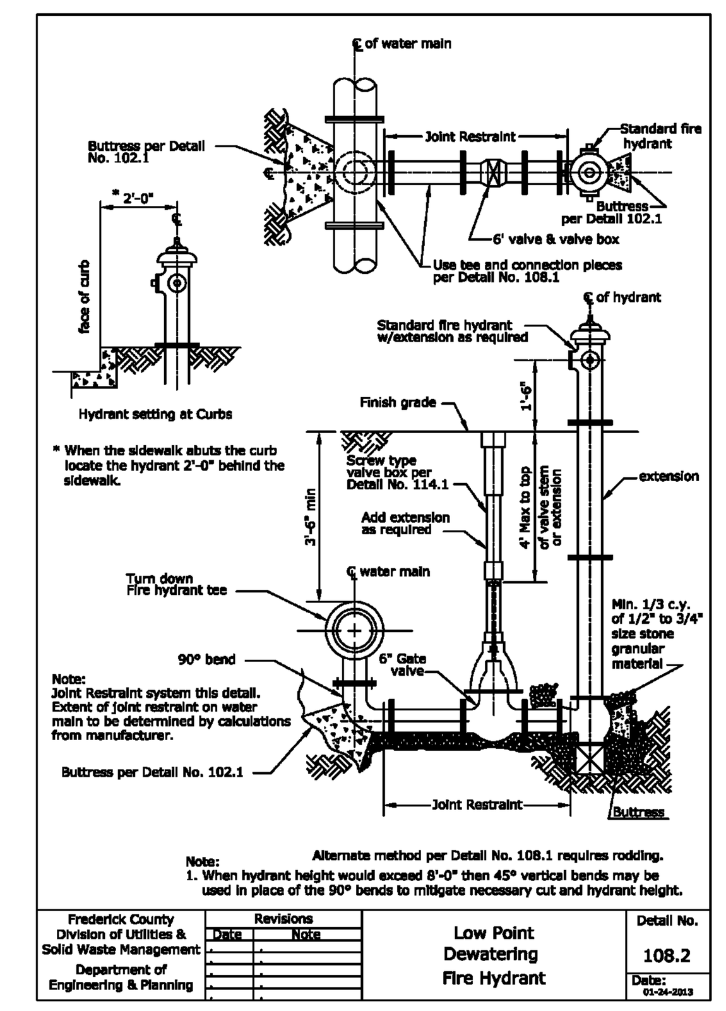
1. All 8" water main and larger to be Ductile Iron CL.52 -Double Cement lined unless otherwise noted. HDPE pipe D-11 to be utilized for water line installed by horizontal directional drilling. All 6" and smaller water main to be Ductile Iron, CL. 54 unless otherwise noted.
2. All pipe elevations shown are invert elevations unless otherwise indicated.
3. Developer shall set all property pipes and c/l stations necessary to stake out this construction.
4. All water and non-potable water construction shall be in accordance with the latest addition of Frederick County General Conditions and Standard Specifications for Water Mains, Sanitary Sewer and Related Structures, Special Provisions and amendments thereto. For details not shown on the contract drawings, see Frederick County Standard Details.
5. The contractor shall not tap or penetrate existing sewer mains without approval from Frederick County DWSU.
6. The contractor shall not operate valves on existing county owned mains.
7. Contractor to assume all responsibility in verifying locations and elevations of all existing underground utilities in the vicinity of this construction. The contractor shall locate existing utilities a minimum of two weeks in advance of construction operations in the vicinity of proposed utilities and at his own expense.
8. Existing utilities are shown from best available records. the contractor shall test pit in the area of known utilities to verify size, elevation, location and type prior to performing any work. any utility, whether shown or not, that is damaged by the contractor shall be repaired immediately at no expense to the owner. Should the contractor discover discrepancies between the plans and field conditions, the owner/ engineer is to be notified immediately. Should the contractor make field corrections or adjustments without the authorization of the owner, then the contractor assumes the responsibility for said corrections or adjustments.
9. Clear all utilities by a minimum of 1' - 0" vertically. Clear all poles by 7'-0" horizontally or tunnel as required. Cost for tunneling or bracing at poles shall be included in the unit price bid for water & sewer construction. Water mains shall be laid at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank , or subsoil treatment system. The distance shall be measured edge to edge. Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible.
10. Any necessary adjustments to existing manholes, valve boxes, etc., are to be done so by the contractor. The contractor is responsible for removing and replacing any existing fences, driveways, signs, drainage pipes, mailboxes, shrubs, trees, etc. damaged or removed during construction. All disturbed areas shall be returned to their original condition or better.
11. The contractor shall notify MISS UTILITY (1-800-257-7777) 5 days prior to start of construction.
12. All material stockpiles left at the end of each work day require stabilization until the next redisturbance.
13. Contractor shall repair/ replace any damaged sediment control devices during the same working day.
14. Maintain a minimum of 10'-0" horizontal clearance between water and sewer mains, and 5'-0" horizontal between all other utilities.
15. For details not shown on the contract drawings, see Frederick County standard details.
16. For materials and construction methods, use Frederick County standard specifications.
17. During pumping operation, no water will be discharged directly across the ground or into any existing body of water or stream, without first being pumped to an approved temporary sediment trap/ desilting structure. See SCD approved sediment control plan.
18. For required sediment control measures see SCD approved Sediment Control plan.
19. The developer shall rough grade to within one half foot of finished subgrade in areas of water and sewer installation prior to starting any trenching work for the water and sewer lines.
20. Owner/Developer/Contractor Responsibilities for Subgrade:
   A. The Contractor shall ensure that the ground elevation over the water and/or sewer line locations, is within six (6) inches of finished grade (outside roadway) or at the road subgrade elevation (within roadway) prior to the start of any excavation or trenching of water and/or sewer lines. Cut sheets prepared by the Contractor shall be presented to the inspector sufficiently in advance of the work being done (this advance notice to be determined by the inspector during the preconstruction meeting). The inspector reserves the right to withhold payment and/or to stop work if cut sheets are not provided in a timely fashion.
   B. If after installation of water and/or sewer facilities there exists a conflict with other utilities (shown as future), the relocation, adjustment, replacement, etc. of said water and sewer will be affected pursuant to Article 16 of the General Conditions and Standard Specifications.
   C. If subgrade is shown as controlled fill or fill beneath the water and/or sanitary sewer, the mass grading Engineer of Record shall certify the entire portion of the mass graded area has been installed pursuant to the Section 2200 where water and/or sewer lines are to be installed.
21. All proposed water shown on this plan to be installed by a combination of horizontal directional drilling and open cut method.
22. The contractor shall maintain access to all property owners at all times. the contractor, with owner approval, will coordinate with property owners if access must be interrupted for short time periods.
23. The contractor is responsible to avoid the spillage of raw sewage. The contractor shall furnish necessary equipment (sewer plugging, pumping, containment, etc.) to prevent said spillage.
24. The contractor shall be responsible for keeping silt and debris out of the storm drainage system for the duration of the contract.
25. Waterline bacterial testing requirement: disinfection and verification testing will be performed in accordance with AWWA C651-05, or latest edition. The contractor shall be required to have bacterial testing performed on all new water mains to demonstrate bacterial levels meet State MDE requirements prior to the County granting conditional acceptance of the contract. Requirements include but are not limited to obtaining two consecutive sets of acceptable samples that are collected a minimum of 24 hours apart. One sample shall be collected for residual chlorine, total coliform, and e. coli analysis for: every 1200 feet of pipeline; at the end of each branch; and at the end of the line. After disinfection the line must be flushed. Chlorine residual samples must yield a result of 1.0 ppm or less before total coliform or e. coli analysis may be performed. All sample collections shall be performed by individuals certified for drinking water sample collection by the Maryland Department of Environment. Laboratories utilized for the analysis shall be certified by the Maryland Department of Environment for total coliform and e. coli analysis. If the contractor has allowed contaminants to enter the pipe during construction (this shall be determined by inspector) then sampling may be required at reduced distance intervals as determined by the DWSU. Disinfected water (of chlorine residual 1.0 ppm or less) will stand in the line for at least 16 hours after a final flush. Certified bacterial test results shall be provided to the DWSU and shall include certification information for both the sample collector and laboratory.
26. In compliance with COMAR 09.20.01.3 and the Safe Drinking Water Act (Section 1417(a)(4)(8), materials that come in contact with water intended for use in public water supply shall comply with the Reduction of Lead in Drinking Water Act, which went into effect in Maryland in January 2012.
27. In accordance with Code of Maryland Regulations (COMAR) 26.04.01.33, Direct and Indirect Additives, suppliers of water shall only use products (any materials that come in contact with water intended for use in public water supply) that meet the applicable American National Standards Institute/ NSF International (ANSI / NSF) standards for direct or indirect drinking water additives. The products can also be certified by an organization accredited by the ANSI for such testing (i.e., International Association of Plumbing and Mechanical Officials Research and Testing, Ontario CA, Underwriters Laboratory, Northbrook, IL, and Water Quality Association, Lisle, IL).

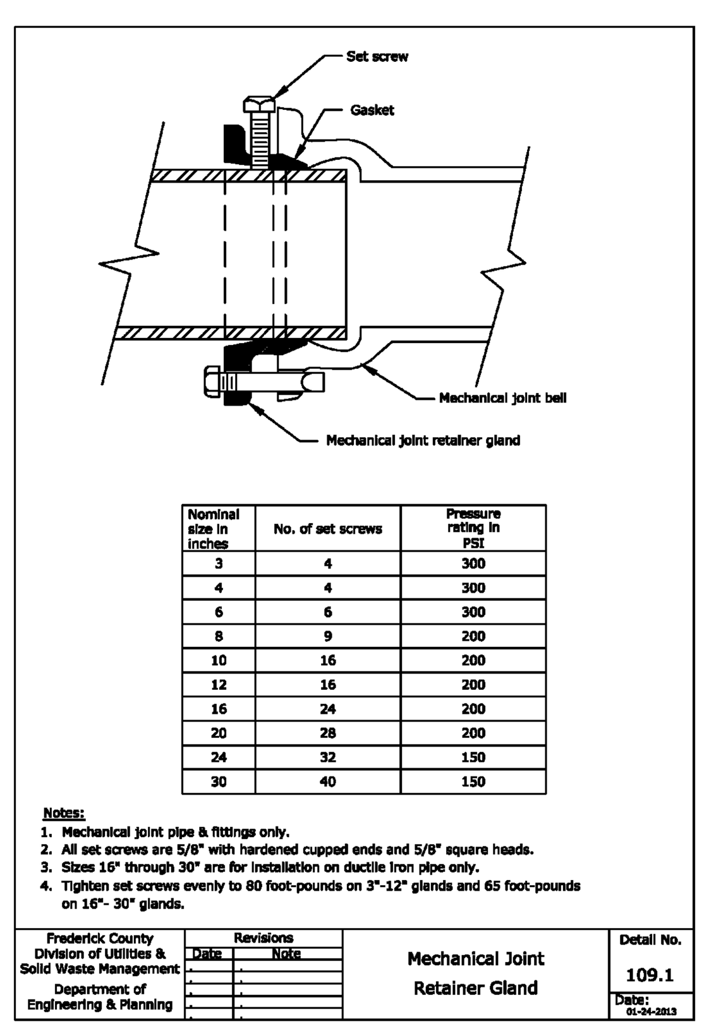


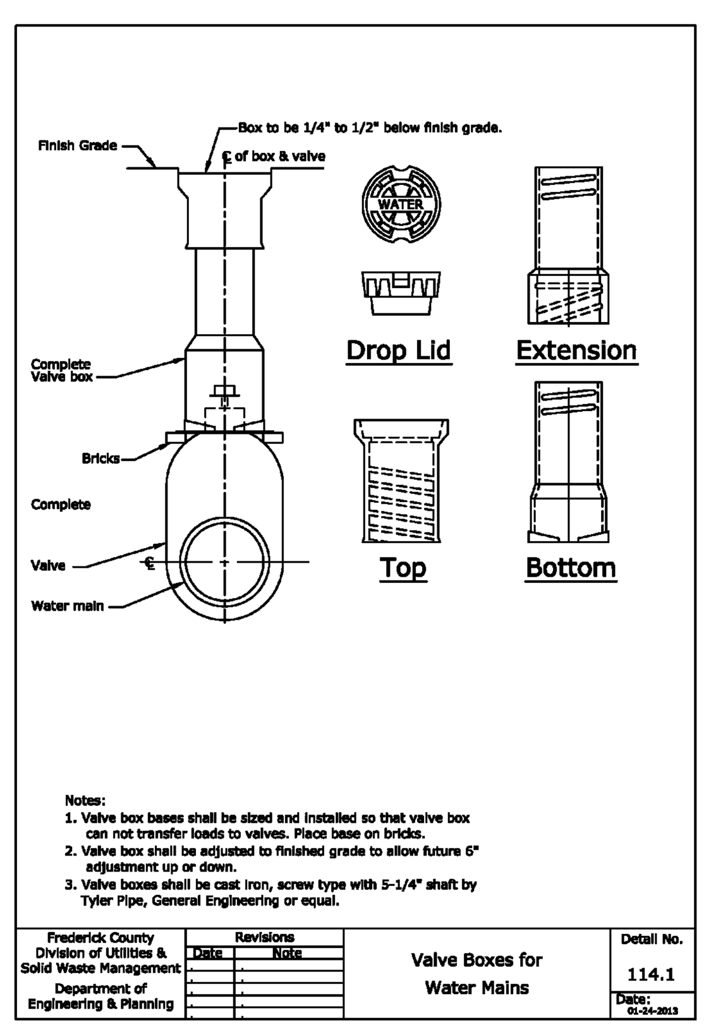












MATERIALS/QUANTITIES LIST

WATER	UNIT	QTY.	AS-BUILT	SUPPLIER/MATERIAL
			(To be completed by the county)	
16" DUCTILE IRON PIPE CL 52	LF	318		
16" HDPE DR-11	LF	915		
12" DUCTILE IRON PIPE CL52	LF	330		
12" HDPE DR-11	LF	915		
16" 1/8 HB (DUCTILE IRON)	EA	4		
12" 1/8 HB (DUCTILE IRON)	EA	4		
16" 1/32 UVB (DUCTILE IRON)	EA	2		
12" 1/32 UVB (DUCTILE IRON)	EA	2		
16" HYMAX REDUCER HDPE/DIP CONNECTOR	EA	2		
12" HYMAX 2 HDPE/DIP CONNECTOR	EA	2		
16"X6" DEWATERING FHT/ FIRE HYDRANT ASSEMBLY (INCL. 6"VALVE, VALVE BOX, LEAD & PIPE. FIRE HYDRANT AS MFG BY AMERICAN DARLING CORP.)- FRED. CO. DET. 108.2	EA	1		

THRUST BEARING/RESTRAINT NOTES

1. Restrain all fire hydrants with Duc-Lugs. Refer to Frederick County Std. Detail 107.1. Do not block fire hydrants and fire hydrant tee's with concrete.
2. Block all horizontal and lower vertical bends with concrete per Frederick County Std Detail 102.1.
3. Block all other fittings with concrete per Frederick County Std. Detail 103.1.
4. All public fittings and valves are to be restrained by use of 'Mega-Lugs' or equal. If no restrained joint length is shown on the drawings, install concrete buttresses/ anchors at fittings per the Standard Details or submit an RFI to the engineer to have restrained joint length clarified.

WATER SYSTEMS

NOTE:
ALL DETAILS AS SHOWN ON THIS PLAN ARE REFERENCED TO FREDERICK COUNTY STANDARD DETAILS UNLESS OTHERWISE NOTED.

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

CONTRACT NO. -W

PROFESSIONAL CERTIFICATION
"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 29782 , Expiration Date: 1/16/2025 ".

STATE OF MARYLAND — PHILLIP THOMAS WAGNER — 29782 — PROFESSIONAL ENGINEER
For Review Only

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR ____________
BY ______ DATE ____

DEVELOPER/ OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
PHONE: 530-417-7496
CONTACT: AD ROBISON

WATER NOTES AND DETAILS

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Combined Stormwater Management Development and Improvement Plan
12"W & 16"PCW Crossing Tuscarora Creek at Happy Landing Rd

QUANTUM FREDERICK

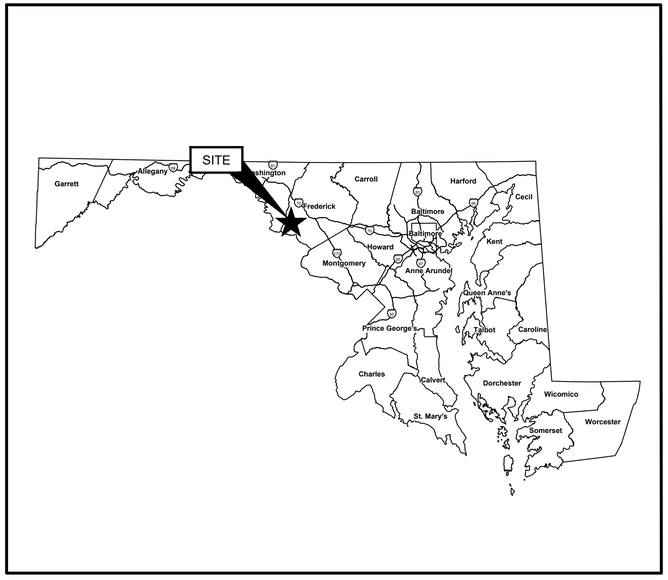
Liber 15038 Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: As Shown
JOB No. 1339A8
April, 2024
INDEX No. WND-1
SHEET No. 9 OF 9

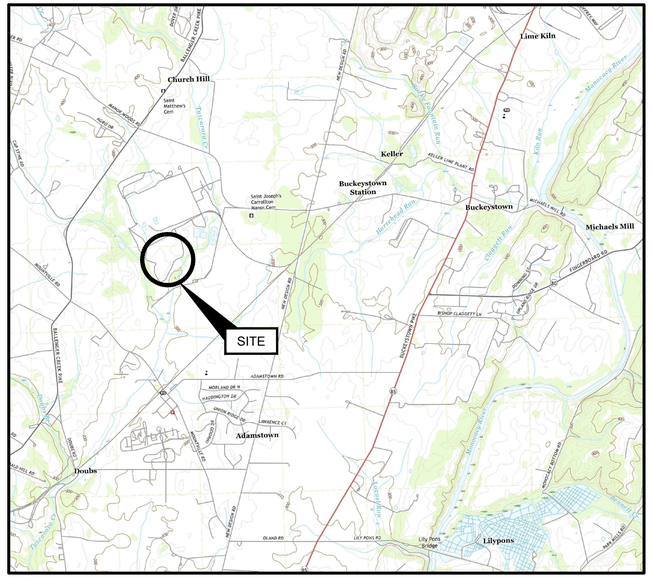
2024-04-26

QUANTUM LOOP MARYLAND WEST WATER LOOP SOUTHERN CROSSING

HDD DESIGN OF 12 INCH WATER AND 16 INCH POTABLE COOLING WATER LINES FREDERICK, MARYLAND



STATE or COUNTY MAP
(NOT TO SCALE)



SOURCE:
MAP TAKEN FROM USGS.GOV.

SITE LOCATION MAP
(NOT TO SCALE)

SHEET INDEX

SHEET NO.	DRAWING NO.	TITLE
1	G-01_WWLS	COVER SHEET
2	G-02_WWLS	GENERAL NOTES
3	C-01_WWLS	EXISTING PLAN AND PROFILE OF WATER LINES
4	C-02_WWLS	PROPOSED PLAN AND PROFILE OF WATER LINES
5	C-03_WWLS	BORING LOGS
6	HDD-01_WWLS	HDD SECTION AND DETAILS
7	IDFR-01_WWLS	INADVERTENT DRILLING FLUID RETURN CONTINGENCY DETAILS

QUANTUM LOOP WEST WATER SOUTHERN LOOP NOMENCLATURE:

WWLS - WEST WATER LOOP SOUTHERN CROSSING HDD DESIGN SET

PREPARED FOR:

STO MISSION CRITICAL
330 W 34th ST
NEW YORK, NY 10001

PREPARED BY:

6010 EXECUTIVE BLVD.
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

GEI Consultants

FOR CONSTRUCTION

NO.	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

SHEET NO.
G-01_WWLS

DWG. NO.
1 OF 7

GENERAL NOTES

1. THESE DRAWINGS CORRESPOND TO THE DESIGN AND CONSTRUCTION OF THE 12 INCH COOLING WATER AND 16 INCH POTABLE COLD WATER LINES BY HORIZONTAL DIRECTIONAL DRILLING (HDD).
2. THE DRAWINGS DO NOT ADDRESS SAFETY ISSUES RELATED TO THE WORK. SITE SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE DESIGN OF THE HORIZONTAL DIRECTIONALLY DRILLED WATERLINES IS BASED ON INFORMATION PRESENTED IN THE FOLLOWING:
   a. GEOTECHNICAL BASELINE REPORT BY GEI CONSULTANTS, INC (GEI) DATED APRIL 5, 2024.
   b. GEOTECHNICAL DATA REPORT BY GEI CONSULTANTS, INC (GEI) DATED MARCH 15, 2024.
   c. QUANTUM PERMIT MODIFICATION PACKAGE K-LINE DATED MARCH 15, 2024 AND APPROVED ON APRIL 23, 2024 BY MDE WITH AUTHORIZATION NUMBER 22-NT-3124/202260907.
   d. WATER/POTABLE COOLING WATER CROSSING TUSCARORA CREEK AT HAPPY LANDING ROAD BY RODGERS CONSULTING DATED APRIL 26, 2024.
   e. GEO 201536 FORMER ALCOA EASTALCO WORKS PROPERTY GEOTECHNICAL REPORT BY GTA DATED JANUARY 5, 2021.
   f. EMAIL APPROVAL FROM FREDERICK COUNTY DEPARTMENT OF WATER AND SEWER UTILITIES FOR HDPE PIPE USE VIA EMAIL ON APRIL 1, 2024.
   g. MINIMUM CLEAR DIMENSIONS PROVIDED BY HDD CONTRACTOR FOR THE HORIZONTAL DIRECTIONAL DRILLING EQUIPMENT.
4. IF SITE CONDITIONS DIFFER FROM THOSE PRESENTED IN THE GTA GEOTECHNICAL REPORTS, THE DRAWINGS OR INFORMATION PROVIDED, IT SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER OF THE HORIZONTAL DIRECTIONAL DRILLED (HDD) WATER LINES, GEI.
5. IF SITE CONDITIONS DIFFER FROM THOSE PRESENTED IN THE GEI GEOTECHNICAL REPORTS, THE DRAWINGS OR INFORMATION PROVIDED, IT SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGNER OF THE HORIZONTAL DIRECTIONAL DRILLED (HDD) WATER LINES, GEI.
6. GENERAL CONTRACTOR IS TO ENSURE THAT ALL EXISTING UTILITIES ARE LOCATED AND REMOVED/RELOCATED PRIOR TO THE INSTALLATION OF THE HORIZONTAL DIRECTIONALLY DRILLED WATERLINES. HDD WATERLINES ARE NOT DESIGNED TO INTERFACE WITH ANY EXISTING UTILITIES OTHER THAN THOSE SHOWN ON THE DRAWINGS.
7. SITE TO BE MODIFIED TO CREATE A STABLE WORKING PLATFORM FOR ALL HDD EQUIPMENT. ENSURE THAT THE BACKFILL MATERIAL, COMPACTION EFFORTS AND GEO-REINFORCING, IF REQUIRED, WILL PROVIDE A SAFE AND STABLE PLATFORM FOR THE ANTICIPATED EQUIPMENT NEEDED TO PERFORM THE WORK. DESIGN OF THE WORKING PLATFORM IS THE RESPONSIBILITY OF OTHERS.
8. SURVEY COORDINATES PROVIDED ARE MD NAD83 COORDINATES.
9. SURVEY LAYOUT IS TO BE PERFORMED BY OTHERS.
10. THE HDD WATERLINES SHOWN ON THE DRAWINGS ARE DESIGNED BY GEI USING THE CONSTRUCTION SEQUENCE INDICATED ON THE DRAWINGS. LOADING CONDITIONS PRODUCED BY A DIFFERENT TRENCHLESS INSTALLATION SCHEME OR SEQUENCE, OR OTHER DESIGN COMPONENTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF GEI FOR REVIEW AND ACCEPTANCE.
11. ITEMS DEFINED AS TEMPORARY CONSIST OF OR MATERIALS, STRUCTURES, OR SEQUENCES USED TO FACILITATE THE CONSTRUCTION OF A PERMANENT UTILITY OR PORTION OF INFRASTRUCTURE. THESE FEATURES ARE NOT PART OF THE PERMANENT STRUCTURE AND WILL BE ABANDONED IN PLACE AFTER FACILITATING THE CONSTRUCTION OF PERMANENT UTILITIES AND FEATURES. TEMPORARY FEATURES USED AT THE CROSSINGS WILL BE REMOVED AFTER FACILITATING THE CONSTRUCTION OF PERMANENT UTILITIES.
12. COMPLY WITH ALL ENVIRONMENTAL POLICIES, PROCEDURES, AND PROTOCOLS ESTABLISHED FOR THE PROJECT, INCLUDING ENVIRONMENTAL MANAGEMENT PLANS AND STORMWATER POLLUTION PREVENTION PLANS.

DESIGN CRITERIA

1. THE DESIGN OF THE HORIZONTAL DIRECTIONAL DRILL PATH WAS PERFORMED IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
   a. 2018 MARYLAND BUILDING CODE.
   b. FREDERICK COUNTY DEPARTMENT OF WATER AND SEWER UTILITIES, WATER AND SEWER RULES AND REGULATIONS DATED OCTOBER 1, 2022.
   c. NASTT HDD GOOD PRACTICES MANUAL.
2. THE LOADS ON THE HDD DRILL EQUIPMENT AND WATERLINES DESIGNED BY GEI ARE THOSE FROM SOIL, ROCK, AND WATER AS NOTED HEREIN.
3. SUBGRADE ELEVATIONS TAKE INTO ACCOUNT CLEARANCES FOR HDD EQUIPMENT REQUESTED BY THE MICROTUNNELING CONTRACTOR.

SPECIFICATIONS

1. THE SPECIFICATIONS TO REFERENCE INCLUDE BUT ARE NOT LIMITED TO THE FOLLOW SPECIFICATION:
   A. SPECIFICATION 31 05 13.15.STO HORIZONTAL DIRECTIONAL DRILLING.

MATERIALS

1. THE CONTRACTOR SHALL USE PERFORMANCE PIPE 4000 SERIES DIPS PE PIPE, OR APPROVED EQUIVALENT, FOR GEI DESIGNED WATER LINES INSTALLED WITH HDD TRENCHLESS TECHNOLOGY.
2. THE CONTRACT SHALL USE HYMAX 2 CONNECTIONS AS NOTED ON THE HDD DETAILS PAGE OF THIS PLAN SET, OR APPROVED EQUIVALENT, TO CONNECT HDPE AND DI PIPES.

CONSTRUCTION SEQUENCE

1. IDENTIFY ALL EXISTING UTILITIES AND RELOCATE OR ABANDON AS NECESSARY.
2. EARTHWORK PERFORMED AT THE WEST WATER LOOP SOUTH WORK AREA WEST OF MH 400 TO MODIFY THE GROUND SURFACE FOR A SAFE AND STABLE WORK PLATFORM.
3. EARTHWORK PREFORMED, AS NECESSARY, SOUTH OF THE SUPPORT OF EXCAVATION AT MH 3 AND ALONG HAPPY LANDING ROAD TO CREATE A PIPE LAYDOWN AREA WITHIN THE LIMITS ESTABLISHED IN THE RODGERS DRAWING SET REFERENCED IN THIS SET.
4. RECEIVE ALL HDPE PIPE MATERIALS IN LAYDOWN AREA ALONG THE SOUTH SIDE OF THE PUMP STATION WITHIN THE HAPPY LANDING ROAD LIMITS OF DISTURBANCE.
5. ASSEMBLE ALL HDD EQUIPMENT.
6. EXCAVATE THE HYDROFRACTURE PITS ON EACH SIDE OF THE STREAM CROSSING.
7. DRILL PILOT BORE USING GUIDANCE SYSTEM.
8. USE REAMING TOOLS TO EXPAND THE BOREHOLE WITH MULTIPLE PASSES IF NECESSARY.
9. FUSE ALL HDPE CARRIER PIPE SECTIONS TOGETHER.
10. CONNECT FUSED CARRIER PIPE TO REAMER AND PULL BACK THE CARRIER PIPE INSTALLATION.
11. PUMP ALL DRILLING FLUID OUT OF HYDROFRACTURE PITS CONTAINERS FOR TESTING AND DISPOSAL.
12. PERFORM LEAK TEST AND DECONTAMINATE THE CARRIER PIPE.
13. INSTALL FITTINGS NOTED IN THIS DRAWING SET FOR DUCTILE IRON PIPE CONNECTION FOR FUTURE UTILITY CONNECTION.
14. CAP ENDS OF THE PIPE IF UPSTREAM AND DOWNSTREAM UTILITIES ARE NOT INSTALLED OR PREPARED FOR CONNECTION.
15. BACKFILL HYDROFRACTURE PITS WITH STRUCTURAL BACKFILL PER PROJECT AND ENVIRONMENTAL MANAGEMENT PLAN SPECIFICATIONS.

MONITORING

1. AN INSTRUMENTATION PLAN CONSISTING OF OPTICAL SURVEY PRISMS OR SETTLEMENT MONITORING POINTS SHALL BE INSTALLED AND MONITORED TO VERIFY THE PERFORMANCE OF THE HORIZONTAL DIRECTIONAL DRILL..
2. SURVEY MONITORING POINTS SHALL BE INSTALLED AT THE CENTERLINE OF EACH BOREPATH AND 25 FEET NORTH AND 25 FEET SOUTH OF THE CENTERLINE APPROXIMATELY EVERY 250 FEET OF THE LENGTH OF THE BOREPATH.
3. SURVEY MONITORING POINTS SHALL BE READ TWICE WEEKLY FROM START OF BOREPATH UNTIL PULLBACK IS COMPLETE. PLOT DATA TO IDENTIFY MOVEMENT TRENDS AND PROVIDE INSTRUMENTATION READINGS TO GEI ON A WEEKLY BASIS.
4. INSTRUMENTATION PLAN SHALL BE PREPARED BY THE CONTRACTOR AND REVIEWED AND APPROVED BY GEI.

QUALITY ASSURANCE

1. GEI SHALL OBSERVE THE FOLLOWING ITEMS AND THOSE IN THE RELATED SPECIFICATIONS AND SUBMITTALS:
   a. LOCATION OF HYRDOFRACTURE PITS.
   b. FINAL DRILL PATH OF EACH CARRIER PIPE INSTALLED WITH ELEVATIONS.
   c. NUMBER OF REAM PASSES AND FINAL BOREHOLE DIAMETER.
   d. ANY INADVERTENT FLUID RETURN.
   e. HEAT WELDING OR FUSING OF ALL HDPE JOINTS.
   f. PULLBACK CONNECTION TO CARRIER PIPE.
   g. TRACKING PLACED CARRIER PIPE LENGTH.
   h. START AND STOP OF ALL HDD OPERATION.
   i. HDD INSTRUMENTATION READINGS.
   j. UNUSUAL CONDITIONS, BREAKDOWNS, OR DELAYS.
2. THE OWNER SHALL RETAIN AN INDEPENDENT TESTING AGENCY FOR THIRD PARTY INSPECTIONS FOR ALL PERMANENT WORKS.

FOR CONSTRUCTION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	TM
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
SOUTHERN CROSSING
HDD DESIGN

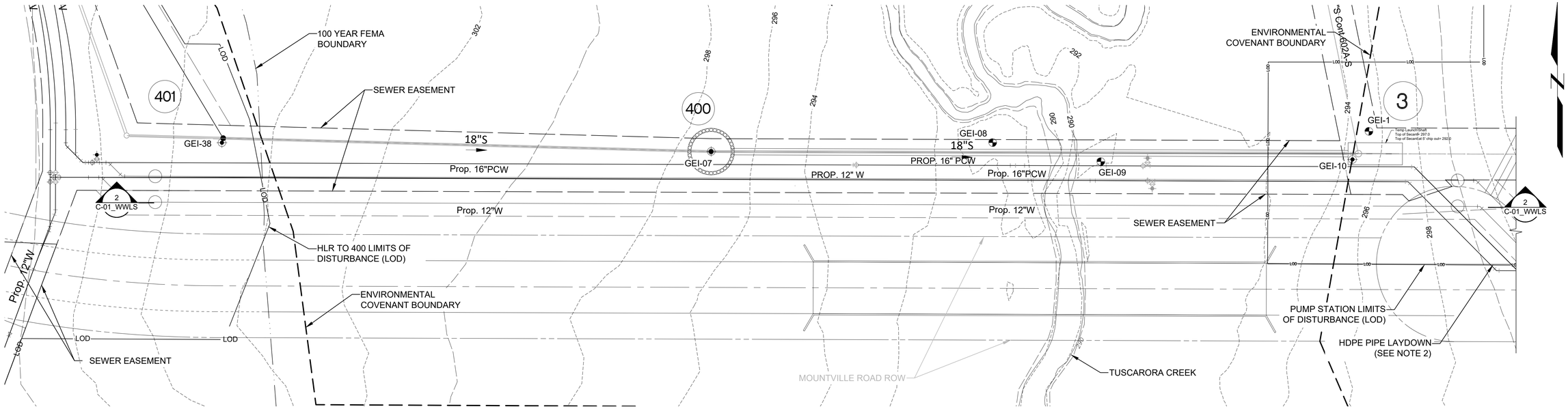
FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

SHEET NAME
GENERAL NOTES

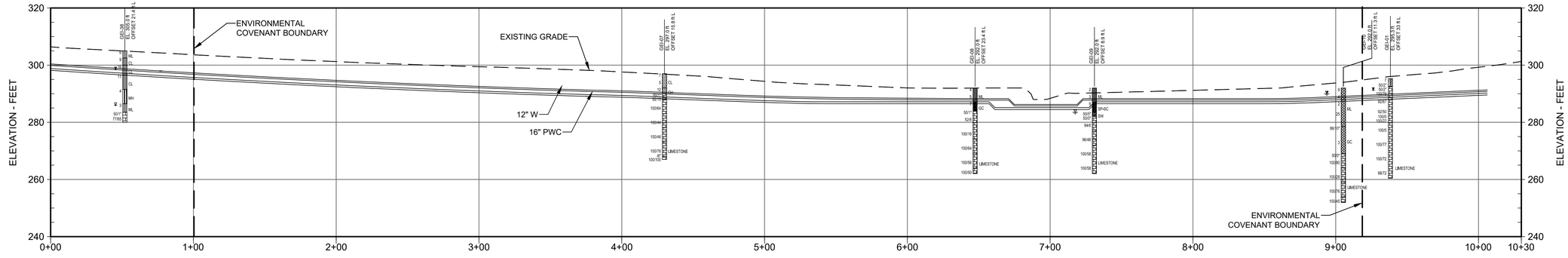
SHEET NO.
G-02_WWLS

DWG. NO.
2 OF 7



1 ORIGINAL PLAN
C-01_WWLS

SCALE: 1" = 40'



2 ORIGINAL PROFILE
C-01_WWLS

SCALE: 1" = 40' H
1"= 20' V

FOR CONSTRUCTION

LEGEND:

GEI GEOTECHNICAL BORING (2023)

GEI GEI MONITORING WELLS (2023)

HORIZONTAL SCALE, FEET
0 40 80
0 20 40
VERTICAL SCALE, FEET
NOTE: 2x VERTICAL EXAGGERATION

Attention:
0 1"
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Designed:	AL/AWD
Drawn:	TM
Checked:	XXX
Approved:	GAB
P.E. No:	27970
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STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
SOUTHERN CROSSING
HDD DESIGN

FREDERICK, MD

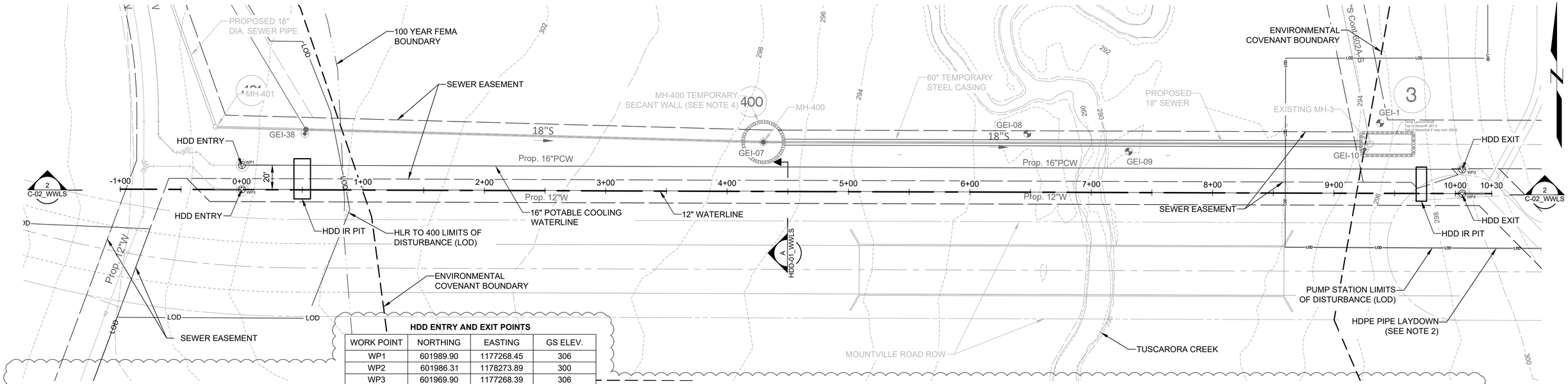
NO	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

SHEET NAME

EXISTING PLAN AND PROFILE OF WATER LINES

SHEET NO.
C-01_WWLS

DWG. NO.
3 OF 7



HDD ENTRY AND EXIT POINTS

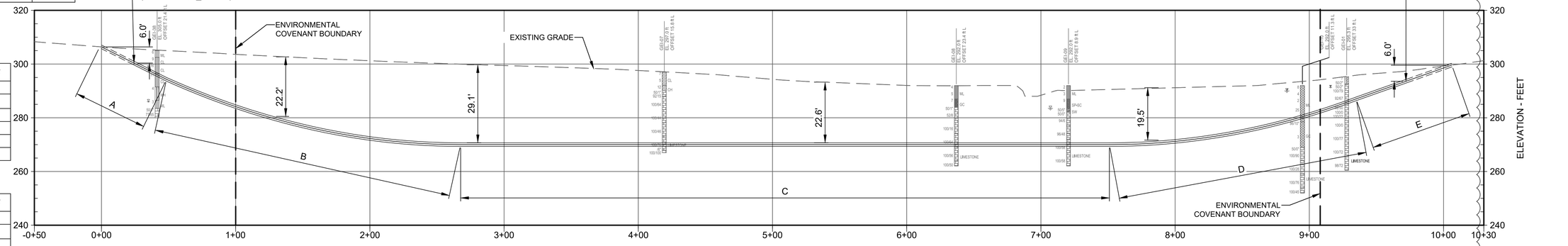
WORK POINT	NORTHING	EASTING	GS ELEV.
WP1	601989.90	1177268.45	306
WP2	601986.31	1178273.89	300
WP3	601969.90	1177268.39	306
WP4	601966.17	1178273.89	300

1 C-02_WWLS — PROPOSED PLAN - 12 INCH W AND 16 INCH PCW

SCALE: 1" = 40'

HDD BOREPATH GEOMETRY

SEGMENT	LENGTH (FT)	ANGLE / PERCENT GRADE	RADIUS (FT)
A	55	14° / 24.93%	N/A
B	224	N/A	1000
C	483	0° / 0.00%	N/A
D	187	N/A	1000
E	76	10° / 17.63%	N/A



12 INCH W INV

POINT NAME	STATION	INV ELEV
WP1	0+00	305.95
AB	0+48.50	293.86
BC	2+67.62	269.56
CD	7+51.02	269.56
DE	9+34.83	286.60
WP2	10+06.15	299.17

16 INCH PCW INV

POINT NAME	STATION	INV ELEV
WP1	0+00	305.81
AB	0+48.50	293.72
BC	2+67.62	269.42
CD	7+51.02	269.42
DE	9+34.83	286.46
WP2	10+06.15	299.03

2 C-02_WWLS — PROPOSED PROFILE - 12 INCH W AND 16 INCH PCW

SCALE: 1" = 40' H
1" = 20' V

2

NOTE:

1. PERFORMANCE PIPE DRISCOPLEX 4000 DIPS 12" & 16" SERIES PE PIPE OR APPROVED EQUIVALENT.
2. THE PIPE STAGING AND LAYDOWN AREA IS ALONG THE LOD OF HAPPY LANDING ROAD SEE RODGERS DRAWINGS REFERENCED IN THIS DRAWING SET.

LEGEND:

GEI GEI GEOTECHNICAL BORING (2023)

GEI GEI MONITORING WELLS (2023)

HORIZONTAL SCALE, FEET
0 40 80
0 20 40
VERTICAL SCALE, FEET
NOTE: 2x VERTICAL EXAGGERATION

FOR CONSTRUCTION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	TM
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND WEST WATER LOOP SOUTHERN CROSSING HDD DESIGN

FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

SHEET NAME

PROPOSED PLAN AND PROFILE OF WATER LINES

SHEET NO.

C-02_WWLS

DWG. NO.

4 OF 7

EDDY, DEREK B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Design\Sheets\West Water Loop Southern Crossing\C-01 - C-02_WWLS - Plan + Profile.dwg - 5/23/2024

BORING NUMBER GEI-1
PAGE 1 OF 2

Tetra Tech
One Oxford Valley, Suite 200A
Langhorne, PA 19047

CLIENT: Clark Water
PROJECT NUMBER: 112C10263
PROJECT NAME: Quantum Loophole - Proposed Sewer Line
PROJECT LOCATION: 5601 Manor Woods Road, Frederick, MD 21703
DATE STARTED: 11/8/23 COMPLETED: 11/9/23
GROUND ELEVATION: 295.344 ft NAVD88 HOLE SIZE: 3.25
CONTRACTOR/ OPERATOR: Free State Drilling/ R. Stidham
NORTHING: 602024.4941 EASTING: 1178206.1491
METHOD, RIG & HAMMER: Hollow Stem Auger, CME 55, Automatic 80%
GWL AT TIME OF DRILLING: ---
LOGGED BY: Z. Hill CHECKED BY: M. Ahmed
GWL AT END OF DRILLING: 2.50 ft / Elev 293.50 ft
NOTES: PID 0 ppm throughout.
GWL AFTER DRILLING: ---

Depth (ft)	Material Description	Sample Type Number	Recovery % (RQD)	Blow Counts (N Value)	Remarks and Other Tests
0	Fill- Poorly Graded Sand With Silty Clay And Gravel (SP-SC), loose to very dense, angular, brown to gray, dry to moist.	SS 1	33	5-4-3-4 (7)	
		SS 2	63	4-50/2"	
	Weathered Rock- Limestone, gray.	SS 3	100	50/2"	Top of rock at 2.9 ft
	LIMESTONE, light gray, freshly weathered to slightly weathered, fine grained, medium hard, indistinct to thin bedding, flat to moderate dip, random fractures, close to medium spacing, shallow to steep dip, open joints.	RC 1	100 (79)		Water return from 2.9 feet to 3.9 feet. No water return for rest of boring at 3.9 ft
		RC 2	92 (67)		Vertical fracture at 7.5 ft; Vertical calcite seam from 7.9 feet to 8.9 feet
		RC 3	92 (50)		45° calcite seam from 9.9 feet to 10.4 feet; 60° fracture, calcite seam from 10.7 feet to 11.2 feet; Broken, weathered at joints, jammed core barrel from 11.2 feet to 11.7 feet
	LIMESTONE, light gray to gray, freshly weathered to slightly weathered, fine grained, medium hard, laminated to thin bedding, moderate to steep dip, bedding joints, close to medium spacing, moderate to steep dip, open joints.	RC 4	100 (0)		
		RC 5	100 (22)		
		RC 6	100 (0)		Broken, jammed core barrel from 15.8 feet to 16.8 feet; Broken, vertical fracture from 18.7 feet to 19.0 feet; Vertical fracture from 19.5 feet to 19.8 feet
		RC 7	100 (77)		Calcite seam from 20.9 feet to 21.1 feet; Calcite seam at 23.9 ft

(Continued Next Page)

GEOTECH BH PLOTS - DF STD US LAB.GDT - 11/13/23 12:15 - C:\USERS\ZACHARY.HILL\DOCUMENTS_PROJECT FILES\2023-10 QUANTUM LOOP MD\BORINGS\GINT\QL MD BORINGS LOGS 11-13-2023.GPJ

BORING NUMBER GEI-1
PAGE 2 OF 2

Tetra Tech, One Oxford Valley, Suite 200A, Langhorne, PA 19047
CLIENT: Clark Water; PROJECT NUMBER: 112C10263; PROJECT NAME: Quantum Loophole - Proposed Sewer Line; PROJECT LOCATION: 5601 Manor Woods Road, Frederick, MD 21703

Depth (ft)	Material Description	Sample Type Number	Recovery % (RQD)
25	LIMESTONE, light gray to gray, freshly weathered to slightly weathered, fine grained, medium hard, laminated to thin bedding, moderate to steep dip, bedding joints, close to medium spacing, moderate to steep dip, open joints. *(continued)*	RC 8	100 (72)
30		RC 9	98 (72)

Bottom of borehole at 34.9 feet.

FINAL BORING LOG GEI-07
PAGE 1 of 1

BORING INFORMATION
NORTHING/EASTING (ft): 602,008.9/1,177,698.1; LATITUDE/LONGITUDE (ft): 39.318693/-77.475877
GROUND SURFACE EL. (ft): 293; DATE START/END: 2/5/2024 - 2/5/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F; DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.0; DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo; RIG TYPE: Diedrich D-70 ATV Track

DRILLING INFORMATION
SPT HAMMER TYPE: Automatic; CASING I.D./O.D.: NA/NA; DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA; DRILL ROD O.D.: NA; DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger
WATER LEVEL: After Drilling: El. 284.6 @ 2/12/2024 - Water depth measured in observation well installed.

Sample No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description	Remarks
S-1	18/18 100%	2-3-4 (7)	0'- LEAN CLAY (CL): Mostly nonplastic fines; moist	0'- PID=8.9ppm
S-2	14/18 78%	3-2-3 (5)	2.5'- Similar to previous	2.5'- PID=7.5ppm
S-3	16/18 89%	4-5-7 (12)	5'- Similar to previous	5'- PID=1.6ppm
S-4 / C-01	0/1 0% / 22/24 92% 15%	50/1" (50/1")	7'- LIMESTONE - Hard, moderately weathered, Gray, very close to close discontinuities, open to tight joints, low to moderate joint angle, undulating, slightly rough to very rough	
C-02	60/60 100% 64%		9'- LIMESTONE - Hard, slightly weathered, Gray, close discontinuities, open to tight joints, low to moderate joint angle, planar to undulating, smooth to rough	
C-03	60/60 100% 44%		14'- LIMESTONE - Hard, moderately weathered, Gray, Very close to close discontinuities, low to vertical joint angle, planar to undulating, smooth to rough	
C-04	60/60 100% 46%		19'- LIMESTONE - Hard, slightly weathered, Gray, Close discontinuities, close joints, low to moderate joint angle, planar to undulating, slight rough to rough	
C-05	60/60 100% 76%		24'- LIMESTONE - Hard, slightly weathered, Gray, Close discontinuities, close joints, low to moderate joint angle, planar to undulating, slightly rough to rough	
C-06	12/12 100% 100%		29'- LIMESTONE - Hard, slightly weathered, Gray, Close discontinuities, open to tight joints, moderate joint angle, undulating, rough	

BORING TERMINATED AT 30 FT (EL. +263.0 FT) OBSERVATION WELL INSTALLED UPON COMPLETION.

PROJECT NAME: STO MC - Frederick; CITY/STATE: Frederick, MD; GEI PROJECT NUMBER: 2302756

FINAL BORING LOG GEI-08
PAGE 1 of 1

NORTHING/EASTING (ft): 602,015.8/1,177,956.0; LATITUDE/LONGITUDE (ft): 39.318715/-77.474965
GROUND SURFACE EL. (ft): 292; DATE START/END: 2/2/2024 - 2/2/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F; DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.0; DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo; RIG TYPE: Diedrich D-70 ATV Track
SPT HAMMER TYPE: Automatic; CASING I.D./O.D.: NA/NA; DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA; DRILL ROD O.D.: NA; DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger
WATER LEVEL: Dry at time of drilling.

Sample No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description
S-1	14/18 78%	1-2-2 (4)	0'- SILT (ML): Mostly nonplastic fines; moist
S-2	18/18 100%	2-2-3 (5)	2.5'- Similar to previous
S-3	9/18 50%	5-3-4 (7)	5'- CLAYEY SAND (SC): Mostly fine to medium sand; some nonplastic fines; trace fine to coarse subangular gravel; loose, moist
S-4 / C-1	0/1 0% / 31/60 52% 8%	50/1" (50/1")	8'- LIMESTONE - Gray , medium hard, moderately weathered, Close discontinuities, open joints, low to moderate angle joint orientation, slightly rough to very rough.
C-2	60/60 100% 16%		13'- LIMESTONE - Gray, hard, moderately weathered, Very close to close discontinuities, open to tight joints, low to high angle joint orientation, planar to undulating surface, smooth to very rough.
C-3	60/60 100% 64%		18'- LIMESTONE - Gray, hard, slightly weathered, Very close discontinuities,
C-4	60/60 100% 56%		23'- LIMESTONE - Gray, hard, moderately weathered, Very close discontinuities, open to tight joints, low to moderate angle joint orientation, slightly rough to rough.
C-5	24/24 100% 50%		28'- LIMESTONE - Gray, hard, slightly weathered, Very close discontinuities, open to tight joints, low to moderate angle joint orientation, smooth to rough

BORING TERMINATED AT 30 FT (EL. +262.0 FT) GROUTED UPON COMPLETION.

PROJECT NAME: STO MC - Frederick; CITY/STATE: Frederick, MD; GEI PROJECT NUMBER: 2302756

FINAL BORING LOG GEI-09
PAGE 1 of 1

NORTHING/EASTING (ft): 602,001.1/1,177,999.1; LATITUDE/LONGITUDE (ft): 39.318676/-77.474813
GROUND SURFACE EL. (ft): 292; DATE START/END: 1/17/2024 - 1/17/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F; DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 30.0; DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo; RIG TYPE: Diedrich D-70 ATV Track
SPT HAMMER TYPE: Automatic; CASING I.D./O.D.: NA/NA; DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA; DRILL ROD O.D.: NA; DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger
WATER LEVEL: At Time of Drilling: El. 283.5 @ 1/17/2024

Sample No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description
S-1	14/18 78%	1-1-1 (2)	0'- SILT (ML): Mostly nonplastic fines; few fine to medium sand; moist
S-2	16/18 89%	1-1-2 (3)	2.5'- Similar to previous
S-3	12/18 67%	5-5-4 (9)	5'- Similar to previous
S-4	4/5 80%	50/5" (50/5")	8.5'- WIDELY GRADED SAND WITH GRAVEL (SW): Mostly fine to medium sand; little fine to coarse subangular gravel; wet
S-5 / C-1	0/0 % / 56/60 94% 6%	50/0" (50/0")	10'- LIMESTONE - Gray, hard, moderately weathered
C-2	58/60 96% 48%		15'- LIMESTONE - Gray, hard, moderately weathered
C-3	60/60 100% 58%		20'- LIMESTONE - Gray, hard, moderately weathered
C-4	60/60 100% 58%		25'- LIMESTONE - Gray, hard, moderately weathered

BORING TERMINATED AT 30 FT (EL. +262.0 FT) GROUTED UPON COMPLETION.

PROJECT NAME: STO MC - Frederick; CITY/STATE: Frederick, MD; GEI PROJECT NUMBER: 2302756

FINAL BORING LOG GEI-10
PAGE 1 of 2

NORTHING/EASTING (ft): 602,007.2/1,178,198.1; LATITUDE/LONGITUDE (ft): 39.318695/-77.474110
GROUND SURFACE EL. (ft): 292; DATE START/END: 1/16/2024 - 1/16/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F; DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 40.0; DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo; RIG TYPE: Diedrich D-70 ATV Track
SPT HAMMER TYPE: Automatic; CASING I.D./O.D.: NA/NA; DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA; DRILL ROD O.D.: NA; DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger
WATER LEVEL: At Time of Drilling: El. 288.0 @ 1/16/2024; After Drilling: El. 289.7 @ 2/12/2024 - Water depth measured in observation well installed.

Sample No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description
S-1	11/18 61%	2-6-2 (8)	0'- SILT (ML): Mostly nonplastic fines; trace fine sand; trace fine gravel; stiff, moist
S-2	8/18 44%	1-2-2 (4)	2.5'- SILT (ML): Mostly nonplastic fines; wet
S-3	10/18 56%	1-1-1 (2)	5'- Similar to previous
S-4	13/18 72%	20-13-12 (25)	8.5'- SILT WITH GRAVEL (ML): Mostly nonplastic fines; little fine to coarse subangular gravel; wet
S-5	16/16 100%	33-36-50/4" (86/10")	13.5'- Similar to previous
S-6	3/18 17%	2-1-2 (3)	18.5'- Similar to previous
S-7 / C-1	0/0 % / 60/60 100% 90%	50/0" (50/0")	23'- LIMESTONE - Gray, hard, slightly weathered
C-2	60/60 100% 28%		28'- LIMESTONE - Gray, medium hard, moderately weathered
C-3	60/60 100% 76%		33'- LIMESTONE - Gray, hard, slightly weathered

FINAL BORING LOG GEI-10
PAGE 2 of 2

NORTHING/EASTING (ft): 602,007.2/1,178,198.1; LATITUDE/LONGITUDE (ft): 39.318695/-77.474110
GROUND SURFACE EL. (ft): 292; DATE START/END: 1/16/2024 - 1/16/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F; DRILLING COMPANY: Connelly

Sample No.	REC/PEN (in) REC% RQD%	Soil Description
C-3	60/60 100% 76%	
C-4	24/24 100% 45%	38'- LIMESTONE - Gray, hard, moderately weathered

BORING TERMINATED AT 40 FT (EL. +252.0 FT) OBSERVATION WELL INSTALLED UPON COMPLETION.

PROJECT NAME: STO MC - Frederick; CITY/STATE: Frederick, MD; GEI PROJECT NUMBER: 2302756

FINAL BORING LOG GEI-38
PAGE 1 of 1

NORTHING/EASTING (ft): 602,021.3/1,177,246.6; LATITUDE/LONGITUDE (ft): 39.318720/-77.477473
GROUND SURFACE EL. (ft): 309; DATE START/END: 2/5/2024 - 2/6/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F; DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 25.0; DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo; RIG TYPE: Diedrich D-70 ATV Track
SPT HAMMER TYPE: Automatic; CASING I.D./O.D.: NA/NA; DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA; DRILL ROD O.D.: NA; DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger
WATER LEVEL: At Time of Drilling: El. 290.0 @ 2/5/2024 2:10 pm; After Drilling: El. 302.5 @ 2/12/2024 - Water depth measured in observation well installed.

Sample No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description	Remarks
S-1	16/18 89%	2-3-3 (6)	0'- SILT (ML): Mostly nonplastic fines; moist	0'- PID=9.1ppm
S-2	18/18 100%	3-4-5 (9)	2.5'- LEAN CLAY (CL): Mostly fines with low plasticity; moist	2.5'- PID=7.5ppm
S-3	16/18 89%	5-7-9 (16)	5'- LEAN CLAY (CL): Mostly fines with low plasticity; trace gravel; moist	5'- PID=9.8ppm
S-4	18/18 100%	4-6-5 (11)	8.5'- LEAN CLAY WITH SAND (CL): Mostly fines with low plasticity; few fine to medium sand; few fine to coarse subangular gravel; stiff, moist	8.5'- PID=0ppm
S-5	15/18 83%	2-2-2 (4)	13.5'- LEAN CLAY (CL): Mostly fines with low plasticity; moist	13.5'- PID=0.7ppm
S-6	10/18 56%	WOH-2-1 (3)	18.5'- LEAN CLAY (CL): Mostly fines with low plasticity; wet	18.5'- PID=0ppm
S-7 / C-1	0/1 0% / 32/42 77% 65%	50/1" (50/1")	21.5'- LIMESTONE - Gray, hard, moderately weathered, Very close discontinuities, open to tight joints, low to high angle joint orientation, undulating joint surfaces, slightly rough to very rough.	

BORING TERMINATED AT 25 FT (EL. +284.0 FT) OBSERVATION WELL INSTALLED UPON COMPLETION.

PROJECT NAME: STO MC - Frederick; CITY/STATE: Frederick, MD; GEI PROJECT NUMBER: 2302756

FOR CONSTRUCTION

Attention: If this scale bar does not measure 1" then drawing is not original scale.

Designed: AL/AWD
Drawn: TM
Checked: XXX
Approved: GAB
P.E. No: 27970
GEI Project 2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
(202)609-7677

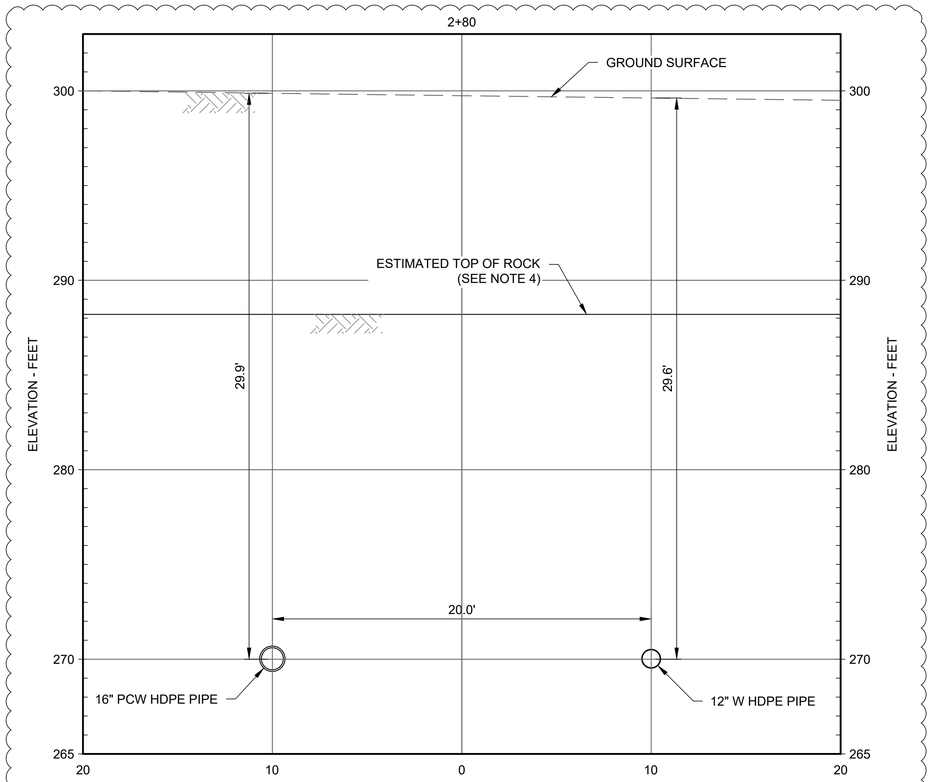
STO MISSION CRITICAL
330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND WEST WATER LOOP SOUTHERN CROSSING HDD DESIGN
FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

SHEET NAME: BORING LOGS
SHEET NO.: C-03_WWLS
DWG. NO.: 5 OF 7

EDDY, DEREK B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Design\Sheets\West Water Loop Southern Crossing\C-03 Boring Logs.dwg - 5/23/2024



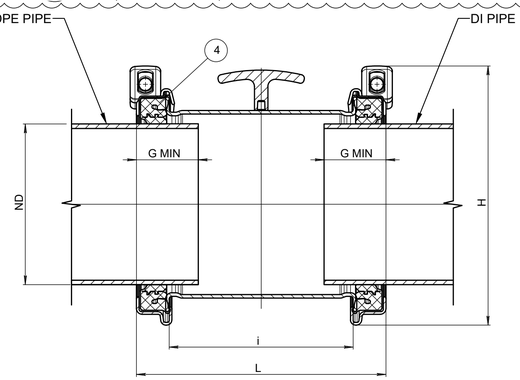
A SECTION - PROPOSED HPDE WATER LINES AT STA 4+50
C-02_WWLS (SEE NOTE 1) SCALE: 1" = 4'

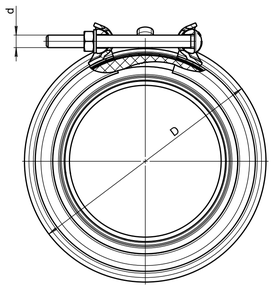
DRISCOPLEX 4000/4100 SERIES PE PIPING		
DRISCOPLEX 4000/4100 SERIES PIPE MATERIAL PROPERTIES		
PROPERTY	STANDARD	TYPICAL VALUE
MATERIAL DESIGNATION	-	PE4710
CELL CLASSIFICATION	ASTM D3350	445574C
DENISTY (4)	ASTM D1505	0.960 g/cc (BLACK)
MELT INDEX (40	ASTM D1238	0.08 g/10 MIN
FLEXURAL MODULUS (5)	ASTM D790	>140,000 PSI
TENSILE STRENGTH (5)	ASTM D638 Type IV	>3500 PSI
SCG (PENT) (7)	ASTM F1473	>500 HOURS
HDB at 73°F (23C°) (4)	ASTM D2837	1600 PSI
COLOR: UV STABILIZER C	ASTM D3350	BLACK

COMMON DIMENSION RATIOS* FOR DRISCOPLEX® 4000 DIPS SERIES PIPE							
DIPS		DR 17 PC = 125			DR 11 PC= 200		
PIPE SIZE, (IN)	OD SIZE (IN)	MINIMUM WALL THICKNESS (IN)	AVERAGE ID (IN)	WEIGHT (LBS/FT)	MINIMUM WALL THICKNESS (IN)	AVERAGE ID (IN)	WEIGHT (LBS/FT)
4	4.80	0.282	4.201	1.76	0.436	3.875	2.62
6	6.90	0.406	6.040	3.64	0.627	5.570	5.42
8	9.05	0.532	7.921	6.26	0.823	7.306	9.32
10	11.10	0.653	9.716	9.42	1.009	8.961	14.03
12	13.20	0.776	11.554	13.32	1.200	10.656	19.84
14	15.30	0.900	13.392	17.89	1.391	12.351	26.65
16	17.40	1.024	15.230	23.14	1.582	14.047	34.47
18	19.50	1.147	17.068	29.07	1.773	15.742	43.29
20	21.60	1.271	18.906	35.66	1.964	17.437	53.12

1 HDPE PIPE PROPERTIES AND SIZES
(SEE NOTE 1) NO SCALE

2

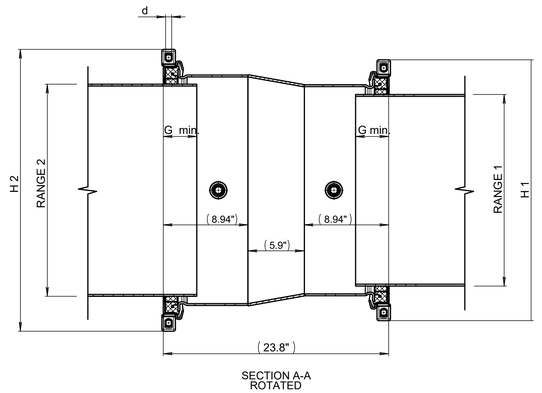




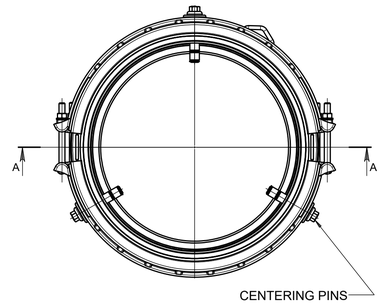
HYMAX2

PART NUMBER	NOMINAL DIAMETER (INCH)	OVERALL RANGE (INCH)	RANGE IN CLOSED GASKET POSITION (INCH)	RANGE IN OPEN GASKET POSITION (INCH)	BOLT QTY. AND SIZE (mm)	TORQUE (Ft-Lbs)	APPROX. WEIGHT (Lbs)	LENGTH (INCH)
860-54-0315-16	12	12.40-13.66	12.40-13.03	12.99-13.66	2-M14	80	39	10.8

2 DETAIL - 12" HDPE TO 12" DIP CONNECTION
C-02_WWLS (SEE NOTE 2) NO SCALE



SECTION A-A
ROTATED



HYMAX2 REDUCER

PART NUMBER	NOMINAL DIAMETER (INCH)	OVERALL RANGE (INCH)	BEFORE REMOVAL OF THE INNER LAYER 1 (INCH)	AFTER REMOVAL OF THE INNER LAYER 1 (INCH)	OVERALL RANGE 2 (INCH)	BEFORE REMOVAL OF THE INNER LAYER 1 (INCH)	AFTER REMOVAL OF THE INNER LAYER 1 (INCH)	BOLTS QTY. AND SIZE	H1 (INCH)	H2 (INCH)	L (INCH)	APPROX. WEIGHT (lbs)
861560378043416	14x16	15.00 - 17.10	15.00 - 16.10	16.02 - 17.10	17.10 - 19.20	17.10 - 18.19	18.11 - 19.20	4 - M16	23.2	25.6	23.8	142

3 DETAIL - 16" HDPE TO 16" DIP CONNECTION
C-02_WWLS (SEE NOTE 3) NO SCALE

FOR CONSTRUCTION

NOTES:

1. PERFORMANCE PIPE DRISCOPLEX 4000 DIPS 12" & 16" SERIES PE PIPE OR APPROVED EQUIVALENT.
2. HYMAX 2 860-54-0316-16 OR APPROVED EQUIVALENT TO CONNECT 12" HDPE TO 12" DIP.
3. HYMAX 2 REDUCER 86150378043416 OR APPROVED EQUIVALENT TO CONNECT 16" HDPE TO 16" DIP.
4. THE TOP SURFACE OF KARSTIC LIMESTONE CAN BE HIGHLY VARIABLE.

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	TM
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

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STO MISSION CRITICAL
330 W 34th ST
NEW YORK, NY 10001

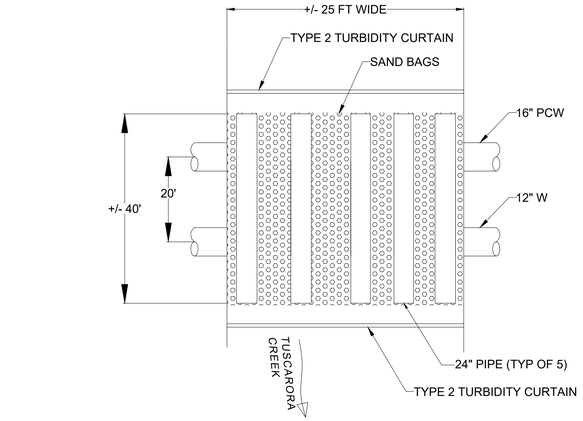
QUANTUM LOOP MARYLAND
WEST WATER LOOP
SOUTHERN CROSSING
HDD DESIGN
FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

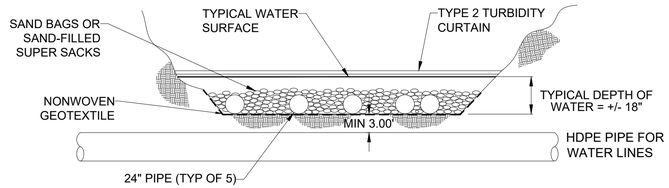
SHEET NAME
HDD SECTION AND DETAILS

SHEET NO.
HDD-01_WWLS

DWG. NO.
6 OF 7



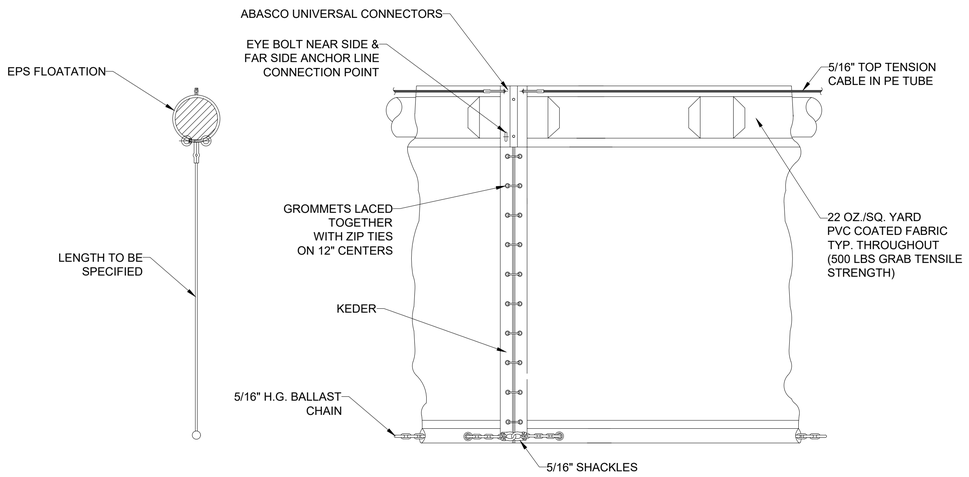
PLAN VIEW



SECTION VIEW

1 - TEMPORARY STREAM BOTTOM PROTECTION DETAIL

(SEE NOTES) NO SCALE



2 - TYPE 2 TURBIDITY CURTAIN DETAIL

(SEE NOTE 3) NO SCALE

TYPE 2	FABRIC	FLOAT	CHAIN	CABLE	OPTIONS
EC-DOT	18 OZ PVC POLYESTER	6", 8", 10"	5/16"	5/16"	FLOAT, CHAIN
WC-DOT	22 OZ PVC POLYESTER	6", 8", 10"	5/16"	5/16"	FLOAT, CHAIN
HEAVY DUTY	22 OZ PVC POLYESTER	6", 8" 10, 12"	5/16" – 3/8"	5/16"	FLOAT, CHAIN
FILTER FABRIC SKIRT	WOVEN OR NONWOVEN	6" – 12"	5/16" – 3/8"	5/16"	FLOAT, CHAIN, SKIRT FABRIC

TEMPORARY STREAM PROTECTION:

1. ITEMS DEFINED AS TEMPORARY CONSIST OF MATERIALS, STRUCTURES, OR SEQUENCES USED TO FACILITATE THE CONSTRUCTION OF A PERMANENT UTILITY OR PORTION OF INFRASTRUCTURE. THESE FEATURES ARE NOT A PART OF THE PERMANENT STRUCTURE, AND WILL BE REMOVED FROM THE STREAM AFTER FACILITATING THE CONSTRUCTION OF PERMANENT UTILITIES AND FEATURES AT THE CROSSING.
2. TEMPORARY ADDITIONAL OVERBURDEN TO BE INSTALLED FOR ADDITIONAL DOWNPRESSURE FOR TUNNELING AND HDD CROSSING UNDER TUSCARORA CREEK.
3. ABASCO TYPE 2 TURBIDITY CURTAIN WITH FILTER FABRIC SKIRT OR APPROVED EQUIVALENT TO PROVIDE CONTAINMENT FOR POTENTIAL IDFR DURING HDD. DEPLOY AND SECURE TURBIDITY CURTAINS AT THE UPSTREAM AND DOWNSTREAM LOCATIONS PRIOR TO THE HDD BOREPATH CROSSING UNDER THE STREAM. MAINTAIN AND SERVICE THE TURBIDITY CURTAINS UNTIL PULLBACK IS COMPLETE FOR BOTH THE 12 INCH AND 16 INCH HDPE PIPES.

FOR CONSTRUCTION

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

Designed:	AL/AWD
Drawn:	TM
Checked:	XXX
Approved:	GAB
P.E. No:	27970
GEI Project	2302756

GEI Consultants
6010 EXECUTIVE BLVD
SUITE 702
ROCKVILLE, MD 20854
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STO MISSION CRITICAL

330 W 34th ST
NEW YORK, NY 10001

QUANTUM LOOP MARYLAND
WEST WATER LOOP
SOUTHERN CROSSING
HDD DESIGN

FREDERICK, MD

NO	DATE	ISSUE/REVISION	APP
2	5/23/2024	PROFILE REVISIONS	GAB
1	5/10/2024	100% DESIGN	GAB

SHEET NAME

INADVERTENT DRILLING FLUID RETURN CONTINGENCY DETAILS

SHEET NO.

IDFR-01_WWLS

DWG. NO.

7 OF 7

Appendix E

Geotechnical Boring Logs (GEI-4 and GEI-18 through GEI-23)

BORING INFORMATION

NORTHING/EASTING (ft): 604,654.4/1,176,705.0 | **LATITUDE/LONGITUDE (ft):** 39.325942/-77.479436
GROUND SURFACE EL. (ft): 310 | **DATE START/END:** 5/8/2024 - 5/8/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | **DRILLING COMPANY:** Connelly
TOTAL DEPTH (ft): 30.0 | **DRILLER NAME:** J. Lewis
LOGGED BY: N. Gallo | **RIG TYPE:** Diedrich D-70 ATV Track

Final Boring Log

GEI-04

DRILLING INFORMATION

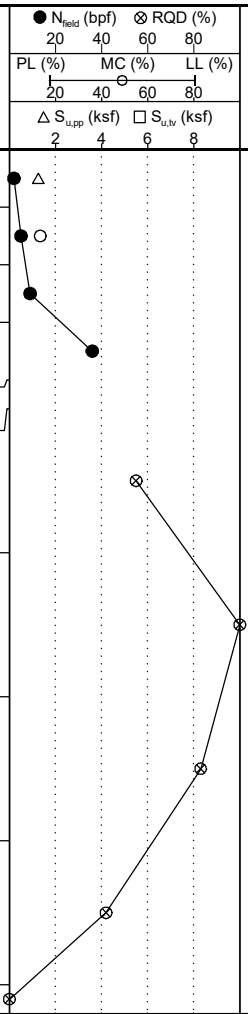
SPT HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/NA | **DRILLING FLUID:** NA
AUGER I.D./O.D.: 4.25 inches/NA | **DRILL ROD O.D.:** NA | **DRILL BIT DIAMETER:** NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: ▽ - At Time of Drilling: El. 306.0

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft)	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description (Per ASTM D2488 - updated with lab data where available)	Drilling and Other Remarks
+310.0						
		S-1	24/24 100%	1-1-1-2 (2)	CL 0'- LEAN CLAY WITH SAND (CL): Mostly fines with low plasticity; little sand; red brown, moist	0'- PID=0.2ppm
		S-2	12/24 50%	1-1-4-8 (5)	SC 2'- CLAYEY SAND (SC) : red brown to brown, moist, trace rock fragments	2'- PID=0.1ppm
305	5	S-3	12/24 50%	9-5-4-1 (9)	4'- Similar to previous except brown, wet	4'- PID=0.3ppm
		S-4	18/24 75%	6-7-29-32 (36)		6'- PID=0.3ppm
		S-5	5/12 42%	9-50/5" (/6")	GC 6'- CLAYEY GRAVEL WITH SAND (GC): Some gravel; some fines; little sand; dense, brown, wet, weathered rock fragments	8'- PID=0.1ppm
		S-6	0/0 %	50/0" (50/0")	8'- Similar to previous	9'- Auger refusal
300	10	C-1	50/60 83% 55%		9'- LIMESTONE CONGLOMERATE - hard to very hard, fine grained, fresh or unweathered to moderately weathered, close to moderately close discontinuities, open to tight joints, low to moderate angle joint orientation, planar to rough, Gray and reddish to dark purple-red matrix	water added during coring
					10.2'- Void	
295	15	C-2	60/60 100% 100%		10.9'- LIMESTONE CONGLOMERATE - hard to very hard, fine grained, fresh or unweathered to moderately weathered, close to moderately close discontinuities, open to tight joints, low to moderate angle joint orientation, planar to rough, Gray and reddis	
					14'- LIMESTONE CONGLOMERATE - hard to very hard, fine grained, fresh or unweathered to moderately weathered, close to moderately close discontinuities, open to tight joints, low to moderate angle joint orientation, planar to rough, Gray and reddish to dark purple-red matrix	
290	20	C-3	60/60 100% 83%		19'- LIMESTONE - very hard, fine grained, slightly weathered, close discontinuities, open joints, moderate to high angle joint orientation, planar to rough, bedded, Gray with streaks of red	
285	25	C-4	54/60 90% 42%		24'- LIMESTONE - hard to very hard, fine grained, slightly to moderately weathered, very close to close discontinuities, open joints, moderate angle joint orientation, planar to rough, bedded, Gray with streaks of red	
280	30	C-5	12/12 100% 0%		29'- LIMESTONE - hard to very hard, fine grained, slightly to moderately weathered, very close to close discontinuities, open joints, moderate angle joint orientation, planar to rough, bedded, Gray with streaks of red	
275	35				**BORING TERMINATED AT 30 FT (EL. +280.0 FT) GROUTED UPON COMPLETION.**	



Layer Name | Graphic Log | USCS

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

BORING INFORMATION

NORTHING/EASTING (ft): 605,681.2/1,178,014.2 | **LATITUDE/LONGITUDE (ft):** 39.328779/-77.474827
GROUND SURFACE EL. (ft): 325 | **DATE START/END:** 5/9/2024 - 5/9/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | **DRILLING COMPANY:** Connelly
TOTAL DEPTH (ft): 25.0 | **DRILLER NAME:** J. Lewis
LOGGED BY: N. Gallo | **RIG TYPE:** Diedrich D-70 ATV Track

Final Boring Log

GEI-18

DRILLING INFORMATION

SPT HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/NA | **DRILLING FLUID:** NA
AUGER I.D./O.D.: 4.25 inches/NA | **DRILL ROD O.D.:** NA | **DRILL BIT DIAMETER:** NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/9/2024 Dry during drilling.

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft)	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Graphic Log	USCS	Soil Description (Per ASTM D2488 - updated with lab data where available)	Drilling and Other Remarks
+325.0		Grab-1	12/12 100%			GP	0'- GRAVEL WITH SAND (GP): Mostly gravel; little sand	0'- PID=0ppm
		S-1	20/24 83%	4-7-10-10 (17)		CL	1'- LEAN CLAY (CL): Mostly fines with low plasticity; brown, moist	1'- PID=0ppm
		S-2	24/24 100%	4-6-6-9 (12)			3'- Similar to previous except trace quartz fragments	3'- PID=0.6ppm
320	5	S-3	24/24 100%	3-3-5-6 (8)		CH	5'- FAT CLAY (CH) : brown, moist	5'- PID=0.2ppm
		S-4	24/24 100%	2-3-5-6 (8)			7'- Similar to previous	7'- PID=1.3ppm
		S-5	24/12 200%	3-4-4-5/0" (8/6")			9'- Similar to previous	9'- PID=0ppm
315	10							
		S-6	18/18 100%	2-1-2 (3)			13.5'- Similar to previous	13.5'- PID=0.2ppm
310	15							
		S-7 C-1	0/0 % 26/36 72% 71%	50/0" (50/0")			17'- LIMESTONE - Medium hard, slightly weathered, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	17'- Auger refusal water added during coring
305	20	C-2	45/60 75% 75%				20'- LIMESTONE - Medium hard, slightly to moderately weathered, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	
							23'- Void	
300	25						24.3'- LIMESTONE - Medium hard, slightly weathered, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray. **BORING TERMINATED AT 25 FT (EL. +300.0 FT) GROUTED UPON COMPLETION.**	
295	30							
290	35							

N_{field} (bpf) ⊗ RQD (%) 20 40 60 80
PL (%) MC (%) LL (%) 20 40 60 80
△ $S_{u,pp}$ (ksf) □ $S_{u,tv}$ (ksf) 2 4 6 8

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

GEI DC DEFAULT BORING LOG GINT PROJECT RIVERRENEW-FASTFIELD-REV.GDT 5/24/24

BORING INFORMATION

NORTHING/EASTING (ft): 605,526.6/1,177,670.6 | **LATITUDE/LONGITUDE (ft):** 39.328350/-77.476039
GROUND SURFACE EL. (ft): 325.5 | **DATE START/END:** 5/9/2024 - 5/9/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | **DRILLING COMPANY:** Connelly
TOTAL DEPTH (ft): 25.0 | **DRILLER NAME:** J. Lewis
LOGGED BY: N. Gallo | **RIG TYPE:** Diedrich D-70 ATV Track

Final Boring Log

GEI-19

DRILLING INFORMATION

SPT HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/NA | **DRILLING FLUID:** NA
AUGER I.D./O.D.: 4.25 inches/NA | **DRILL ROD O.D.:** NA | **DRILL BIT DIAMETER:** NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/9/2024 Dry during drilling.

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft) +325.5	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Layer Name	Graphic Log	USCS	Soil Description (Per ASTM D2488 - updated with lab data where available)	Drilling and Other Remarks
325	0	Grab-1	12/12 100%				GP	0'- GRAVEL WITH SAND (GP): Mostly gravel; little sand	0'- PID=0ppm 1'- PID=0ppm
		S-1	16/24 67%	7-5-5-5 (10)			CL	1'- LEAN CLAY WITH SAND (CL): Mostly fines with low plasticity; few sand; few gravel; stiff, brown, moist	3'- PID=0ppm
		S-2	22/24 92%	3-3-3-3 (6)				3'- Similar to previous	5'- PID=0.2ppm
320	5	S-3	24/24 100%	2-2-2-3 (4)				5'- Similar to previous	7'- PID=0ppm
		S-4	20/24 83%	3-2-3-3 (5)			ML	7'- SILT (ML) : brown, moist	9'- PID=0ppm
		S-5	14/18 78%	3-2-50/3"				9'- Similar to previous	10.5'- Auger refusal
315	10	S-6	0/0 %	50/0" (50/0")				10.5'- LIMESTONE - Medium hard, slightly to moderately weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	water added during coring
		C-1	45/54 83% 61%						
310	15	C-2	58/60 97% 57%					15'- LIMESTONE - Medium hard, slightly to moderately weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	
305	20	C-3	60/60 100% 88%					20'- LIMESTONE - Medium hard, slightly to moderately weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	
300	25							**BORING TERMINATED AT 25 FT (EL. +300.5 FT) GROUTED UPON COMPLETION.**	
295	30								
290	35								

Sample Information

N_{field} (bpf) ⊗ RQD (%) 20 40 60 80
PL (%) MC (%) LL (%) 20 40 60 80
△ $S_{u,pp}$ (ksf) □ $S_{u,tv}$ (ksf) 2 4 6 8

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

GEI DC DEFAULT BORING LOG GINT PROJECT RIVERRENEW-FASTFIELD-REV.GDT 5/24/24

BORING INFORMATION

NORTHING/EASTING (ft): 605,318.2/1,177,580.9 | **LATITUDE/LONGITUDE (ft):** 39.327777/-77.476352
GROUND SURFACE EL. (ft): 325.5 | **DATE START/END:** 5/9/2024 - 5/9/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | **DRILLING COMPANY:** Connelly
TOTAL DEPTH (ft): 25.0 | **DRILLER NAME:** J. Lewis
LOGGED BY: N. Gallo | **RIG TYPE:** Diedrich D-70 ATV Track

Final Boring Log

GEI-20

DRILLING INFORMATION

SPT HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/NA | **DRILLING FLUID:** NA
AUGER I.D./O.D.: 4.25 inches/NA | **DRILL ROD O.D.:** NA | **DRILL BIT DIAMETER:** NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/10/2024 Dry during drilling.

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft) +325.5	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Layer Name	Graphic Log	USCS	Soil Description (Per ASTM D2488 - updated with lab data where available)	Drilling and Other Remarks
325	0	S-1	20/24 83%	3-4-4-5 (8)			CL	0'- LEAN CLAY (CL): brown, moist, trace gravel	0'- PID=0ppm
									2'- PID=0.1ppm
		S-2	22/24 92%	4-5-6-7 (11)				2'- Similar to previous	
									4'- PID=0ppm
320	5	S-3	20/24 83%	5-5-7-7 (12)				4'- Similar to previous except trace quartz fragments	
									6'- PID=0ppm
		S-4	20/24 83%	3-3-3-5 (6)				6'- Similar to previous	
									8'- PID=0ppm
		S-5	24/24 100%	4-3-4-3 (7)				8'- Similar to previous	
315	10								
									13.5'- PID=0ppm
		S-6	18/18 100%	2-1-3 (4)			MH	13.5'- ELASTIC SILT (MH): brown, moist	
310	15								
									18.5'- PID=0ppm
		S-7	18/18 100%	2-2-3 (5)				18.5'- Similar to previous	
305	20								
									23.5'- PID=0ppm
		S-8	18/18 100%	2-2-2 (4)				23.5'- Similar to previous	
300	25							**BORING TERMINATED AT 25 FT (EL. +300.5 FT) GROUTED UPON COMPLETION.**	
295	30								
290	35								

Sample Information

N_{field} (bpf) ⊗ RQD (%) — 20 40 60 80
PL (%) MC (%) LL (%) — 20 40 60 80
△ $S_{u,pp}$ (ksf) □ $S_{u,tv}$ (ksf) — 2 4 6 8

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

GEI DC DEFAULT BORING LOG GINT PROJECT RIVERRENEW-FASTFIELD-REV.GDT 5/24/24

BORING INFORMATION

NORTHING/EASTING (ft): 605,155.7/1,177,195.1
LATITUDE/LONGITUDE (ft): 39.327325/-77.477713
GROUND SURFACE EL. (ft): 315
DATE START/END: 5/10/2024 - 5/10/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F
DRILLING COMPANY: Connelly
TOTAL DEPTH (ft): 25.0
DRILLER NAME: J. Lewis
LOGGED BY: N. Gallo
RIG TYPE: Diedrich D-70 ATV Track

Final Boring Log

GEI-21

DRILLING INFORMATION

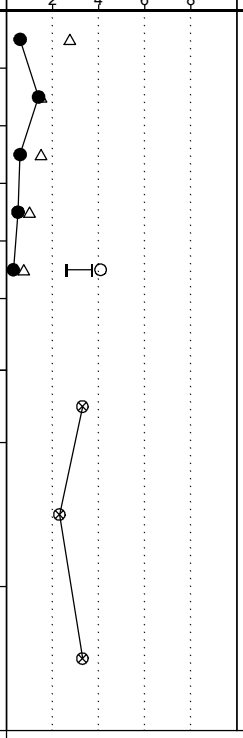
SPT HAMMER TYPE: Automatic
CASING I.D./O.D.: NA/NA
DRILLING FLUID: NA
AUGER I.D./O.D.: 4.25 inches/NA
DRILL ROD O.D.: NA
DRILL BIT DIAMETER: NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/10/2024 Dry during drilling.

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft)	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	USCS	Soil Description (Per ASTM D2488 - updated with lab data where available)	Drilling and Other Remarks
+315.0							
		S-1	20/24 83%	2-2-4-5 (6)	CL	0'- LEAN CLAY (CL): Mostly fines with low plasticity; trace sand; brown, moist	0'- PID=0ppm
		S-2	22/24 92%	4-7-7-8 (14)		2'- Similar to previous	2'- PID=0.4ppm
310	5	S-3	22/24 92%	3-3-3-3 (6)		4'- Similar to previous	4'- PID=0.1ppm
		S-4	24/24 100%	2-2-3-3 (5)		6'- Similar to previous	6'- PID=0ppm
		S-5	18/24 75%	2-1-2-2 (3)	ML	8'- SILT (ML): brown, moist	8'- PID=0ppm
305	10						
		S-6 C-1	0/0 % 23/30 77% 33%	50/0" (50/0")		12.5'- LIMESTONE - Medium hard to hard, slightly weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	12.5'- Auger refusal water added during coring
300	15	C-2	60/60 100% 23%			15'- LIMESTONE - Medium hard to hard, slightly weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	
295	20	C-3	55/60 92% 33%			20'- LIMESTONE - Medium hard to hard, slightly to moderately weathered, fine grained, close discontinuities, open to closed joints, low to moderate joint angle, undulating, rough, Gray.	
290	25					**BORING TERMINATED AT 25 FT (EL. +290.0 FT) GROUTED UPON COMPLETION.**	
285	30						
280	35						



Layer Name | Graphic Log

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

BORING INFORMATION

NORTHING/EASTING (ft): 604,989.5/1,177,257.5 | **LATITUDE/LONGITUDE (ft):** 39.326869/-77.477489
GROUND SURFACE EL. (ft): 316 | **DATE START/END:** 5/10/2024 - 5/13/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | **DRILLING COMPANY:** Connelly
TOTAL DEPTH (ft): 25.0 | **DRILLER NAME:** J. Lewis
LOGGED BY: N. Gallo | **RIG TYPE:** Diedrich D-70 ATV Track

Final Boring Log

GEI-22

DRILLING INFORMATION

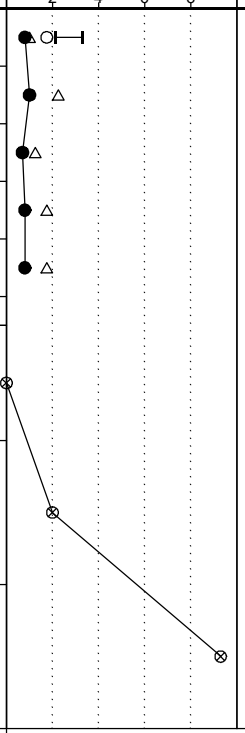
SPT HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/NA | **DRILLING FLUID:** NA
AUGER I.D./O.D.: 4.25 inches/NA | **DRILL ROD O.D.:** NA | **DRILL BIT DIAMETER:** NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/13/2024 Dry during drilling.

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft) +316.0	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Layer Name	Graphic Log	USCS	Soil Description (Per ASTM D2488 - updated with lab data where available)	Drilling and Other Remarks
315	0	S-1	24/24 100%	2-3-5-5 (8)			CL	0'- LEAN CLAY (CL): Mostly fines with low plasticity, brown,moist	0'- PID=0ppm
									2'- PID=0.3ppm
		S-2	24/24 100%	5-5-5-7 (10)				2'- Similar to previous	
	5	S-3	20/24 83%	3-3-4-4 (7)				4'- Similar to previous	4'- PID=0ppm
310		S-4	20/24 83%	3-4-4-6 (8)				6'- Similar to previous except trace weathered rock	6'- PID=0.1ppm
		S-5	12/24 50%	3-4-4-5 (8)				8'- Similar to previous	8'- PID=0ppm
	10								11'- Auger refusal
305		S-6	0/0 %	50/0" (50/0")				11'- LIMESTONE - Medium hard to hard, slightly weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	water added during coring
		C-1	22/48 46% 0%					13'- Void	
	15	C-2	54/60 90% 20%					15'- LIMESTONE - Medium hard to hard, slightly to moderately weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.	
295	20	C-3	60/60 100% 93%					20'- LIMESTONE - Medium hard to very hard, slightly weathered, close discontinuities, fine grained, open joints, low to moderate joint angle, planar to undulating, rough, Gray.	
290	25							**BORING TERMINATED AT 25 FT (EL. +291.0 FT) GROUTED UPON COMPLETION.**	
285	30								
280	35								



PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

GEI DC DEFAULT BORING LOG GINT PROJECT RIVERRENEW-FASTFIELD-REV.GDT 5/24/24

BORING INFORMATION

NORTHING/EASTING (ft): 604,858.5/1,176,984.1 | **LATITUDE/LONGITUDE (ft):** 39.326506/-77.478453
GROUND SURFACE EL. (ft): 312 | **DATE START/END:** 5/13/2024 - 5/13/2024
VERTICAL/HORIZONTAL DATUM: NAVD88/MD83F | **DRILLING COMPANY:** Connelly
TOTAL DEPTH (ft): 25.0 | **DRILLER NAME:** J. Lewis
LOGGED BY: N. Gallo | **RIG TYPE:** Diedrich D-70 ATV Track

Final Boring Log

GEI-23

DRILLING INFORMATION

SPT HAMMER TYPE: Automatic | **CASING I.D./O.D.:** NA/NA | **DRILLING FLUID:** NA
AUGER I.D./O.D.: 4.25 inches/NA | **DRILL ROD O.D.:** NA | **DRILL BIT DIAMETER:** NA
DRILLING METHOD: Hollow Stem Auger

WATER LEVEL: @ 5/13/2024 Dry during drilling. - Dry during drilling.

ABBREVIATIONS

PEN = Penetration Length
REC = Recovery Length
RQD = Rock Quality Designation
I.D. = Inside Diameter
O.D. = Outside Diameter
HSA = Hollow-Stem Auger
S-# = Split Spoon Sample and Number
U-# = Undisturbed Sample and Number
SC-# = Sonic Core and Number
WOR = Weight of Rods
WOH = Weight of Hammer
VOC = Volatile Organic Carbon
CO = Carbon Monoxide
H_2S = Hydrogen Sulfide
O_2 = Oxygen
LEL = Lower Explosive Limit
ppm = parts per million
NA = Not Applicable
NM = Not Measured
bgs = below ground surface
bpf = blows per foot
N_{field} = Uncorrected SPT N-Value
LL = Liquid Limit
PL = Plastic Limit
MC = Moisture Content
$S_{u,pp}$ = Undrained Strength from Pocket Penetrometer
$S_{u,tv}$ = Undrained Strength from Pocket Torvane
USCS = Unified Soil Classification System

Elev. (ft)	Depth (ft)	Sample Type-No.	REC/PEN (in) REC% RQD%	Blows per 6 in. (N_{field})	Soil Description (Per ASTM D2488 - updated with lab data where available)	USCS	Drilling and Other Remarks
+312.0							
310	0	S-1	24/24 100%	2-2-2-4 (4)	0'- LEAN CLAY (CL): Mostly fines with low plasticity; few sand; brown, moist	CL	0'- PID=0.3ppm
					2'- Similar to previous		2'- PID=0.1ppm
	5	S-2	22/24 92%	4-5-5-8 (10)			
305		S-3	24/24 100%	4-5-6-10 (11)	4'- Similar to previous except trace quartz fragments		4'- PID=0.1ppm
		S-4	24/24 100%	4-5-6-8 (11)	6'- Similar to previous		6'- PID=0ppm
	10	S-5	24/24 100%	2-3-4-3 (7)	8'- Similar to previous except trace weathered rock fragments		8'- PID=0ppm
300							13.5'- Auger refusal
	15	S-6	0/0 %	50/0" (50/0")	13.5'- LIMESTONE - Medium hard, slightly weathered, fine grained, very close to close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.		water added during coring
		C-1	36/60 60% 47%		15.3'- Void		
295					16'- LIMESTONE - Medium hard, slightly weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.		
					16.3'- Void		
	20	C-2	51/60 85% 53%		17.2'- LIMESTONE - Medium hard, slightly weathered, fine grained, very close to close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.		
290					18.5'- LIMESTONE - Medium hard, slightly weathered, fine grained, close discontinuities, open joints, low to moderate joint angle, undulating, rough, Gray.		
	25	C-3	12/18 67% 22%		23.5'- LIMESTONE - Medium hard, slightly weathered, fine grained, close discontinuities, open joints, moderate to high joint angle, undulating, rough, Gray.		
285					**BORING TERMINATED AT 25 FT (EL. +287.0 FT)**		
	30				**GROUTED UPON COMPLETION.**		
280							
	35						
275							

PROJECT NAME: STO MC - Frederick
CITY/STATE: Frederick, MD
GEI PROJECT NUMBER: 2302756

GEI Consultants

GEI DC DEFAULT BORING LOG GINT PROJECT RIVERRENEW-FASTFIELD-REV.GDT 5/24/24

Appendix F

Stream Crossing Studies and Seepage Plans

1. **QPS Stream Crossing Study** (used for West Loop North estimate)
2. **West Water Loop South Stream Crossing Study** (title was Mountville Road when study was produced)

Memo

To: Peter McCabe (STO Mission Critical)

From: Christophe Locussol, P.E. (GEI)

c: Giovanni Bonita, Ph.D., P.E.; Albin Rosado, EIT (GEI)

Date: December 13, 2023

Re: Dewatering Assessment – Quantum Place South Crossing
Quantum Maryland, LLC
Frederick, MD

This memorandum describes the design approach used to estimate the volume of groundwater and the drawdown associated with the extraction of water within the proposed temporary excavations for the installation of two water lines beneath Tuscarora Creek along the proposed Quantum Place South (QPS) road.

The original design called for installing two ductile iron water lines using cut and cover methods that would require diverting Tuscarora Creek. GEI proposed an alternative trenchless construction method in the Technical Memorandum *Trenchless Engineering Design – QPS Engineering Scope – DWSU Permit 603A-SW* dated November 6, 2023. This method would use horizontal directional drilling (HDD) to drill below the stream using either HDPE or fusible PVC pipe materials. A connection between the ductile iron and HDPE/fusible PVC materials would be required on both sides of the stream, within temporary excavations between 8 feet and 16.5 feet in depth. The analysis quantifies the dewatering volumes required to maintain the groundwater two (2) feet below subgrade to allow for the connection between pipe materials. The analysis assumes that these excavations will be either sloped excavations or utilize trench boxes for temporary support of the trench walls.

Our design was based on the subsurface information provided in the Geo-Technology Associates, Inc. (GTA) geotechnical report titled *Report of Geotechnical Exploration – Quantum Place South Quantum Frederick Property* dated April 5, 2023.

Existing Conditions

The proposed development is located within the larger Quantum Maryland, LLC property consisting of approximately 2,200 acres. The proposed QPS Crossing is located approximately 3,500 feet south-east of the intersection of Ballenger Creek Pike and Manor Woods Road, but only approximately 330 feet west of Manor Woods Road in the north-east portion of the development. The site straddles agricultural farmland on the eastern bank of the Tuscarora Creek and a paved parking lot for the former Eastalco plant. Construction at the development was halted by regulatory agencies due to permitting issues relating to dewatering after grading operations started in other areas of the site.

Subsurface Conditions

Subsurface conditions throughout the site were developed from the soil borings advanced for the project and presented in the GTA geotechnical reports. Three geotechnical borings were drilled along the proposed QPS Crossing alignment. Only two of the borings encountered auger refusal, and none of the borings extended into the bedrock. Air track probes along the alignment were advanced to encounter the top of bedrock and to identify cavities in the rock.

The top of rock elevation varies significantly across the site and GEI has requested additional subsurface investigation within the proposed work area to better understand the conditions.

The following provides a brief summary of the typical subsurface stratigraphy at the site:

Stratum 1 – Fill/Residual Soils (El. 328 feet to El. 303 feet):

The residual layer generally consists of moderate to high-plasticity cohesive soils classified as lean clay (CL), fat clay (CH), elastic silt (ML) and high-plasticity silt (MH) with some silty sand (SM). Fill soils were encountered in two borings above the residual layer, and appear to be recompacted residual soils. SPT N-values in this layer ranged from 2 blows per foot (bpf) to 50 bpf. Soft layers were encountered at depth near the transition between residual soils and highly weathered rock/rock.

Stratum 2 – Highly Weathered Rock (El. 310 feet to El. 298 feet):

The Residual Soils are underlain by a thin layer of highly weathered rock, defined as Stratum 1 soils with SPT N-values between 51 bpf and 50 blows for 6 inch of split spoon penetration. Borings on the western bank of the stream encountered slightly thicker Stratum 2 soils.

Stratum 3 –Rock (El. 293 feet):

Stratum 1 and Stratum 2 are underlain by the Cambrian-age Frederick Formation, which consists of thin-bedded, laminated limestone. This formation is particularly susceptible to developing karst features. Top of rock is defined as auger refusal. Rock coring was not performed in either of the three borings advanced within the footprint of the proposed work. However, based on borings advanced within other areas of the site, Rock Quality Designation (RQD) for the rock ranged from 0% to 100%, with RQD values increasing approximately 10 feet below the top of rock.

Air track probes were also advanced along the QPS road alignment. Depth of rock ranged between 17 feet in depth and 20 feet in depth, and top of rock appears to dip as the alignment moves west.

Groundwater:

Groundwater was encountered within the Residual Soils layer at elevations ranging between El. 311 feet and El. 321.5 feet along the alignment.

Relevant boring logs and subsurface data are included as Attachment 1 for reference.

Proposed Construction

The proposed construction consists of a 12-inch diameter potable water line and a 16-inch diameter potable cooling water line along the same alignment. Both lines are currently designed as ductile iron pipes. The 16-inch water line is currently placed at a 10-foot horizontal offset and has a deeper invert elevation than the 12-inch water line. GEI proposed HDD as an alternative construction method where the two water lines intersect the existing Tuscaroa Creek to minimize disturbance. The length of the HDD-installed water lines is approximately 275 feet and would consist of either HDPE or fusible PVC material.

A coupler between the two dissimilar pipe materials will be required. These connections will be achieved in temporary excavations approximately 8 feet in depth on the eastern bank of the stream and approximately 18 feet in depth on the western bank. The analysis assumes that the excavations will have an approximate footprint at subgrade of 17.5 feet by 15 feet at the eastern excavation and an approximate footprint at subgrade of 17 feet by 7 feet at the western excavation to perform the connections for both water lines. The excavations will be either sloped excavations or excavations

supported by trench boxes. Ground improvement to restrict or limit groundwater intrusion into the excavations was not considered in the analysis.

Analysis Approach

A numerical model was prepared using the geometry of the proposed excavations, groundwater elevations and stratigraphy discussed above to estimate the flow that will enter the excavations. The computer program, SEEP/W, developed by Geoslope International, a Bentley company, was used to perform the analysis. SEEP/W is a finite element software product for modelling two-dimensional groundwater flow in porous media.

SEEP/W uses permeability properties of the subsurface layers to estimate the flow rate of the groundwater through these layers. As mentioned previously in the subsurface conditions section, three different soil layers were modeled in SEEP/W based on the available boring logs.

The permeability value for Stratum 1 (Residual Soils) layer was conservatively estimated using hydraulic conductivity values consistent with silty sand material. This is a conservative value as most of the Stratum 1 soils consist of fine-grained soils. The permeability values of the Stratum 2 (Weathered Rock) and Stratum 3 (Rock) layers were estimated using hydraulic conductivity values of well graded gravel (GW) and limestone, respectively presented in NAVFAC DM 7.1 (2022 Manual).

The NAVFAC DM 7 manual indicates that the ratio of vertical to horizontal permeability (K_y/K_x) can be on the order of 0.1 for stratified soil deposits.

Table 1 summarizes the permeability properties of the various elements used in the SEEP/W analysis.

Table 1. Permeability Properties

Layer	Name	Saturated Horiz. Permeability, K_x (ft/sec)
1	Residual Soils (SM)	3.13×10^{-6}
2	Weathered Rock	3.28×10^{-3}
3	Limestone	4.92×10^{-4}

The analysis was set up as a two-dimensional SEEP/W model section view, modeling both excavations. At the western excavation, the top of the model was set at a grade elevation of El. 326 feet. A constant water head of 321.5 feet was set as the boundary condition to the west of the model. At the eastern excavation, the top of the model was set at a grade elevation of El. 324.5. A constant water head of 315 feet was set as the boundary condition to the east of the model. A no flow boundary condition was set along the bottom of the limestone layer in the SEEP/W model.

In the SEEP/W model, wells along the width of the excavation were used to model drainage trenches and sump pits. The wells were placed at relatively equal horizontal distances and flow rates were assigned to target stabilized groundwater depths of two feet below the excavation subgrade. The flow rates were then added to estimate the anticipated flow into the excavations.

The HDD process will use introduced drilling mud to lubricate the cutter head and remove spoils. Given this installation method, we do not anticipate seepage of groundwater into the HDD process. Therefore, the amount of seepage from this construction activity is considered negligible.

The results of the SEEP/W analyses at the two excavations locations are included as Attachment 2. The results of the analysis indicate that about 4.0 gallons per day per foot of wall (gpd/ft) will leak into the excavation at the eastern excavation and 45.6 gpd/ft will enter the excavation at the western

excavation. These flow rates were then multiplied by the total perimeter lengths of the respective excavations to estimate the total flow into the SOE systems. The total flow at the eastern excavation and the western excavation were approximately 260 gpd and 2200 gpd, respectively. The two excavations are anticipated to extract a maximum steady state total flow of about 2,460 gpd. The SEEP/W model shows a maximum decrease in the water table at the west excavation of 10 feet, with the drawdown extending up to 55 feet past the edge of the excavation. The decrease in the water table at the east excavation is approximately 3.5 feet, with the drawdown extending up to 38 feet from the edge of the excavation. Figures 1 through 3 of Attachment 3 shows the extent of the groundwater drawdown beyond the limits of the excavations.

Closing

The estimated equilibrated maximum total flow of groundwater into the excavation is expected to be 2,460 gpd average over the period of time that the excavation remains open. Our understanding is that this excavation will be open for a period of fifteen (15) days. The analysis did not consider ground improvement or temporary support of excavation (SOE)that might restrict groundwater. This analysis can therefore be considered as the construction method that would generate the highest groundwater extraction volumes at the QPS crossing. Additional measures to decrease the flow of groundwater into the excavation may be required if actual flows significantly exceed the anticipated steady state flow. GEI should remain engaged during the construction phase to monitor actual flow rates and make recommendations on potential mitigation measures.

Attachments:
Attachment 1 – Subsurface Information
Attachment 2 – Calculation Package – QPS Seepage Analysis
Attachment 3 – Groundwater Drawdown Figures

[arr:chl:gab]
B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\11_Seepage Analysis\QPS South Crossing\Quantum Loop QPS Crossing Seepage Analysis memo.docx

GEI Consultants

Attachment 1 – Subsurface Information

Division of Planning and Permitting
Department of Development
Review Engineering

APPROVED: 01/31/23

Signature:

Submittal 12/07/2022
Submittal 11/23/2022
Submittal 11/01/2022
Submittal 9/29/2022
Submittal 8/26/2022
Submittal 8/4/2022
Submittal 7/8/2022
Submitted 6/6/2022

LOT 107
±702,351 sf
±16.12 acres

OPEN SPACE PARCEL 'B'
±919,026 sf
±21.10 acres

LIMITS OF PLAN

PHASE 2 QUANTUM PLACE SOUTH IMPROVEMENTS

FUTURE TRAFFIC CIRCLE PER SEPARATE IMPROVEMENT PLAN

Quantum Place South (Public)

BRIDGE DESIGN BY OTHERS

Prop. 16"PCW

Prop. 12"W

START OF PHASE 1 IMPROVEMENTS

Ex. Environmental Covenant L. 12205 F.01

Temp. Access Road

Ex. Paved Access Road

Truck Scale

EX. TRUCK SCALE TO BE REMOVED

SEE SHEET SC-6 FOR BASIN DA-2 DETAILS

TEMP. ACCESS ROAD TO TIE INTO EX. PAVED ACCESS ROAD

Basin DA-2

SWM ESM'T

Ex. Manor Woods Road (Public)

LIMITS OF PLAN

MATCHLINE: SEE SHEET SP-4

LOT 105
±747,953 sf
±17.17 acres

OPEN SPACE PARCEL 'A'
±6,860,629 sf
±157.50 acres

Ex. Forest

Ex. Stream

Prop. FRO Esm't

FRO Esm't L.16283 F.250

Prop. Utility Esm't See PW271145

Waterbody Buffer

Ex. FEMA-100 Floodplain

25' Ex. FP BRL

Proposed Floodplain (CLOMR in process)

10' ASPHALT SHARED USE PATH

FUTURE 10' SHARED USE PATH

GRASS SWALE

5' SIDEWALK

9' S/W ESMT.

30' SD ESMT.

40' PUE

14' S/W ESMT.

15" RCP

54" RCP

40' SD ESMT.

36' TEMP. ACCESS ESMT.

50' BRL

EX. PAVING TO BE REMOVED

Ex. 18" CMP

25' BRL for Prop. CLOMR FP

PREVIOUS BORINGS

EXISTING AIR TRACK PROBES

PROPOSED BORINGS

KEY MAP

SP-2 SP-3 SP-4 SP-5 SP-6 SP-7 SP-8

GRAPHIC SCALE

30' 0 15' 30' 60' 120'

1 INCH = 30 FT

CALL "MISS UTILITY" AT 1-800-257-7777
72 Hours Before Start Of Construction

PROFESSIONAL CERTIFICATION

"I hereby certify that these documents were prepared or approved by me that I am a duly licensed professional engineer under the laws of the State of Maryland, and NRCS Standard for Ponds 378.

License No. 29782 , Expiration Date: 01/16/2025 ".

STATE OF MARYLAND — PHILIP THOMAS PHILLIPS — 29782 — PROFESSIONAL ENGINEER

12/08/2022

REVISION	DATE	REVISION	DATE

	BY	DATE
BASE DATA	CADD	
DESIGNED		
DRAWN		
REVIEWED		

RELEASE FOR _____

BY_____ DATE ____

DEVELOPER/OWNER:
QUANTUM MARYLAND, LLC
500 E 4TH STREET SUITE 333
AUSTIN, TX 78701
CONTACT: AD ROBISON
PHONE:530-417-7496

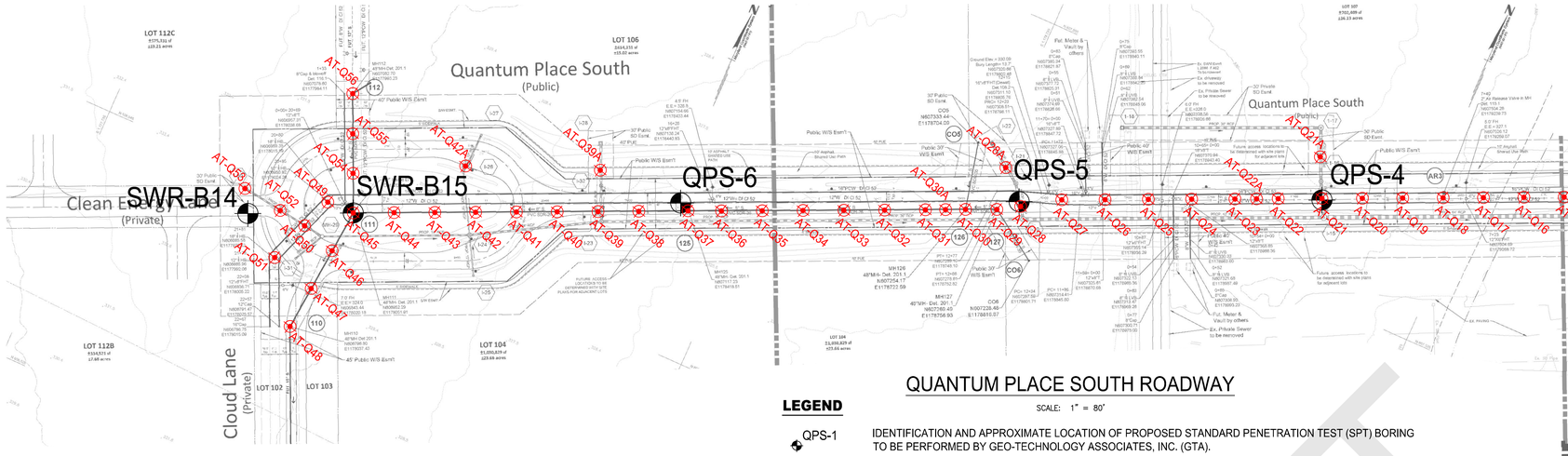
Site Plan

RODGERS CONSULTING
19847 Century Boulevard, Suite 200, Germantown, Maryland 20874
Ph: 301.948.4700 Fx: 301.948.6256 www.rodgers.com

Quantum Frederick
Combined SWM Development and Improvement Plan
Quantum Place South
PW# 273380
Liber 15038, Folio 393
ELECTION DISTRICT NO. 1
FREDERICK COUNTY, MARYLAND

SCALE: 1" = 30'
JOB No. 1339A
INDEX No. SP-2
SHEET No. 12 OF 54

N:\MD-FREDERICK\ALCOA\AUTOCAD\PLOT PLANS\IMPROVEMENT PLANS\QUANTUM SOUTH\12-18-SITE PLANS.DWG



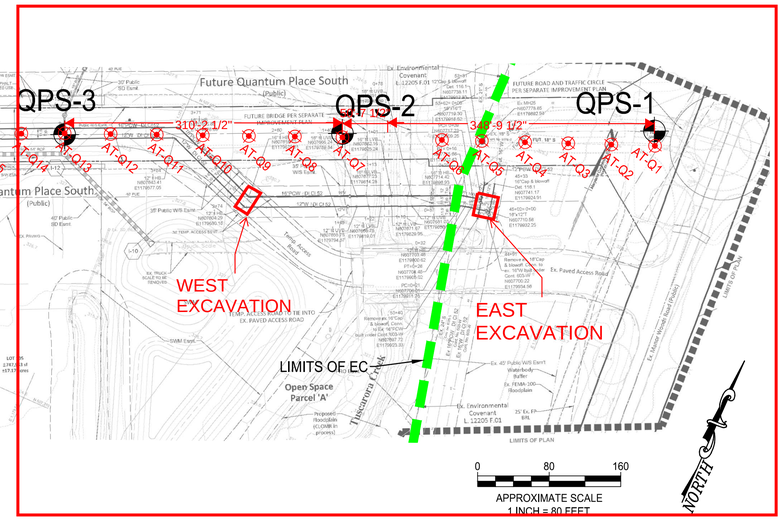
QUANTUM PLACE SOUTH ROADWAY

SCALE: 1" = 80'

LEGEND

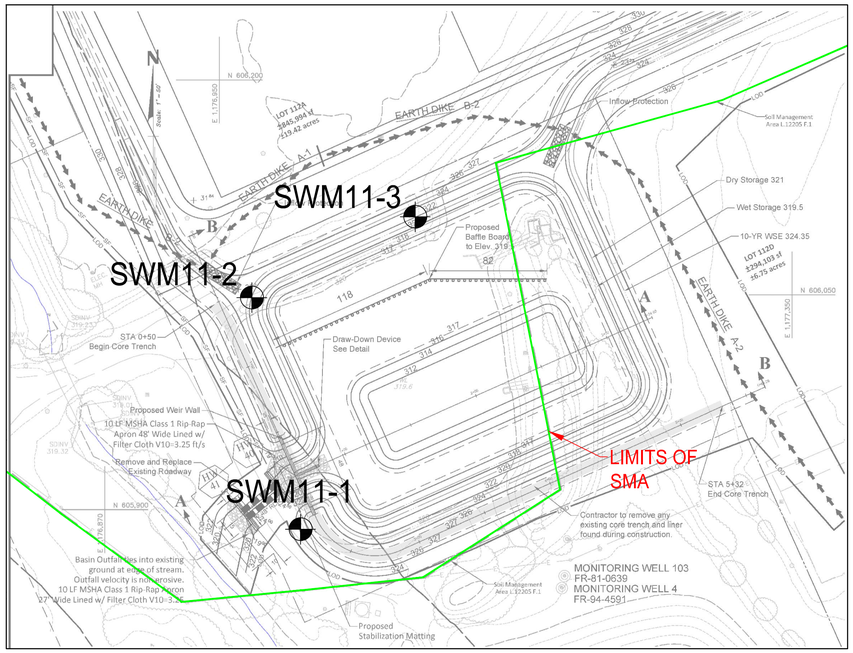
QPS-1	IDENTIFICATION AND APPROXIMATE LOCATION OF PROPOSED STANDARD PENETRATION TEST (SPT) BORING TO BE PERFORMED BY GEO-TECHNOLOGY ASSOCIATES, INC. (GTA).
SWR-B14	IDENTIFICATION AND APPROXIMATE LOCATION OF SPT BORING PERFORMED BY GTA IN JANUARY OF 2023.
AT-Q1	IDENTIFICATION AND APPROXIMATE LOCATION OF AIR TRACK PROBE PERFORMED BY JEMCO IN MARCH OF 2023.

QPS Crossing Location



NOTES

1. BASE IMAGES WERE ADAPTED FROM THE *COMBINED SWM DEVELOPMENT AND IMPROVEMENT PLAN* FOR QUANTUM PLACE SOUTH, DATED JULY 29, 2022, PREPARED BY RODGERS CONSULTING, THE PROJECT CIVIL ENGINEER.
2. EXPLORATION LOCATIONS WERE SELECTED BY GTA. THE SWR-SERIES BORINGS WERE STAKED IN THE FIELD BY RODGERS USING AN INSTRUMENTED SURVEY. THE SWM-SERIES BORING AND THE AIR TRACK PROBE LOCATIONS WERE APPROXIMATELY FIELD-LOCATED BY GTA USING A HAND-HELD GPS UNIT. EXPLORATION LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

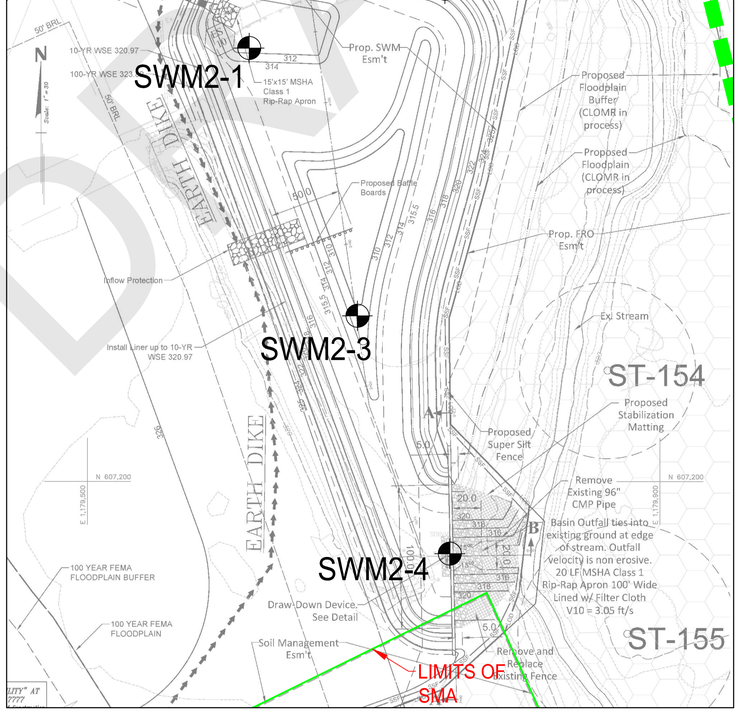


SWM BASIN DA-11

SCALE: 1" = 50'

LEGEND

SWM11-1	IDENTIFICATION AND APPROXIMATE LOCATION OF SPT BORING PERFORMED BY GTA IN AUGUST OF 2022.

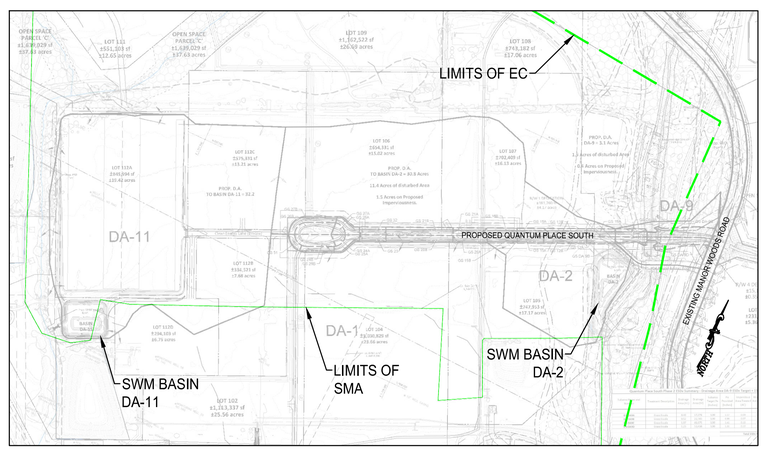


SWM BASIN DA-2

SCALE: 1" = 50'

LEGEND

SWM2-1	IDENTIFICATION AND APPROXIMATE LOCATION OF SPT BORING PERFORMED BY GTA IN AUGUST OF 2022.



VICINITY MAP

SCALE: 1" = 400'

GEO-TECHNOLOGY ASSOCIATES, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
14280 PARK CENTER DRIVE, SUITE A
LAUREL, MARYLAND 20707
(410) 792-9446 OR (301) 470-4470
WWW.GTAENG.COM

QUANTUM FREDERICK
QUANTUM PLACE SOUTH
FREDERICK COUNTY, MARYLAND

EXPLORATION LOCATION PLAN

PROJECT:	DATE:	SCALE:	DRAWN BY:	REVIEW BY:	FIGURE:
201536x5	MARCH 2023	AS SHOWN	DCC	RPM	1

LOG OF BORING NO. QPS-1

PROJECT: **Quantum Place South**
PROJECT NO.: **201536x5**
PROJECT LOCATION: **Frederick County, Maryland**

WATER LEVEL (ft):	9.0	Dry	
DATE:	3/3/2023	3/4/2023	
CAVED (ft):	11.0	10.0	

DATE STARTED: **3/3/2023**
DATE COMPLETED: **3/4/2023**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **3.25" HSA**
SAMPLING METHOD: **Split Spoon/Automatic Hammer**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **8.5**
GROUND SURFACE ELEVATION: **325**
DATUM: **Topo**
EQUIPMENT: **Diedrich D-50**
LOGGED BY: **QCW**
CHECKED BY: **DCG**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					325.0	0				
S-1	0.0	12	4-4-4	8			CL		Light Brown, moist, medium stiff, Sandy Lean CLAY.	Topsoil: 2 in. Qu = 3.0 tsf
					323.0				Gray, dry, very dense, Highly Weathered ROCK (Limestone).	
S-2	2.5	6	50/6"	50/6"						
					321.0		MH		Brown, wet, soft, Elastic SILT with Sand and Rock Fragments. (Limestone)	
S-3	5.0	12	2-1-1	2		5				
					318.0		SC		Brown, wet, very loose, Clayey SAND with Rock Fragments. (Limestone)	▽
S-4	8.5	12	WOH/12"-3	3						
					315.0	10			Auger refusal encountered at 12.5 feet. Auger refusal encoutered at 4.5 at staked location. Boring offset 5 feet west of staked location. Qu is the unconfined compressive strength, given in tons per square foot (tsf), as measured by a pocket penetrometer.	
						15				
						20				
						25				
						30				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
14280 Park Center Drive, Suite A
Laurel, MD 20707

LOG OF BORING NO. QPS-1

LOG OF BORING NO. QPS-2

PROJECT: **Quantum Place South**
PROJECT NO.: **201536x5**
PROJECT LOCATION: **Frederick County, Maryland**

WATER LEVEL (ft): 9.0 | 4.5 |
DATE: 3/3/2023 | 3/4/2023 |
CAVED (ft): Pipe | Pipe |

DATE STARTED: **3/3/2023**
DATE COMPLETED: **3/4/2023**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **3.25" HSA**
SAMPLING METHOD: **Split Spoon/Automatic Hammer**

WATER ENCOUNTERED DURING DRILLING (ft): **13.5**
GROUND SURFACE ELEVATION: **326**
DATUM: **Topo**
EQUIPMENT: **Diedrich D-50**
LOGGED BY: **QCW**
CHECKED BY: **DCG**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					326.0	0				
S-1	0.0	6	7-7-5	12			SM		(FILL) Brown, moist, medium dense, Silty SAND, trace Gravel.	Topsoil: Not Encountered
					324.0		ML		(FILL) Brown, moist, soft, SILT with Sand.	
S-2	2.5	12	2-2-2	4						
S-3	5.0	12	1-2-2	4		5			Same, Sandy, trace Gravel	
					319.0		SC		Brown, moist, loose, Clayey SAND, trace Rock Fragments (Limestone).	
S-4	8.5	3	2-3-2	5		10				
S-5	13.5	18	1-2-2	4					Same, wet, very loose	
					311.0	15			Auger refusal encountered at 17.3 feet.	
						20				
						25				
						30				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
14280 Park Center Drive, Suite A
Laurel, MD 20707

LOG OF BORING NO. QPS-2

LOG OF BORING NO. QPS-3

PROJECT: **Quantum Place South**
PROJECT NO.: **201536x5**
PROJECT LOCATION: **Frederick County, Maryland**

WATER LEVEL (ft):	17.0	Dry	
DATE:	3/2/2023	3/3/2023	
CAVED (ft):	19.0	17.5	

DATE STARTED: **3/2/2023**
DATE COMPLETED: **3/3/2023**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **K. Kozak**
DRILLING METHOD: **3.25" HSA**
SAMPLING METHOD: **Split Spoon/Automatic Hammer**

WATER ENCOUNTERED DURING DRILLING (ft) ▽ **18.5**
GROUND SURFACE ELEVATION: **328**
DATUM: **Topo**
EQUIPMENT: **Diedrich D-50**
LOGGED BY: **QCW**
CHECKED BY: **DCG**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					328.0	0				
S-1	0.0	12	4-3-5	8			CH		(FILL) Brown, moist, medium stiff, Fat CLAY with Sand.	Topsoil: 4 in.
S-2	2.5	16	6-8-8	16					Same, very stiff	
					324.0		CL		Light Brown, moist, very stiff, Lean CLAY with Sand.	
S-3	5.0	12	6-7-9	16		5				
S-4	8.5	18	4-6-6	12					Same, stiff, Sandy, with Rock Fragments (Quartz)	
						10				
					316.0		SC		Brown, moist, medium dense, Clayey SAND with Rock Fragments (Quartz).	
S-5	13.5	18	6-8-7	15		15				
					311.0		CL		Brown, wet, soft, Lean CLAY, trace Rock Fragments (Limestone).	▽ ▽
S_6	18.5	6	1-1-50/6"	50/6"	308.5					
					308.0	20			Brown, wet, very dense, Highly Weathered ROCK (Limestone).	
									Boring terminated at 20 feet.	
						25				
						30				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
14280 Park Center Drive, Suite A
Laurel, MD 20707

LOG OF BORING NO. QPS-3

Table No. 2
Subsurface Exploration Summary - Air Track Probes
Quantum Frederick - Quantum Place South
GTA Project No. 201536x5

Air Track Probe ID	Location	Probe Depth (ft.)	Depth of Overburden (ft.)	Rock Depth Encountered (ft.)	Depth of Cavities/Soil Seams Encountered (ft.)	Depth of Rock Above Utility Invert (ft.)
AT-Q1	SMH 61	23	4	4-14, 18-23	14-18	14
AT-Q2	SMH 61 Sta. 0+49	23	8	8-23	NE	10
AT-Q3	SMH 61 Sta. 0+97	23	16	16-23	NE	2
AT-Q4	SMH 61 Sta. 1+45	23	17	17-23	NE	1
AT-Q5	SMH 25	23	23	NE	NE	---
AT-Q6	Road Sta. 2+50	23	18	18-23	NE	N/A
AT-Q7	Road Sta. 3+70	23	18	18-23	NE	N/A
AT-Q8	Road Sta. 4+20	23	19	19-23	NE	N/A
AT-Q9	Road Sta. 4+70	23	20	20-23	NE	N/A
AT-Q10	W Sta. 3+50	10	10	NE	NE	---
AT-Q11	W Sta. 4+00	12	12	NE	NE	---
AT-Q12	W Sta. 4+50	12	12	NE	NE	---
AT-Q13	W Sta. 5+00	19	19	NE	NE	---
AT-Q14	W Sta. 5+50	18	18	NE	NE	---
AT-Q15	W Sta. 6+00	18	18	NE	NE	---
AT-Q16	W Sta. 6+50	18	18	NE	NE	---
AT-Q17	W Sta. 7+00	19	19	NE	NE	---
AT-Q18	W Sta. 7+50	20	20	NE	NE	---
AT-Q19	W Sta. 8+00	19	19	NE	NE	---
AT-Q20	W Sta. 8+50	20	17	17-20	NE	-2
AT-Q21	W Sta. 9+00	21	21	NE	NE	---
AT-Q21A	SD I-17 + 34	19	19	NE	NE	---
AT-Q22	W Sta. 9+50	18	16	16-18	NE	-3
AT-Q22A	W Sta. 9+75	16	6	6-16	NE	6
AT-Q23	W Sta. 10+00	17	3	3-11, 13-17	11-13	9
AT-Q24	W Sta. 10+50	16	4	4-16	NE	7
AT-Q25	W Sta. 11+00	16	10	10-14, 15-16	14-15	1
AT-Q26	W Sta. 11+50	10	4	4-6, 7-10	6-7	1
AT-Q27	W Sta. 12+00	11	6	6-11	NE	0
AT-Q28	W Sta. 12+50	13	5	5-8, 12-13	8-12	3
AT-Q28A	SD I-22 + 34	10	0	0-4	4-10	5
AT-Q29	SMH 127	13	11	11-13	NE	-3
AT-Q30	SMH 126	14	8	8-14	NE	1
AT-Q30A	SMH 125 Sta. 3+10	13	10	10-13	NE	-1
AT-Q31	SMH 125 Sta. 2+85	15	15	NE	NE	---
AT-Q32	SMH 125 Sta. 2+36	15	15	NE	NE	---
AT-Q33	SMH 125 Sta. 1+87	16	16	NE	NE	---
AT-Q34	SMH 125 Sta. 1+38	16	15	15-16	NE	-4
AT-Q35	SMH 125 Sta. 0+89	16	16	NE	NE	---
AT-Q36	SMH 125 Sta. 0+40	17	11	11-14	14-17	1
AT-Q37	SMH 125	17	13	13-17	NE	-1
AT-Q38	SMH 111 Sta. 3+43	18	13	13-18	NE	0
AT-Q39	SMH 111 Sta. 2+94	18	13	13-18	NE	0
AT-Q39A	SD I-28 + 32	9	6	6-9	NE	-2
AT-Q40	SMH 111 Sta. 2+45	20	10	10-14, 16-20	14-16	4
AT-Q41	SMH 111 Sta. 1+96	20	10	10-20	NE	5
AT-Q42	SMH 111 Sta. 1+47	20	12	12-20	NE	3
AT-Q42A	SD I-27 + 41	9	9	NE	NE	---
AT-Q43	SMH 111 Sta. 0+98	21	10	10-21	NE	6
AT-Q44	SMH 111 Sta. 0+48	22	15	15-22	NE	2
AT-Q45	SMH 111	23	16	16-23	NE	2
AT-Q46	SMH 110 Sta. 1+04	23	15	15-23	NE	3
AT-Q47	SMH 110 Sta. 0+52	23	14	14-23	NE	4
AT-Q48	SMH 110	24	17	17-19, 20-24	19-20	2
AT-Q49	W Sta. 20+75	15	15	NE	NE	---
AT-Q50	W Sta. 21+25	15	15	NE	NE	---
AT-Q51	W Sta. 21+75	15	15	NE	NE	---
AT-Q52	SD I-30 + 50	9	9	NE	NE	---
AT-Q53	SD I-30	9	9	NE	NE	---
AT-Q54	SMH 112 Sta. 0+95	18	10	10-14, 15-18	14-15	3
AT-Q55	SMH 112 Sta. 0+48	19	12	12-15, 15.5-19	15-15.5	2
AT-Q56	SMH 112	18	11	11-18	NE	2

Notes:

NE = Not Encountered N/A = Not Applicable

= Rock encountered less than 5 feet above utility invert.

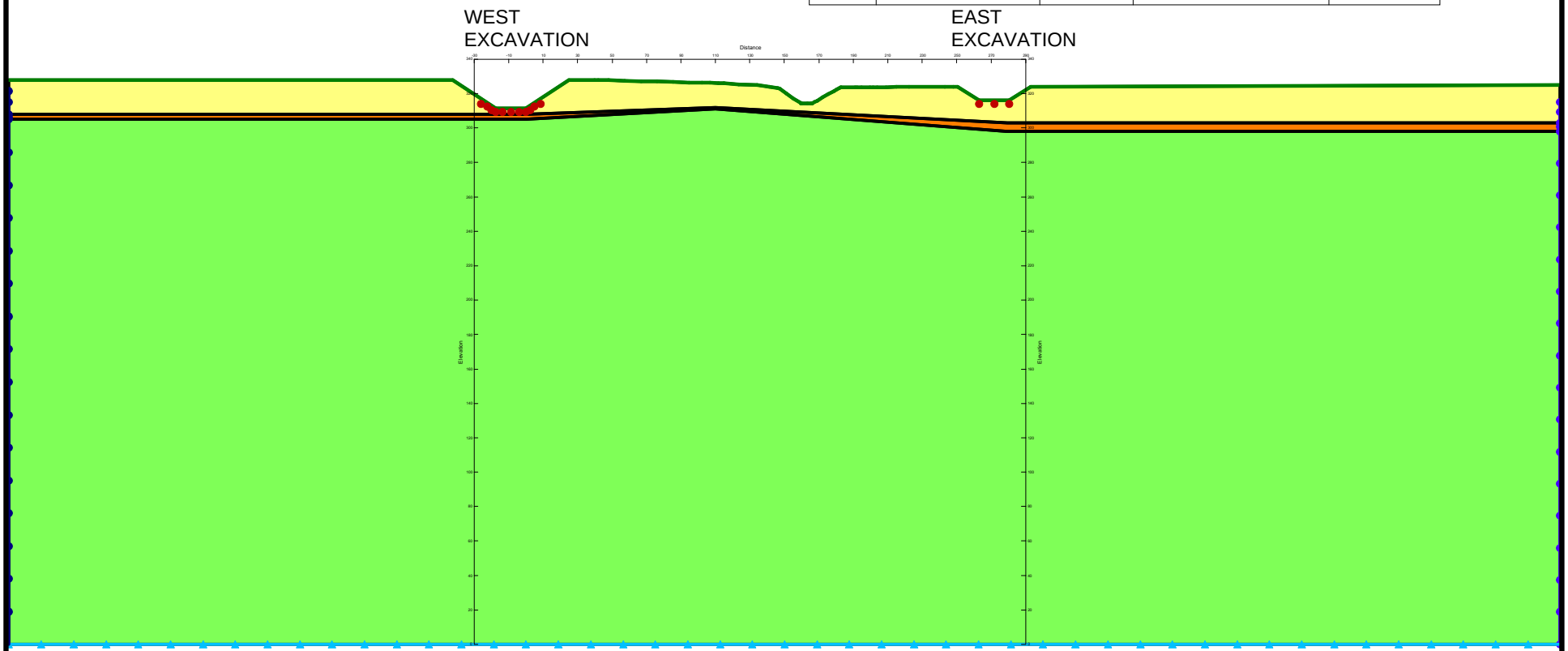
= Rock encountered 5 or more feet above utility invert.

GEI Consultants

Attachment 2 – Excavation Seepage Analysis

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft^3/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Model Geometry
at QPS South
Full Extent View

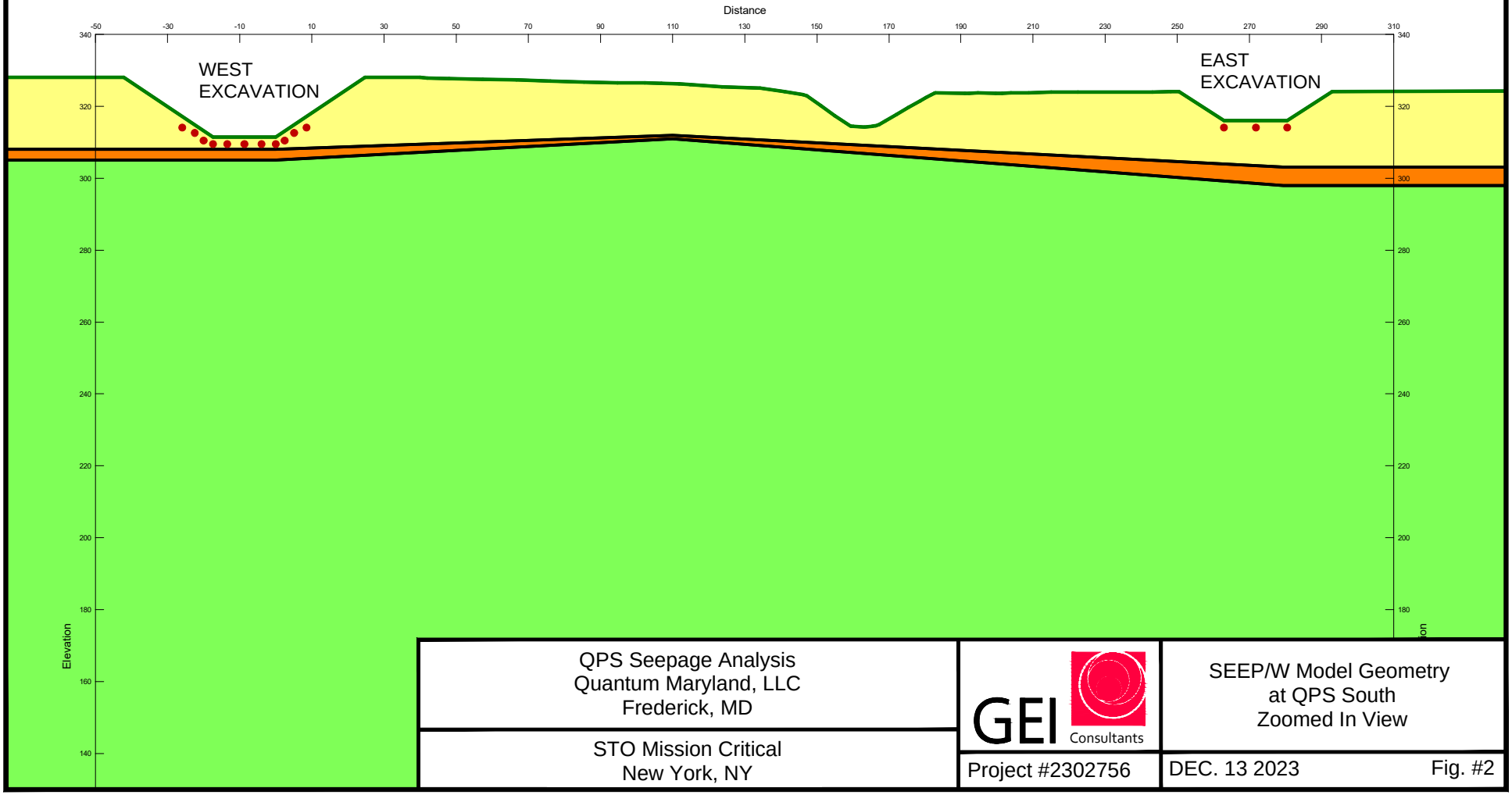
Project #2302756

DEC. 13 2023

Fig. #1

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Model Geometry
at QPS South
Zoomed In View

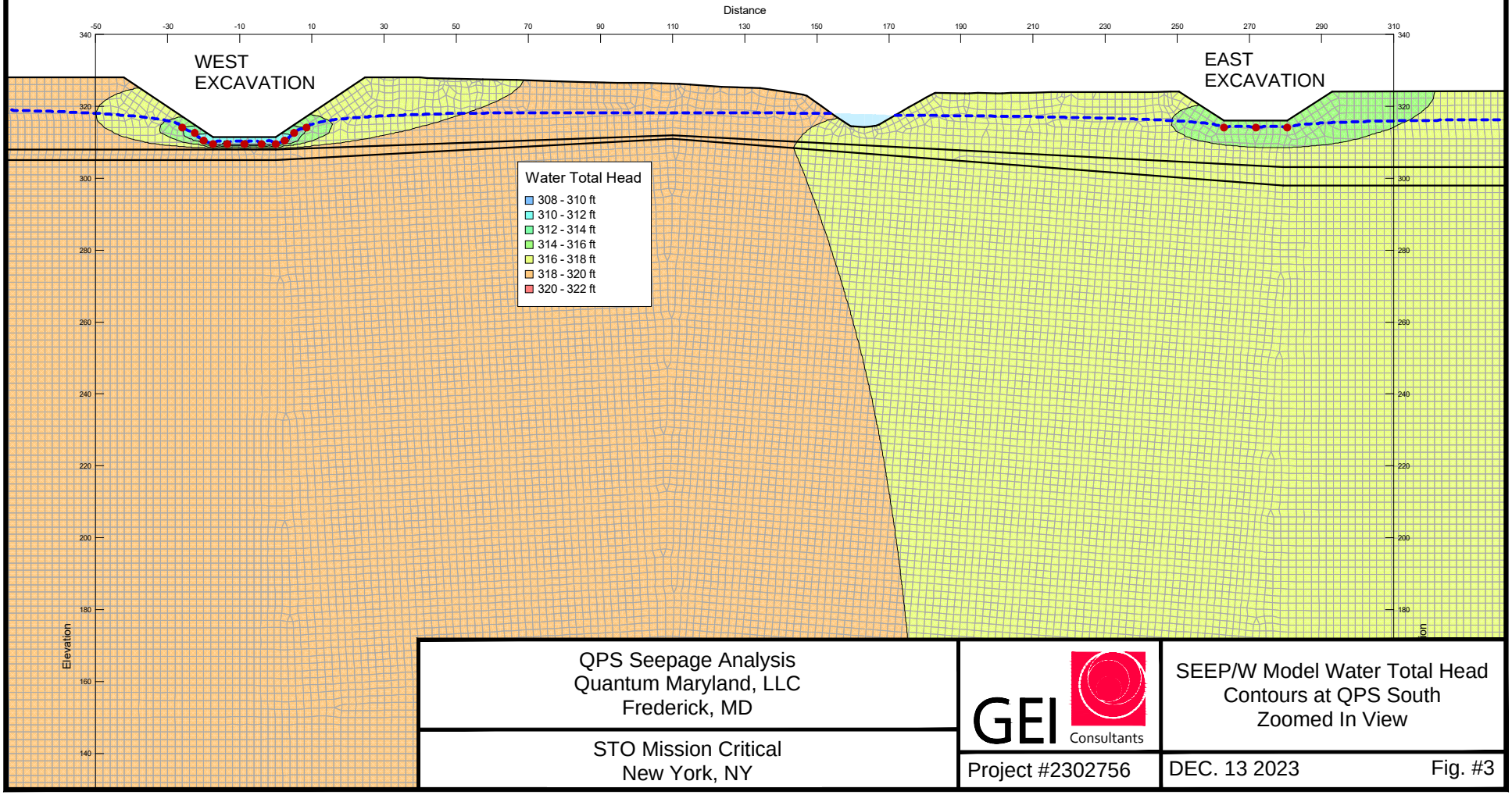
Project #2302756

DEC. 13 2023

Fig. #2

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Model Water Total Head Contours at QPS South Zoomed In View

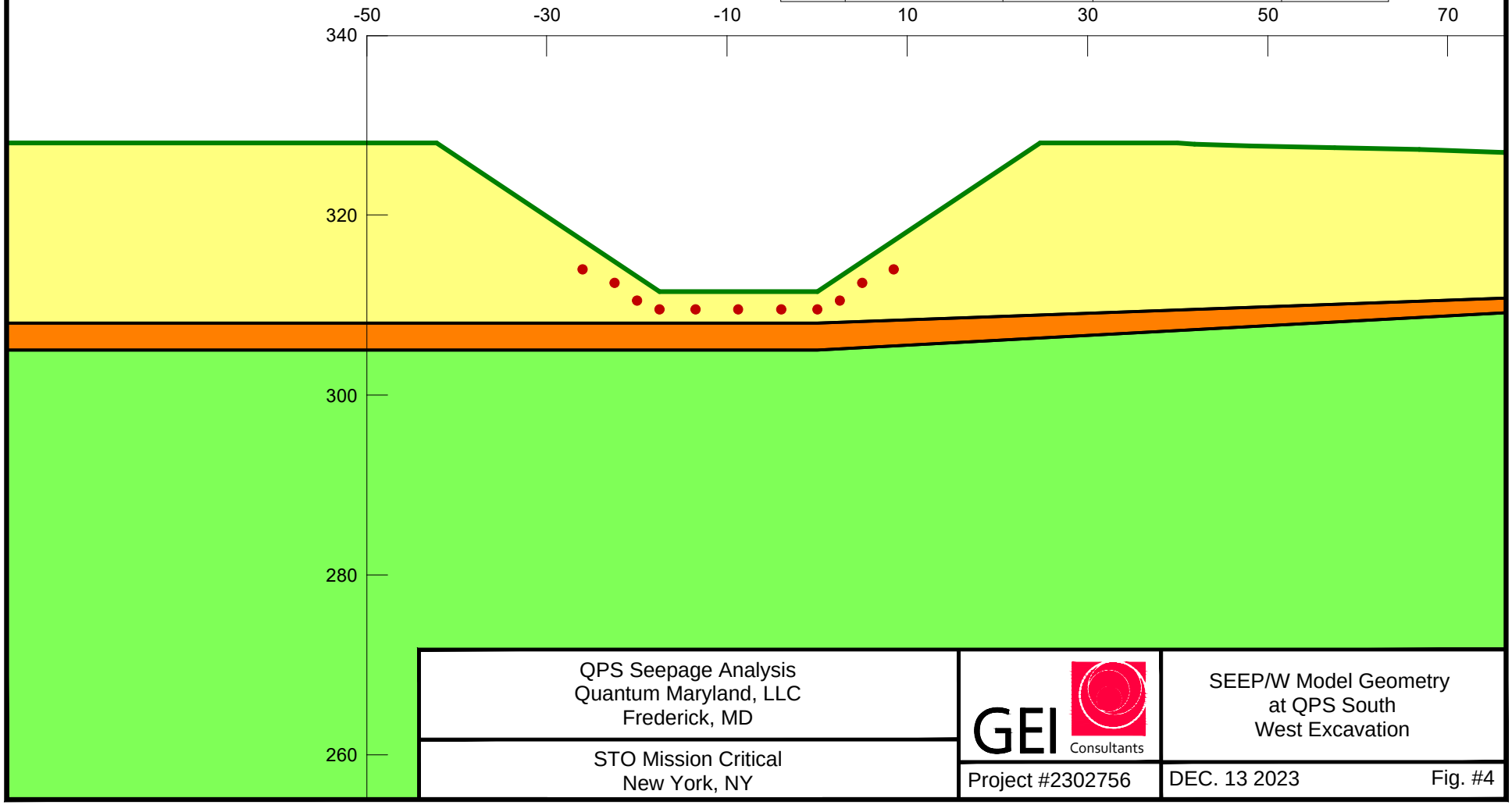
Project #2302756

DEC. 13 2023

Fig. #3

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Model Geometry
at QPS South
West Excavation

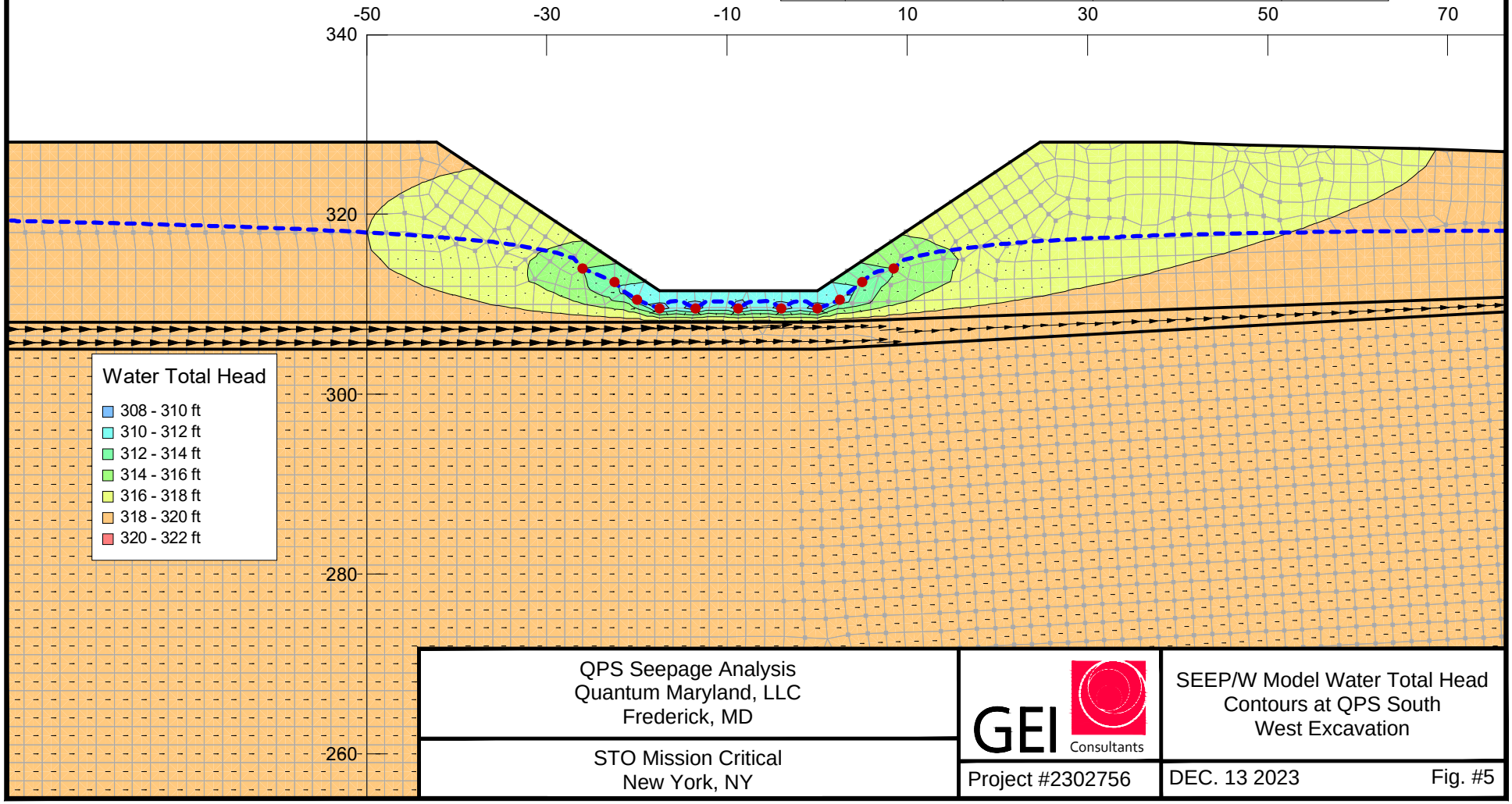
Project #2302756

DEC. 13 2023

Fig. #4

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

Project #2302756

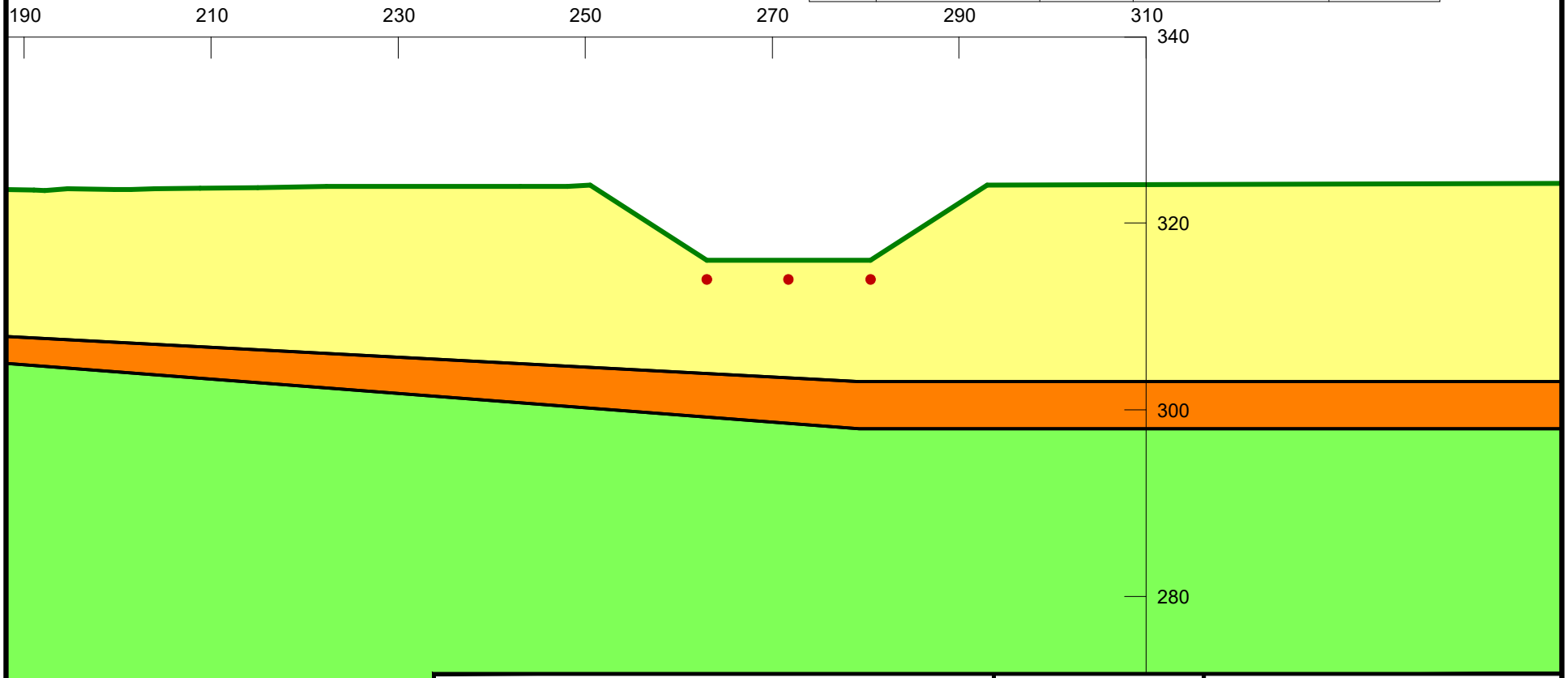
SEEP/W Model Water Total Head Contours at QPS South West Excavation

DEC. 13 2023

Fig. #5

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Model Geometry
at QPS South
East Excavation

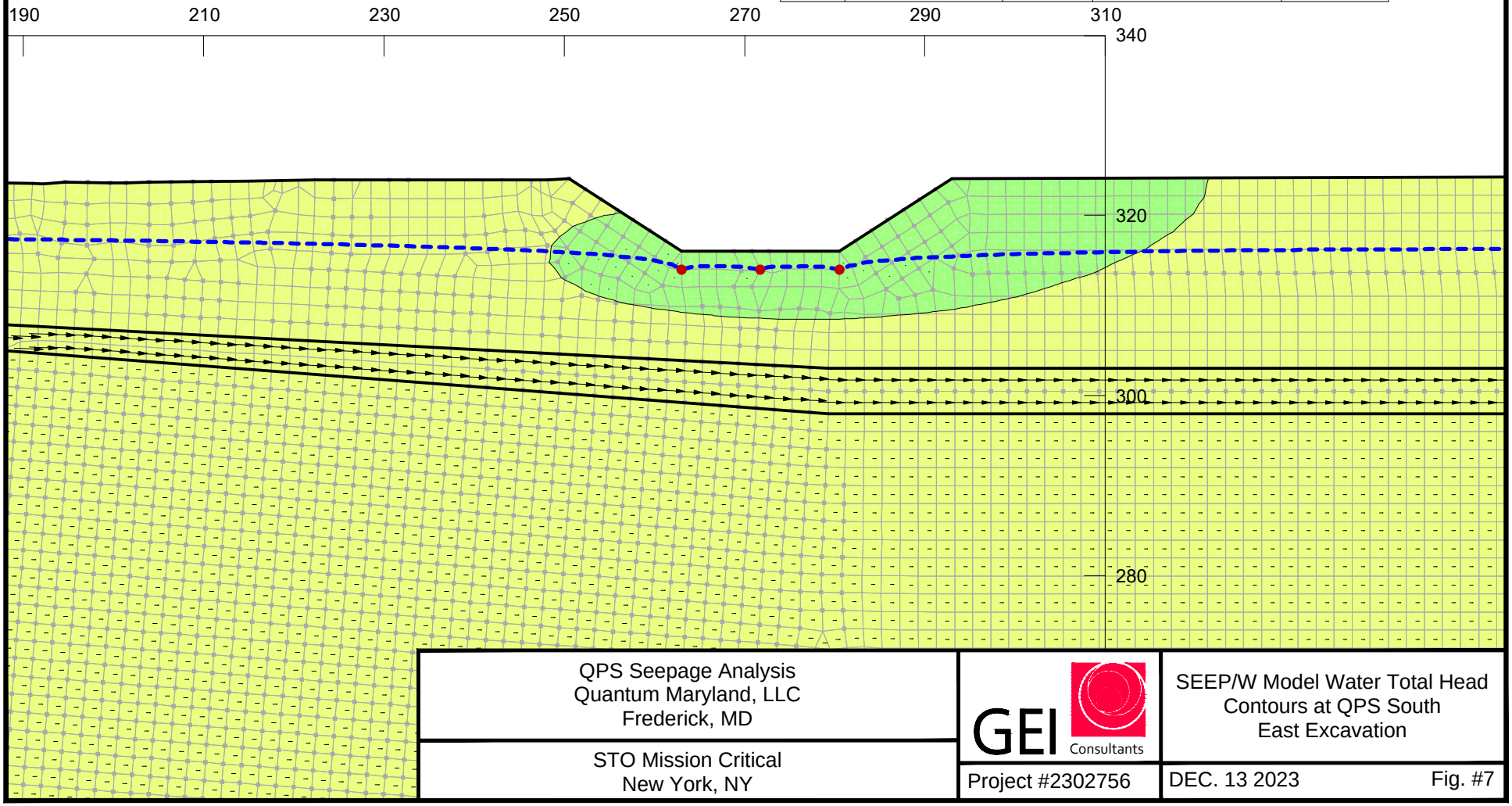
Project #2302756

DEC. 13 2023

Fig. #6

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	Residual Soils	Saturated Only	3.13e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	Total Water Head East 315	Hydraulic	Water Total Head	315 ft
	Total Water Head West 321.5	Hydraulic	Water Total Head	321.5 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



QPS Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

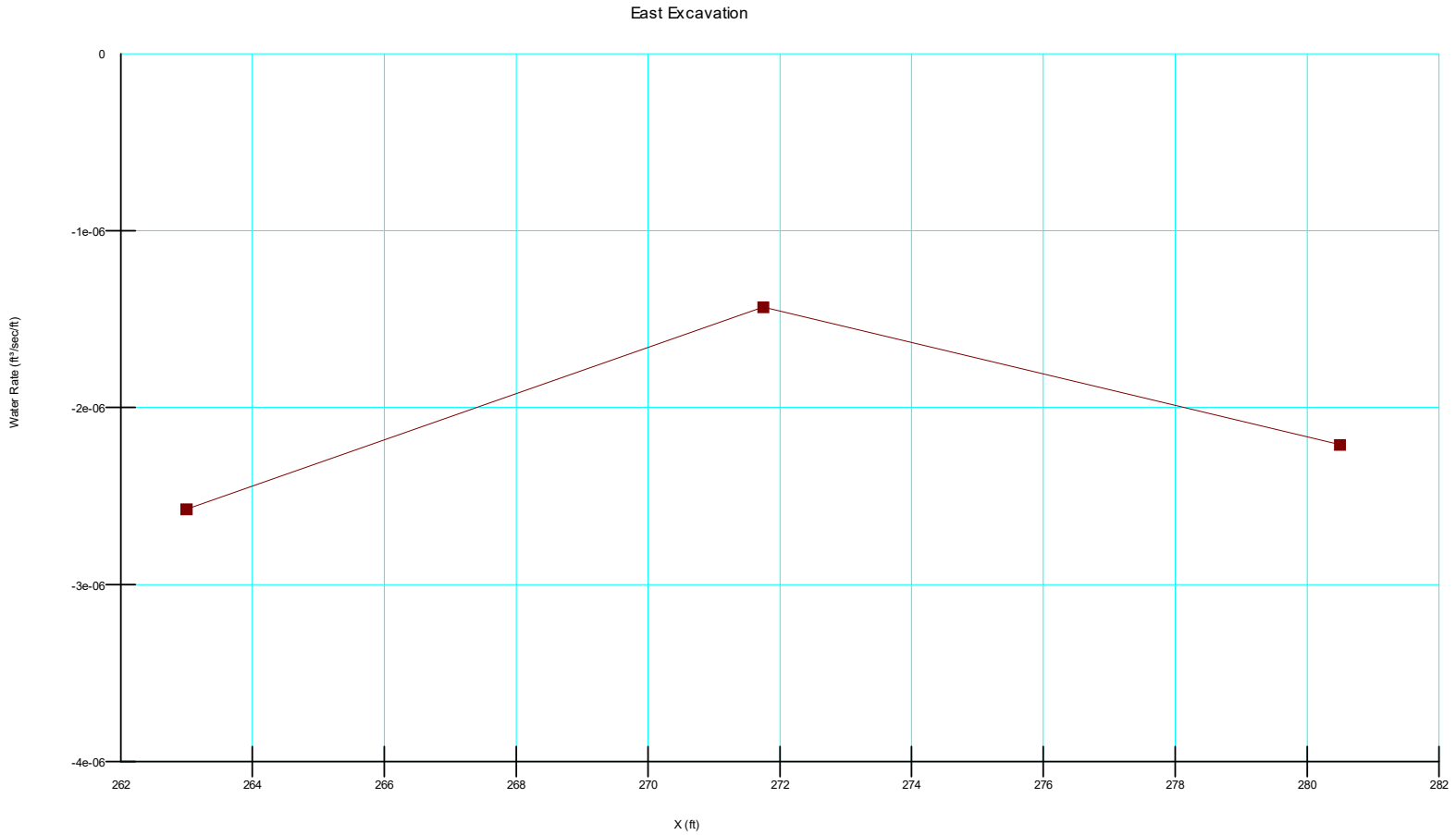
GEI Consultants

SEEP/W Model Water Total Head Contours at QPS South East Excavation

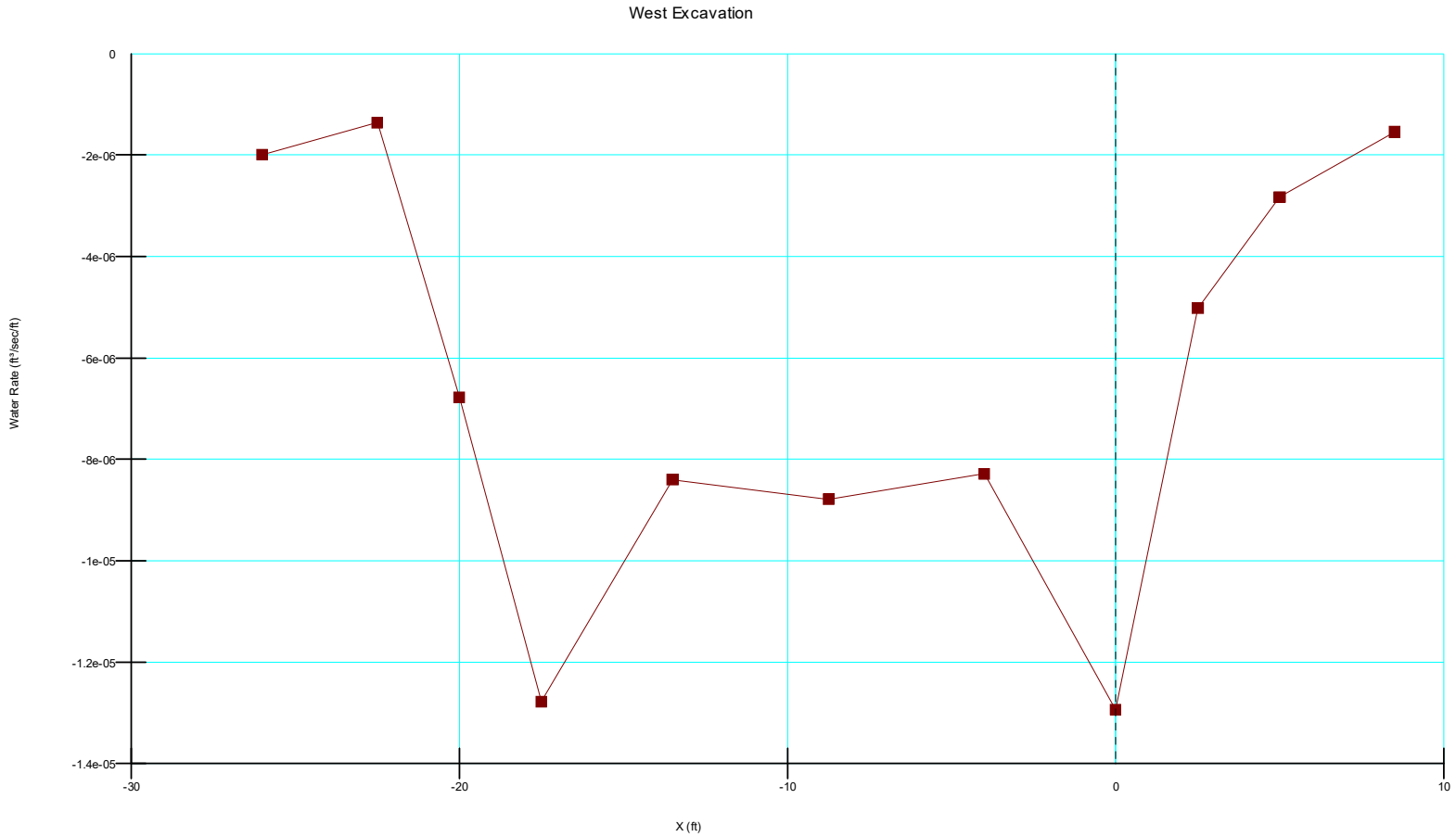
Project #2302756

DEC. 13 2023

Fig. #7



QPS Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rates at QPS South East Excavation
STO Mission Critical New York, NY	Project #2302756	DEC. 13 2023 Fig. #8



QPS Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rates at QPS South West Excavation
STO Mission Critical New York, NY	Project #2302756	DEC. 13 2023 Fig. #9

Table 1: Water Flow Rate Results at East Excavation from SEEP/W Model

X (ft)	Water Rate (ft^3/sec/ft)	Perimeter Length (ft)	Flow Rate (gpd)	Flow Rate Sum (gpd)
263	2.48E-06	65	104.0	258.6
272	1.57E-06	65	65.8	
281	2.12E-06	65	88.9	

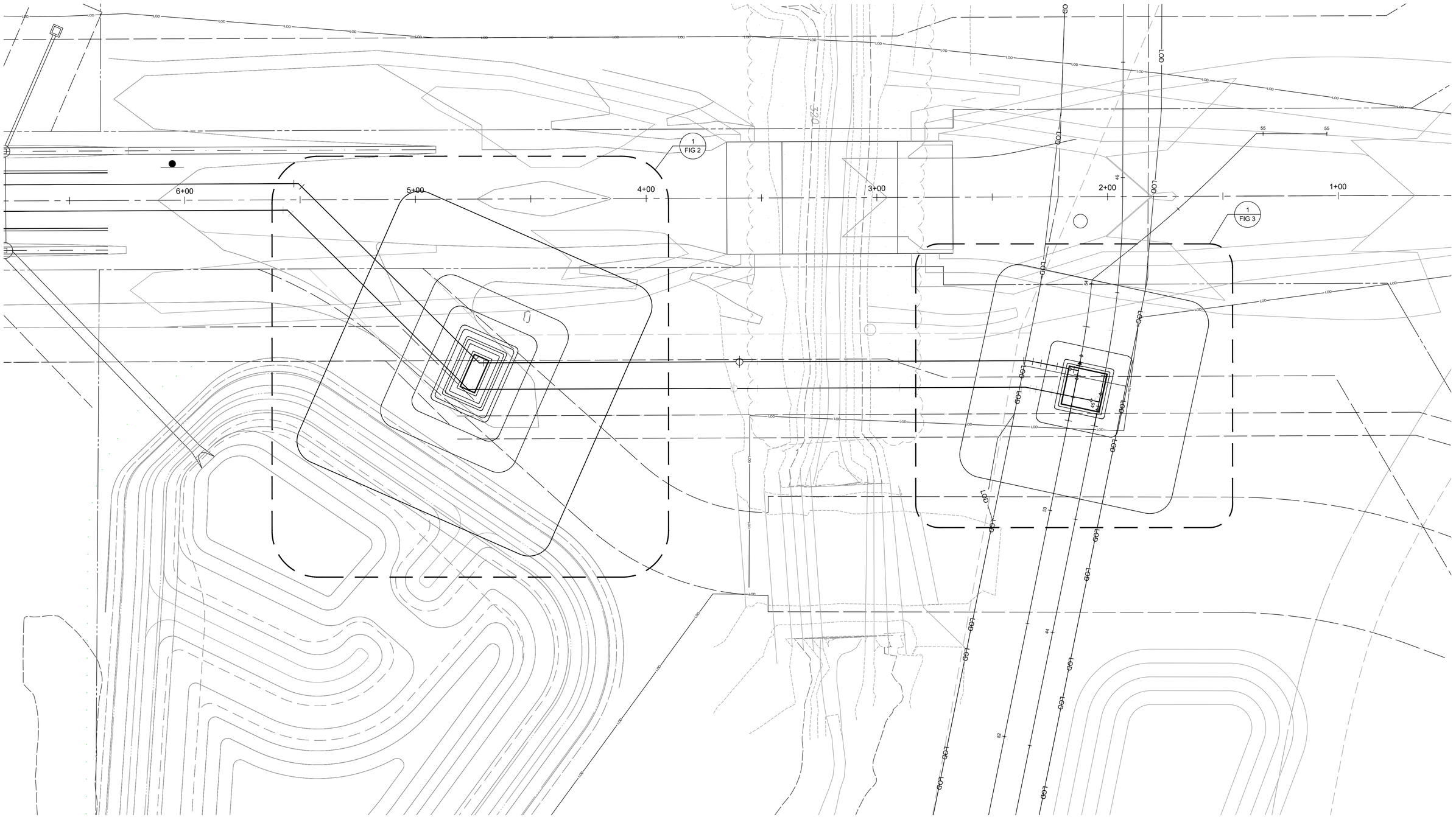
QPS Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rate Results at QPS South East Excavation
STO Mission Critical New York, NY	Project #2302756	DEC. 13 2023 Table #1

Table 2: Water Flow Rate Results at West Excavation from SEEP/W Model

X (ft)	Water Rate (ft^3/sec/ft)	Perimeter Length (ft)	Flow Rate (gpd)	Flow Rate Sum (gpd)
-26	1.99E-06	48	61.8	
-22.5	1.36E-06	48	42.1	
-20	6.78E-06	48	210.2	
-17.5	1.28E-05	48	396.5	
-13.5	8.40E-06	48	260.6	
-8.75	8.79E-06	48	272.6	2193.4
-4	8.28E-06	48	257.0	
0	1.29E-05	48	401.3	
2.5	5.02E-06	48	155.7	
5	2.82E-06	48	87.6	
8.5	1.54E-06	48	47.9	

QPS Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rate Results at QPS South West Excavation
STO Mission Critical New York, NY	Project #2302756	DEC. 13 2023 Table #2

Attachment 3 – Groundwater Drawdown Figures



NOTES:

1. EXCAVATIONS SHOULD BE SHORED BY TRENCH BOXES OR SLOPED.
2. TEMPORARY EXCAVATIONS ARE TO CONNECT DUCTILE IRON PIPE TO HORIZONTAL DIRECTIONAL DRILLING PIPE MATERIAL.
3. SEQUENCE WEST EXCAVATION WITH THE PROPOSED WORK AT THE ADJACENT STORMWATER POND TO MINIMIZE DISTURBANCE OF COMPLETED WORK.

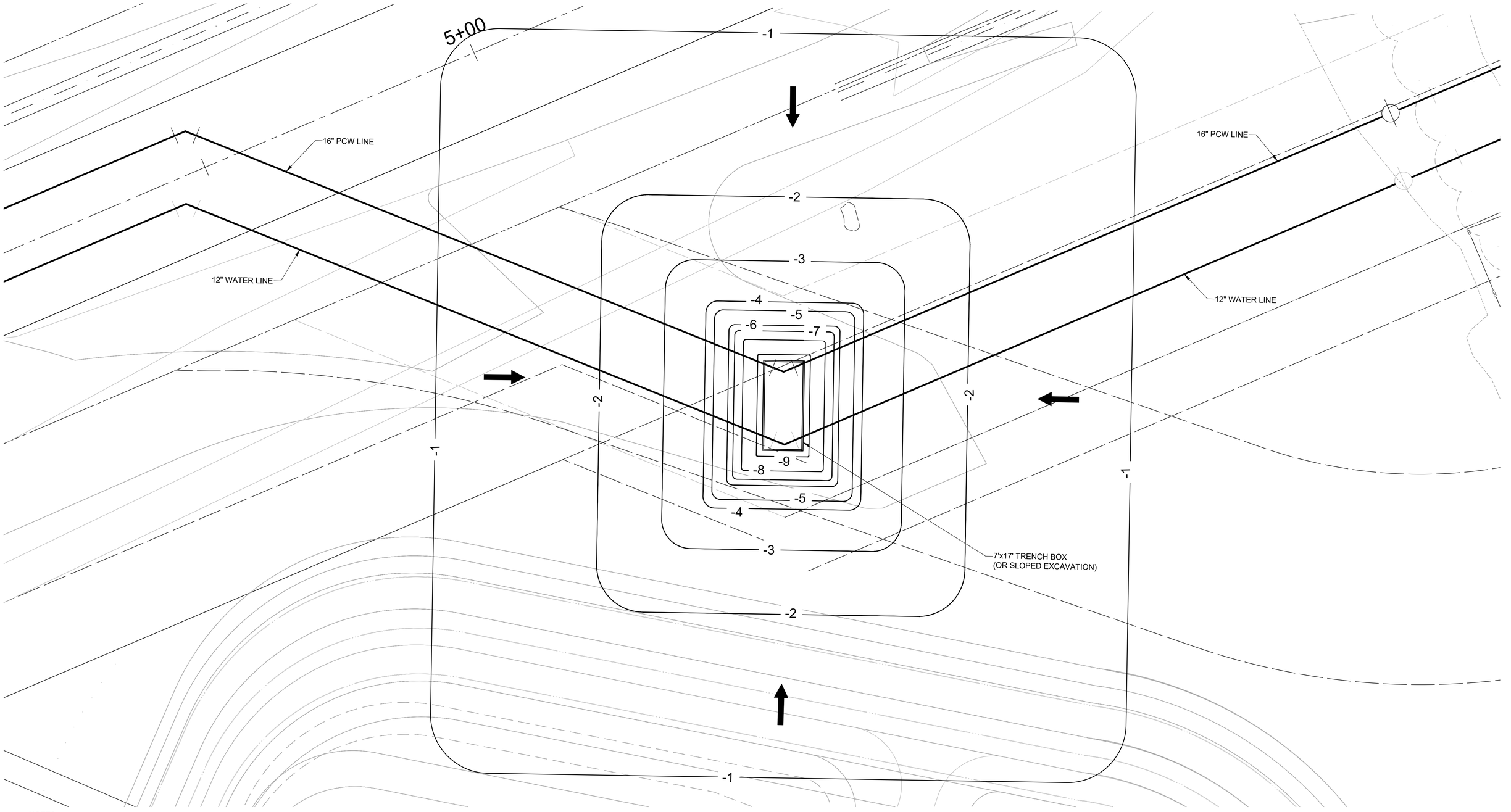
OVERALL PLAN - QPS EAST AND WEST EXCAVATION SITES

SCALE: 1" = 20'

0 20 40
SCALE, FEET

B Line - Stream Crossing Quantum Loop Frederick, MD	GEI Consultants	OVERALL PLAN - QPS EAST AND WEST EXCAVATION SITES
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig. 1

MORTON, TIMOTHY B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Figures\Water Control Concept Plans\East - West Site\Fig 1 and Fig 2_East +West.dwg - 12/14/2023



NOTES:

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2. TEMPORARY EXCAVATIONS ARE TO CONNECT DUCTILE IRON PIPE TO HORIZONTAL DIRECTIONAL DRILLING PIPE MATERIAL.
3. SEQUENCE WEST EXCAVATION WITH THE PROPOSED WORK AT THE ADJACENT STORMWATER POND TO MINIMIZE DISTURBANCE OF COMPLETED WORK.

—— -1 —— GROUNDWATER DRAWDOWN CONTOUR

➡ GROUNDWATER FLOW DIRECTION

1
FIG 2 WEST EXCAVATION

SCALE: 1" = 8'

0 20 40
SCALE, FEET

B Line - Stream Crossing
Quantum Loop
Frederick, MD

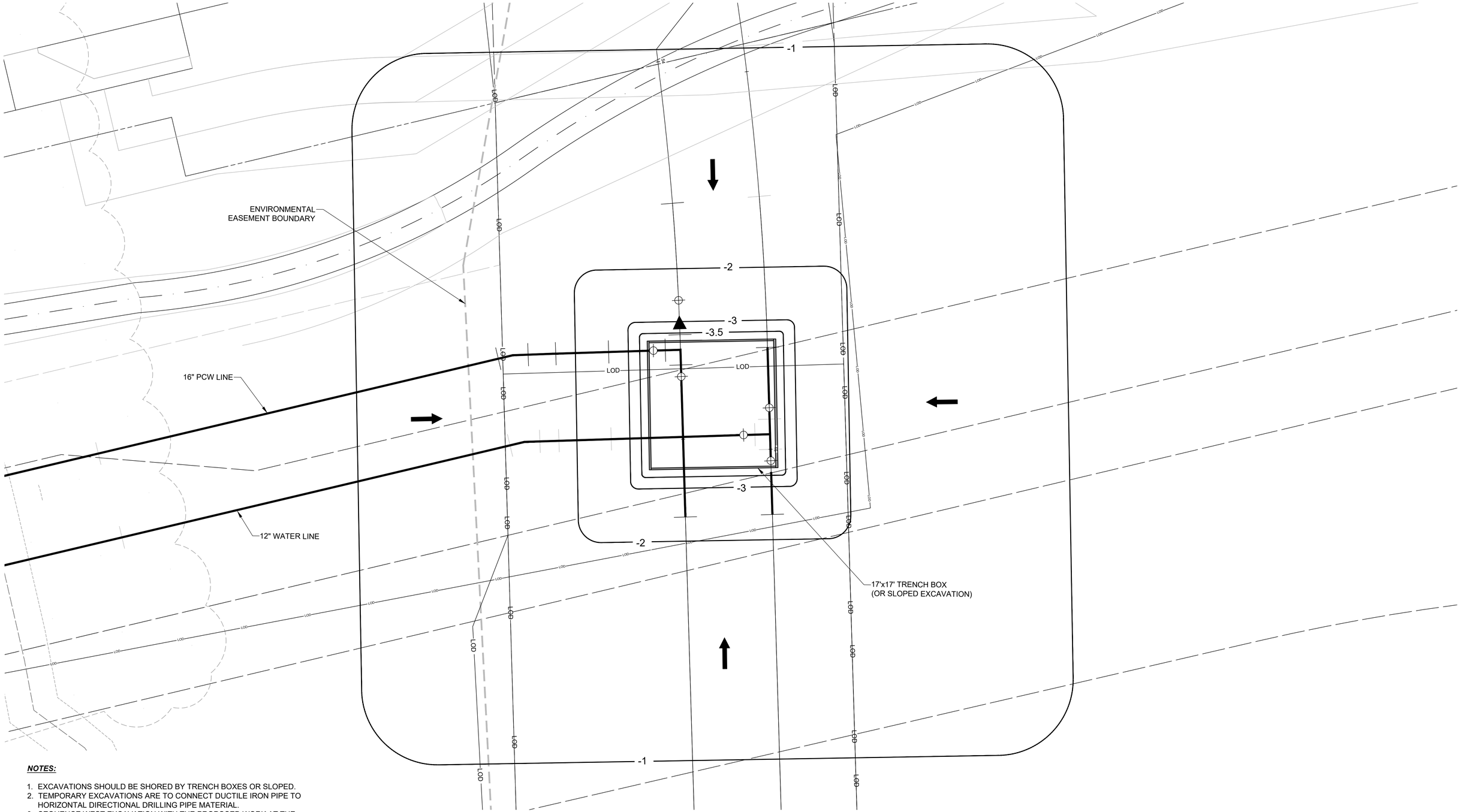
STRUCTURE TONE

GEI Consultants

QPS WEST EXCAVATION SITE
GROUNDWATER DRAWDOWN

Project 2302756 | DECEMBER 2023 | Fig. 2

MORTON, TIMOTHY B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Figures\Water Control Concept Plans\East - West Site\Fig 1 and Fig 2_East +West.dwg - 12/14/2023



NOTES:

1. EXCAVATIONS SHOULD BE SHORED BY TRENCH BOXES OR SLOPED.
2. TEMPORARY EXCAVATIONS ARE TO CONNECT DUCTILE IRON PIPE TO HORIZONTAL DIRECTIONAL DRILLING PIPE MATERIAL.
3. SEQUENCE WEST EXCAVATION WITH THE PROPOSED WORK AT THE ADJACENT STORMWATER POND TO MINIMIZE DISTURBANCE OF COMPLETED WORK.

-1 GROUNDWATER DRAWDOWN CONTOUR

GROUNDWATER FLOW DIRECTION

1 FIG 3 EAST EXCAVATION

SCALE: 1" = 6'

0 6 12

SCALE, FEET

B Line - Stream Crossing Quantum Loop Frederick, MD	GEI Consultants	QPS EAST EXCAVATION SITE GROUNDWATER DRAWDOWN
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig. 3

MORTON, TIMOTHY B:\Working\STRUCTURE TONE\2302756 STO Mission Critical - Frederick\00_CAD\Figures\Water Control Concept Plans\East - West Site\Fig 1 and Fig 2_East +West.dwg - 12/14/2023

Memo

To: Peter McCabe (STO Mission Critical)

From: Christophe Locussol, P.E. (GEI)

c: Giovanni Bonita, Ph.D., P.E.; Albin Rosado, EIT (GEI)

Date: December 19, 2023

Re: Dewatering Assessment – Mountville Road SOE
Quantum Maryland, LLC
Frederick, MD

This memorandum describes the design approach used to estimate the volume of groundwater and associated drawdown related with the extraction of water within the proposed trenchless installation methods for the sewer and water lines along the proposed K-Line at the stream crossing along Mountville Road. The 18-inch diameter sewer line will be installed using microtunneling between MH-401 and MH-3. The 16-inch diameter potable cooling water (PCW) line and 12-inch diameter water line, located south of and parallel to the sewer line will be installed using horizontal direction drilling (HDD). The analyses consider the engineering control measures developed for the project that limit groundwater pumping and discharge in these areas for both proposed installation methods.

Our design was based on the subsurface information provided in the Geo-Technology Associates, Inc. (GTA) geotechnical reports titled *Report of Geotechnical Exploration – Quantum Frederick Property Proposed Sewer Outfall A* dated August 29, 2022 and *Report of Geotechnical Exploration – Former Alcoa Eastalco Works Property* dated January 5, 2021. Additionally, boring log GEI-1 advanced by Tetra Tech was also considered in our design.

Existing Conditions

The proposed development is located within the larger Quantum Maryland, LLC property consisting of approximately 2,200 acres. The existing MH-3 is located approximately 2,500 feet north of the intersection of Mountville Road and Adamstown Road. The site was previously agricultural farmland prior to start of grading operations. Construction around the proposed temporary 1 million gallon per day (MGD) pump station was halted by regulatory agencies due to permitting issues relating to dewatering after grading operations started.

Subsurface Conditions

Subsurface conditions throughout the site were developed from the soil borings advanced for the project and presented in the GTA geotechnical reports. Two geotechnical borings were advanced at the existing MH-3 location over several mobilizations, and one geotechnical boring was advanced west of the proposed MH-401 location. Several air track probes within the footprint of MH-3 and adjacent to MH-3 were also advanced into the bedrock to identify cavities in the rock. The top of rock elevation varies significantly across the site and GEI will be performing additional subsurface investigation along the K-Line to gather more subsurface data and better understand the conditions.

The following provides a brief summary of the typical subsurface stratigraphy at the site:

Stratum 1 – Residual Soils (El. +309 feet to El. +286 feet):

The residual layer generally consists of moderate to high-plasticity cohesive soils classified as lean clay (CL), and elastic silt (ML). SPT N-values in this layer ranged from weight of hammer (WOH) to 11 blows per foot (bpf). Soft layers were encountered at depth near the transition between residual soils and weathered rock.

Based on the borings, the bottom of the residual soils varies significantly in the vicinity of the proposed MH-401 and the MH-3 locations. The boring advanced west of the MH-401 footprint has bottom of residual soils at El. +296 feet. The borings advanced within the MH-3 footprint have bottom of residual soils at El. + 293.3 feet and El. +285.5 feet for borings GEI-01 and SWR-01, respectively.

Stratum 2 – Highly Weathered Rock (El. +286 feet to El. +283 feet):

The Residual Soils are underlain by a thin layer of highly weathered rock, defined as Stratum 1 soils with SPT N-values between 51 bpf and 50 blows for 1 inch of split spoon penetration. The thickness of the weathered rock layer varies significantly in the vicinity of the proposed MH-401 and MH-3 locations. Borings within the MH-3 footprint encountered 0.2 feet and 3 feet of highly weathered rock at borings GEI-01 and SWR-01, respectively. The boring within the MH-403R footprint did not encounter weathered rock.

Stratum 3 – Top of Rock (El. +296 feet to El. +286 feet):

The Highly Weathered Rock, where present is underlain by the Cambrian-age Frederick Formation, which consists of thin-bedded, laminated limestone. This formation is particularly susceptible to developing karst features. Top of rock is defined as auger refusal. Rock Quality Designation for the rock ranged between 0% and 81%, with the top 15 feet of rock showing RQD values typically below 50%.

Air track probes were also advanced within the MH-3 footprint and did not encounter cavities within the rock.

Groundwater was encountered within the Residual Soils layer at elevations ranging between El. + 293.5 feet and El. + 291 feet at the MH-3 location. Groundwater was not encountered in the boring advanced in the vicinity of MH-401, but for analysis purposes, was established at El. +295 feet, consistent with the top of rock.

Relevant boring logs and subsurface data are included as Attachment 1 for reference.

Proposed Construction

The proposed construction consists of a new manhole (MH-401), approximately 878 lineal feet of 18-inch diameter sewer pipe between MH-401 and the existing MH-3, and the installation of a 12-inch potable water line and a 16-inch diameter potable cooling water line along the same alignment. The temporary support of excavation (SOE) around MH-3 was designed under a separate contract, and the seepage analysis for the MH-3 SOE was provided in a separate memorandum dated October 13, 2023.

A watertight SOE system in conjunction with a low-mobility grouting (LMG) program is proposed at MH-401 to minimize the amount of groundwater that will be extracted during construction. The watertight SOE system will consist of a secant pile wall system as the perimeter excavation support system around MH-401. The purpose of the secant pile wall is to provide a lateral cutoff to water flow into the excavation. The secant pile wall consists of a continuous wall of overlapping concrete circular shafts. Steel W section members are placed in alternating shafts to provide structural lateral support during the excavation. Excerpt drawings from the SOE package have been included as Attachment 2 for illustration.

The secant pile wall system around MH-401 will serve as the launch shaft for microtunneling activities and will extend to El. +279 feet. The secant pile wall system around MH-3 will serve as the retrieval shaft.

A LMG program will be performed within the rock along the alignment of the SOE systems and within the proposed excavations to fill cavities and soil seams and restrict water flow into the excavation. The intent of the LMG program is to restrict the amount of groundwater from entering the excavation and aid in the installation of the SOE systems. Additional grouting based on field conditions and grout takes might be required.

The microtunneling will extend from MH-3 to MH-401 in a continuous run. MH-400, which is located approximately 500 feet west of MH-3, will be bypassed during the tunneling activities but will be constructed afterwards using a 'doghouse' method in an open excavation supported by trench boxes. Given that the excavation will extend into rock, a LMG program is recommended to restrict groundwater inflow. The LMG program will consist of a 4-foot thick grout plug below the excavation subgrade and grouting along the perimeter within the weathered rock and limestone.

The two water lines are both currently designed as ductile iron pipes. The 16-inch water line is currently placed at a 10-foot horizontal offset and has a deeper invert elevation than the 12-inch water line. GEI proposed HDD as an alternative construction method where the two water lines intersect the existing Tuscaroa Creek to minimize disturbance. The length of the HDD-installed water lines is approximately 925 feet and would consist of HDPE pipe.

A mechanical coupler will be required to connect the two dissimilar pipe materials. These connections will be achieved in a temporary excavation approximately 8.75 feet in depth near MH-3. The analysis assumes that the excavation will have an approximate footprint at subgrade of 20 feet by 8 feet near the MH-3 location to perform the connections for both water lines. The excavation will be either sloped or supported by trench boxes. Given the excavation near MH-3 will extend into the rock, a LMG program to restrict groundwater intrusion into the excavation was considered in the analysis. The LMG program will consist of a 4-foot thick grout plug below the excavation subgrade and grouting along the perimeter of the excavation within the weathered rock and limestone.

The excavation near MH-401 will extend approximately 7 feet in depth but will be above the assumed groundwater. A seepage analysis was therefore not performed at this location.

Analysis Approach

Two numerical models (one for the SOE around MH-401 and one for the HDD excavation adjacent to MH-3) were prepared using the geometry of the proposed excavations, groundwater elevations and stratigraphy discussed above to estimate the flow that will enter the excavations. The computer program, SEEP/W, developed by Geoslope International, a Bentley company, was used to perform the analysis. SEEP/W is a finite element software product for modelling two-dimensional groundwater flow in porous media.

SEEP/W uses permeability properties of the subsurface layers to estimate the flow rate of the groundwater through these layers. As mentioned previously in the subsurface conditions section, three different soil layers were modeled in SEEP/W based on the available boring logs.

The permeability value for Stratum 1 (Residual Soils) layer was estimated using laboratory data in the publication "Hydrogeology of the Carbonate Rocks, Frederick and Hagerstown Valleys, Maryland" by LJ Nutter for the Maryland Geological Survey (Nutter 1973). Hydraulic conductivity tests were performed on residual soil samples from the Eastalco Plant, approximately 1 mile north of the proposed construction site. The hydraulic conductivity test results are within the range of typical permeability values of silty soils presented in NAVFAC DM 7.1 (2022 Manual). The maximum

hydraulic conductivity test value was conservatively used in the analysis. The permeability values of the Stratum 2 (Weathered Rock) and Stratum 3 (Rock) layers were estimated using hydraulic conductivity values of well graded gravel (GW) and limestone, respectively presented in NAVFAC DM 7.1.

The LMG program requires that the treated areas achieve a permeability of 10^{-6} cm/sec ($3.28x10^{-8}$ ft/sec) or less. This permeability value was used in the seepage analysis for the LMG zone.

The permeability of the concrete associated with the secant pile wall is traditionally very low. But the general nature of the construction process results in the formation of concrete cold joints between adjacent piles. The permeability of the secant pile walls used in the analysis took into consideration these joints by assuming higher than normal flows through water-producing hairline cracks. The permeability of the secant pile walls also considered the permeability of the soil layer behind the cold joints.

The NAVFAC DM 7 manual indicates that the ratio of vertical to horizontal permeability (K_y/K_x) can be on the order of 0.1 for stratified soil deposits.

Table 1 summarizes the permeability properties of the various elements used in the SEEP/W analyses.

Table 1. Permeability Properties in SEEP/W Analysis

Layer	Name	Saturated Horiz. Permeability, K_x (ft/sec)
1	Fine Grained Residual Soils	$3.13x10^{-7}$
2	Weathered Rock	$3.28x10^{-3}$
3	Limestone	$4.92x10^{-4}$
4	Secant Piles – Residual Soils	$1.11x10^{-10}$
5	Secant Piles – Weathered Rock	$1.09x10^{-6}$
6	Secant Piles - Limestone	$1.64x10^{-7}$
7	LMG Treated Areas	$3.28x10^{-8}$

The microtunnel analysis was set up as a two-dimensional SEEP/W model section view, modeling the SOE excavation at the launch pit around MH-401. At the MH-401 excavation, the top of the model was set at a grade elevation of El. +318 feet and a subgrade at El. +278 feet. A constant water head of +291.25 feet was set as the boundary condition to the East of the launch pit. A constant water head of +296.0 feet was set as the boundary condition to the West of the launch pit. A no flow boundary condition was set along the bottom of the limestone layer in the SEEP/W model.

The excavation for MH-400 was modeled as a two-dimensional SEEP/W model section view modeling the temporary excavation. The top of the model was set at a grade elevation of El. +310 feet with a subgrade elevation at El. +277 feet.

The HDD analysis was set up as a two-dimensional SEEP/W model section view modeling the eastern HDD trench adjacent to MH-3. The top of the model was set at a grade elevation of El. +297 feet. The same constant water head and no flow boundary conditions used in the microtunnel analysis were applied in the HDD analysis.

In the SEEP/W model, zero pressure nodes along the width of the excavation were used to model drainage trenches and sump pits. The nodes were placed at relatively equal horizontal distances and were set to target stabilized groundwater depths of two to three feet below the excavation subgrade. The flow rate was then plotted for each of the nodes to estimate the anticipated flow into the excavations.

Grouting along the alignment of the microtunnel is anticipated as part of the LMG program to fill up soil cavities. Note that although the microtunneling process will be designed as a self-contained sealed system, some minor leakage into the excavation may occur through entry portal during the microtunneling process. Given the sealed nature of the construction method, the LMG pre-treatment, and the limited construction duration of the microtunneling process, the amount of seepage from this construction activity is considered negligible. Regardless, the total volume of water estimated was increased by 10% to account for potential inflow of water through the microtunnel seals during the microtunneling process.

The results of the SEEP/W analyses for the three different analyses (launch shaft, open excavation, and HDD) are included as Attachment 3. The results of the HDD analysis indicate about 0.5 gallons per day per foot of wall (gpd/ft) will leak into the eastern excavation. The western HDD excavation is above groundwater. The results of the microtunnel analysis indicate that about 17.7 gpd/ft will leak into the excavation at the launch shaft at MH-401. The open excavation at MH-400 analysis indicates about 1.9 gpd/ft will leak into the excavation. The flow rates from the analyses were then multiplied by the total perimeter lengths of the respective excavations to estimate the total flow into the SOE systems. The total flow in the HDD excavation, microtunnel analysis and open excavation analysis were 28 gpd, 2,100 gpd and 75 gpd, respectively. The SEEP/W model shows a maximum decrease in the water table of 0.2 feet outside of the excavations, which is considered negligible. Figures within Attachment 4 show the extent of the groundwater drawdown beyond the limits of the SOE systems.

Closing

The estimated equilibrated maximum total flow of groundwater into the MH-401, eastern HDD excavation and MH-400 excavation related to the Mountville Road stream crossing is expected to be 2,205 gpd averaged over the period of time that the excavation remains open. When accounting for the estimated equilibrated maximum total flow of groundwater into the MH-3 excavation, the total flow increases to 4,455 gpd averaged over the period of time that the excavation remains open. Although considerations were made in the analysis to account for potential construction contingencies, the actual flow will be dependent on the implementation of the LMG program and the secant pile installation. Additional grouting identified either during the LMG program or during excavation may be required, and a robust special inspection program is necessary to ensure that the construction meets the design intent.

Attachments:
Attachment 1 – Subsurface Information
Attachment 2 – Secant Pile Wall and LMG Grouting General Design
Attachment 3 – Calculation Package –Seepage Analysis
Attachment 4 – Groundwater Drawdown Figures

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GEI Consultants

Attachment 1 – Subsurface Information

Table No. 1
Subsurface Exploration Summary - SPT Borings
Quantum Frederick - Sewer Outfall A
GTA Project No. 201536

Exploration ID No.	Manhole ID	Approximate Existing Ground Surface Elevation[1] (El.)	Approximate Proposed Invert Elevation[2] (El.)	Approximate Cut/Fill (-/+) Required (ft.)	Exploration Depth (ft.)	Approximate Termination Elevation (El.)	Approximate Topsoil Thickness (in.)	Approximate Depth to Highly Weathered Rock[3]		Approximate Depth of Excavatable Rock		Approximate Depth to Auger Refusal		Groundwater Observations						Approximate Cave-in Depth Observation		Depth of Invert Below Unexcavatable Rock (ft.)
														Encountered During Drilling		Completion of Drilling		One to Several Days After Drilling				
								Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	
SWR-1	MH3	295.1	278.8	-16	12.5	283	7	9.5	286	9.5	286	12.5	283	8.5	287	Dry	<283	3.9	291	Pipe	---	7
~~SWR-2~~	~~MH4~~	~~293.5~~	~~279.6~~	~~-14~~	~~7.5~~	~~286~~	~~8~~	~~3~~	~~291~~	~~4~~	~~290~~	~~7.5~~	~~286~~	~~Dry~~	~~<286~~	~~Dry~~	~~<289~~	~~Dry~~	~~<290~~	~~3.9~~	~~290~~	~~10~~
SWR-3	MH5	296.0	281.7	-14	10	286	4	6	290	7	289	10	286	Dry	<286	Dry	<292	Dry	<292	3.9	292	7
SWR-4	MH6	297.7	283.7	-14	10.5	287	3	6	292	6	292	10.5	287	2.5	295	2.5	295	5.6	292	Pipe	---	8
SWR-5	MH7	297.7	285.8	-12	10	288	5	7	291	9	289	10	288	8.5	289	3.7	294	2.1	296	6.1	292	3
SWR-6	MH8	299.0	286.8	-12	10	289	6	6	293	7	292	10	289	2.5	297	2.5	297	3.8	295	5.2	294	5
SWR-7	MH175	314	302.2	-12	20	294	8	12	302	12	302	NE	---	13.5	301	Dry	<297	Dry	<301	13.4	301	0
SWR-8	MH9	303.1	288.8	-14	10	293	3	7	296	7	296	10	293	Dry	<293	Dry	<293	Dry	<293	Pipe	---	7
SWR-9	MH11	303.8	295.7	-8	12.5	291	5	12.5	291	12.5	291	12.5	291	8.5	295	Dry	<300	6.1	298	3.4	300	-4
SWR-10	MH12	306.2	296.7	-10	10	296	4	7	299	7	299	10	296	Dry	<296	Dry	<303	Dry	<302	3.7	303	3
SWR-11	MH13	310.7	297.6	-13	15	296	4	12	299	12	299	15	296	8.5	302	12.5	298	12.2	299	12.6	298	1
SWR-12	MH14	311.4	298.7	-13	16.5	295	3	12	299	12	299	16.5	295	8.5	303	11.5	300	10.1	301	Pipe	---	1
SWR-13	MH15	312.9	299.8	-13	20	293	6	12	301	12	301	NE	---	2.5	310	Dry	<309	Dry	<309	3.9	309	1
SWR-14	MH85	319	305.9	-13	20	299	7	17	302	17	302	NE	---	2.5	317	4.1	315	Dry	<314	5.1	314	-4
SWR-15	MH16	313.0	300.9	-12	10.5	303	4	2	311	2	311	10.5	303	Dry	<303	Dry	<303	Dry	<303	Pipe	---	10
SWR-16	MH17	312.0	301.3	-11	20	292	6	NE	---	NE	---	NE	---	13.5	299	11.1	301	7.1	305	13.3	299	N/A
SWR-17	MH18	314.2	302.4	-12	10	304	4	1	313	6	308	10	304	Dry	<304	Dry	<312	Dry	<314	1.8	312	6
SWR-18	MH19	318.0	303.5	-15	20	298	6	12	306	17	301	NE	---	Dry	<298	Dry	<298	Dry	<298	Pipe	---	-3
SWR-19	MH20	316.1	303.8	-12	20	296	3	12	304	12	304	NE	---	8.5	308	Dry	<312	Dry	<315	1.6	315	0
SWR-20	MH21	316.4	304.3	-12	16	300	4	9	307	9	307	16	300	8.5	308	8.6	308	6.5	310	7.6	309	3
SWR-21	MH22	321.0	305.0	-16	21.5	300	5	17	304	17	304	21.5	300	13.5	308	13.5	308	11.6	309	Pipe	---	-1
SWR-22	MH23	321.0	306.0	-15	20	301	3	14.5	307	14.5	307	NE	---	13.5	308	7.7	313	7.3	314	8.8	312	1
SWR-23	MH24	323.7	306.7	-17	22.5	301	7	17	307	17	307	22.5	301	13.5	310	Dry	<322	Dry	<319	1.7	322	0
SWR-24	MH25	325	307.7	-17	25	300	6	22	303	22	303	NE	---	18.5	307	Dry	<320	Dry	<322	3.0	322	-5
SWR-25	MH26	324	308.2	-16	25	299	6	17	307	17	307	NE	---	13.5	311	12.5	312	8.7	315	Pipe	---	-1

Notes:

NE = Not Encountered N/A = Not Applicable

[1] The existing ground surface elevations for the majority of the borings were provided by Rodgers Consulting, via an instrumented survey. The locations of Borings SWR-7, SWR-14, SWR-24, and SWR-25 were not included in this survey, and these locations were staked by GTA using a hand-held GPS unit. The existing ground surface elevations at these boring locations were estimated based on the topographic *Sewer Outfall* plans, dated March 2022, prepared by Rodgers.

[2] The proposed invert elevations were obtained from the profiles on the above-referenced plans.

[3] Highly weathered rock was first encountered in Boring SWR-17 at a depth of approximately 1 foot, which was inferred to be a boulder. Highly weathered rock was encountered again at a depth of approximately 4 feet.

LOG OF BORING NO. SWR-1

PROJECT: **Quantum Frederick - Sewer Outfall**
PROJECT NO.: **201536**
PROJECT LOCATION: **Frederick County, Maryland**

WATER LEVEL (ft):	Dry	3.9	
DATE:	06/28/22	06/29/22	
CAVED (ft):	Pipe	Pipe	

DATE STARTED: **06/28/22**
DATE COMPLETED: **06/28/22**
DRILLING CONTRACTOR: **Geo-Technology Associates, Inc.**
DRILLER: **M. Lyons**
DRILLING METHOD: **3.25" HSA**
SAMPLING METHOD: **Split Spoon/Automatic Hammer**

WATER ENCOUNTERED DURING DRILLING (ft): **8.5**
GROUND SURFACE ELEVATION: **295**
DATUM: **Topo**
EQUIPMENT: **Diedrich D-50**
LOGGED BY: **XAH**
CHECKED BY: **DCG**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					295.0	0				
S-1	0.0	14	3-3-3	6			CL		Brown, moist, medium stiff, Sandy Lean CLAY.	Topsoil: 7 in.
									Same, Light Brown, stiff, with Sand	
S-2	2.5	12	1-4-4	8						▽
						5			Same, stiff, with Rock Fragments (Quartz)	
S-3	5.0	6	4-6-4	10						
										▽
S-4	8.5	2	5-6-50/3"	50/3"	285.5	10			Light Brown, wet, very dense, Highly Weathered ROCK.	
					282.5					
S-5	12.5	0	50/0"	50/0"					Auger refusal encountered at 12.5 feet.	
						15			Boring offset 10 feet north of staked location. Auger refusal encountered in offset boring at 12.0 feet.	
						20				
						25				
						30				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
14280 Park Center Drive, Suite A
Laurel, MD 20707

LOG OF BORING NO. SWR-1

BORING NUMBER GEI-1

TETRA TECH
Tetra Tech
One Oxford Valley, Suite 200A
Langhorne, PA 19047

CLIENT Clark Water
PROJECT NAME Quantum Loophole - Proposed Sewer Line
PROJECT NUMBER 112C10263
PROJECT LOCATION 5601 Manor Woods Road, Frederick, MD 21703
DATE STARTED 11/8/23 **COMPLETED** 11/9/23
GROUND ELEVATION 296 ft NAVD88 **HOLE SIZE** 3.25
CONTRACTOR/ OPERATOR Free State Drilling/ R. Stidham
LAT **LONG**
METHOD, RIG & HAMMER Hollow Stem Auger, CME 55, Automatic 80%
GWL AT TIME OF DRILLING ---
LOGGED BY Z. Hill **CHECKED BY** M. Ahmed
GWL AT END OF DRILLING 2.50 ft / Elev 293.50 ft
NOTES PID 0 ppm throughout.
GWL AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	SPT N VALUE / PL MC LL / FINES CONTENT (%)	REMARKS AND OTHER TESTS
0		Fill- Poorly Graded Sand With Silty Clay And Gravel (sp-sc), loose to very dense, angular, brown to gray, dry to moist.	SS 1	33	5-4-3-4 (7)			
			SS 2	63	4-50/2"			
		Weathered Rock- Limestone, gray.	SS 3	100	50/2"			Top of rock at 2.9 ft
5		LIMESTONE, light gray, freshly weathered to slightly weathered, fine grained, medium hard, indistinct to thin bedding, flat to moderate dip, random fractures, close to medium spacing, shallow to steep dip, open joints.	RC 1	100 (79)				Water return from 2.9 feet to 3.9 feet. No water return for rest of boring at 3.9 ft
			RC 2	92 (67)				Vertical fracture at 7.5 ft Vertical calcite seam from 7.9 feet to 8.9 feet
10			RC 3	92 (50)				45° calcite seam from 9.9 feet to 10.4 feet 60° fracture, calcite seam from 10.7 feet to 11.2 feet Broken, weathered at joints, jammed core barrel from 11.2 feet to 11.7 feet
		LIMESTONE, light gray to gray, freshly weathered to slightly weathered, fine grained, medium hard, laminated to thin bedding, moderate to steep dip, bedding joints, close to medium spacing, moderate to steep dip, open joints.	RC 4	100 (0)				
15			RC 5	100 (22)				
			RC 6	100 (0)				Broken, jammed core barrel from 15.8 feet to 16.8 feet
20								Broken, vertical fracture from 18.7 feet to 19.0 feet Vertical fracture from 19.5 feet to 19.8 feet
			RC 7	100 (77)				Calcite seam from 20.9 feet to 21.1 feet
25								Calcite seam at 23.9 ft

(Continued Next Page)

TETRA TECH
Tetra Tech
One Oxford Valley, Suite 200A
Langhorne, PA 19047

BORING NUMBER GEI-1

CLIENT Clark Water **PROJECT NAME** Quantum Loophole - Proposed Sewer Line

PROJECT NUMBER 112C10263 **PROJECT LOCATION** 5601 Manor Woods Road, Frederick, MD 21703

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	▲ SPT N VALUE ▲ 20 40 60 80 / PL MC LL 20 40 60 80 / ☐ FINES CONTENT (%) ☐ 20 40 60 80	REMARKS AND OTHER TESTS
25		LIMESTONE, light gray to gray, freshly weathered to slightly weathered, fine grained, medium hard, laminated to thin bedding, moderate to steep dip, bedding joints, close to medium spacing, moderate to steep dip, open joints. *(continued)*	RC 8	100 (72)				
30			RC 9	98 (72)				

Bottom of borehole at 34.9 feet.

Table No. 2
Subsurface Exploration Summary - Air Track Probes
Quantum Sewer Outfall A
GTA Project No. 201536

Air Track Probe ID	Location	Approximate Depth to Sewer Invert (ft.)	Probe Depth (ft.)	Estimated Soil Depth[1] (ft.)	Estimated Rock Depth[1] (ft.)	Remarks[1]
AT-A1	MH3	16	21	0-11	11-21	
AT-A2	MH3 0+52	15	20	0-9.5	9.5-20	
AT-A3	MH3 1+04	14	19	0-4.5	4.5-19	
AT-A4	MH4	14	19	0-3.5	3.5-19	
AT-A5	MH4 0+55	14	19	0-3	3-19	
AT-A6	MH4 1+10	15	20	0-6	6-20	Soil seam 9-9.5 ft.
AT-A7	MH4 1+65	15	20	0-7.5	7.5-20	
AT-A8	MH4 2+20	16	21	0-5	5-21	
AT-A9	MH4 2+75	16	21	0-7	7-21	
AT-A10	MH4 3+30	15	20	0-5	5-20	
AT-A11	MH5	14	19	0-7, 15-19	7-15	
AT-A12	MH5 0+49	15	20	0-9	9-20	
AT-A13	MH5 0+98	15	20	0-6	6-20	
AT-A14	MH5 1+47	15	20	0-20	NE	
AT-A15	MH5 1+96	16	21	0-7	7-21	
AT-A16	MH5 2+45	16	21	0-7	7-21	
AT-A17	MH5 2+94	16	21	0-6	6-21	
AT-A18	MH5 3+43	15	20	0-5	5-20	
AT-A19	MH6	14	19	0-4.5	4.5-19	
AT-A20	MH6 0+50	14	19	0-4.5	4.5-19	
AT-A21	MH6 1+00	13	18	0-5	5-18	
AT-A22	MH6 1+50	13	18	0-5	5-18	
AT-A23	MH6 2+00	13	18	0-6	6-18	
AT-A24	MH6 2+50	13	18	0-6	6-18	
AT-A25	MH6 3+00	13	18	0-7	7-18	
AT-A26	MH6 3+50	13	18	0-8	8-18	
AT-A27	MH7	12	17	0-8	8-17	
AT-A28	MH7 0+46	11	16	0-9	9-16	
AT-A29	MH7 0+91	12	17	0-7	7-17	Broke through rock at 17 ft.
AT-A30	MH7 1+37	12	17	0-7	7-17	
AT-A31	MH8	12	17	0-11.5	11.5-17	
AT-A32	MH8 0+49 (MH175)	6	11	0-8	8-11	
AT-A33	MH8 0+98 (MH175)	6	11	0-6	6-11	
AT-A34	MH8 1+47 (MH175)	6	11	0-8.5	8.5-11	
AT-A35	MH8 1+96 (MH175)	7	12	0-9	9-12	
AT-A36	MH8 2+45 (MH175)	7	12	0-12	NE	
AT-A37	MH8 2+94 (MH175)	7	12	0-12	NE	
AT-A38	MH8 3+43 (MH175)	9	14	0-14	NE	Rock at 14 ft.
AT-A39	MH8 0+48 (MH9)	13	18	0-13	13-18	
AT-A40	MH8 0+96 (MH9)	13	18	0-9	9-18	Soil seam 13-14.
AT-A41	MH8 1+43 (MH9)	14	19	0-19	NE	Boulder 5-8 ft.
AT-A42	MH8 1+91 (MH9)	14	19	0-8	8-19	Sporadic rock 8-19 ft.
AT-A43	MH8 2+39 (MH9)	14	19	0-6	6-19	
AT-A44	MH8 2+87 (MH9)	15	20	0-6	6-20	
AT-A45	MH8 3+34 (MH9)	15	20	0-6.5	6.5-20	
AT-A46	MH9	14	19	0-6.5	6.5-19	
AT-A47	MH9 0+49	14	19	0-6.5	6.5-19	
AT-A48	MH9 0+98	13	18	0-6	6-18	
AT-A49	MH9 1+47	12	17	0-6	6-17	
AT-A50	MH9 1+96	11	16	0-5	5-16	
AT-A51	MH9 2+45	10	15	0-15	NE	
AT-A52	MH10	10	15	0-6.5	6.5-15	
AT-A53	MH10 0+50	9	14	0-12	12-14	
AT-A54	MH10 0+99	9	14	0-7	7-14	

Table No. 1
Subsurface Exploration Summary
Former Alcoa Eastalco Works Property
GTA Project No. 201536

Exploration ID No.	Inferred Geologic Formation[1]	Approximate Existing Ground Surface Elevation[2] (El.)	Boring Depth (ft.)	Approximate Termination Elevation (El.)	Approximate Topsoil Thickness (in.)	Raveling Soil Observations				Approximate Depth to Highly Weathered Rock[3]		Approximate Depth to Auger Refusal[4]		Approximate Cave-in Depth Observation		Groundwater Observations					
																Encountered During Drilling		Completion of Drilling		One to Six Days After Drilling[5]	
						Top (ft.)	Bottom (ft.)	Top El.	Bottom El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.	Depth (ft.)	El.
GTA-1	Poolesville Member	375	6.0	369	6	NE	NE	---	---	4	371	6	369	3.5	372	Dry	<369	Dry	<372	Dry	<372
GTA-2	Poolesville Member	386	23.6	362	6	NE	NE	---	---	4	382	13.6	372	11.9	374	Dry	<362	Dry	<374	Dry	<374
GTA-4	Poolesville Member	386	6.5	380	10	NE	NE	---	---	4	382	6.5	380	2.5	384	Dry	<380	Dry	<383	Dry	<384
GTA-7	Poolesville Member	355	30	325	10	NE	NE	---	---	NE	---	NE	---	17.0	338	Dry	<325	Dry	<336	Dry	<338
GTA-17	Poolesville Member	387	11.5	376	10	NE	NE	---	---	NE	---	11.5	376	8.0	379	Dry	<376	Dry	<379	Dry	<379
GTA-3	Rocky Springs Station Member (Qt)	318	32.0	286	6	12	22	306	296	NE	---	22	296	16.5	302	Dry	<286	Dry	<299	Dry	<302
GTA-5	Rocky Springs Station Member	338	13.5	325	10	NE	NE	---	---	NE	---	13.5	325	7.0	331	8.5	330	Dry	<331	Dry	<331
GTA-6	Rocky Springs Station Member	343	30	313	10	NE	NE	---	---	NE	---	NE	---	18.5	325	Dry	<313	Dry	<321	Dry	<325
GTA-13	Rocky Springs Station Member (Qr)	334	13.5	321	10	NE	NE	---	---	NE	---	13.5	321	9.0	325	Dry	<321	Dry	<325	Dry	<325
GTA-14	Rocky Springs Station Member	335	20.5	315	10	NE	NE	---	---	NE	---	20.5	315	Pipe	---	10	325	14.0	321	14.5	321
GTA-15	Rocky Springs Station Member	328	66.5	262	6	12	47	316	281	49	279	51.5	277	12.5	316	14	314	10.0	318	9.0	319
GTA-16	Rocky Springs Station Member	356	22.0	334	10	17	20	339	336	20.5	336	22.0	334	18.0	338	18.5	338	Dry	<338	Dry	<338
GTA-18	Rocky Springs Station Member	330	14.0	316	10	NE	NE	---	---	3.5	327	4	326	3.5	327	Dry	<316	Dry	<327	Dry	<327
GTA-19	Rocky Springs Station Member	330	31.5	299	8	22	27	308	303	17	313	31.5	299	Pipe	---	18.5	312	20.0	310	18.4	312
GTA-20	Rocky Springs Station Member	326	17.5	309	6	NE	NE	---	---	NE	---	7.5	319	6.5	320	Dry	<309	Dry	<310	Dry	<320
GTA-22	Rocky Springs Station Member	328	28.8	299	10	22	27.5	306	301	27.5	301	28.8	299	Pipe	---	23.5	305	24.0	304	25.5	303
GTA-23	Rocky Springs Station Member (Qt)	330	30	300	3	NE	NE	---	---	NE	---	NE	---	10.0	320	18.5	312	26.5	304	N/A	---
GTA-24	Rocky Springs Station Member	320	30	290	2	NE	NE	---	---	NE	---	NE	---	1.5	319	23.5	297	Dry	<320	N/A	---
GTA-25	Rocky Springs Station Member	311	15.0	296	6	7	14.5	304	297	14	297	15.0	296	6.0	305	13.5	298	Dry	<305	Dry	<305
GTA-26	Rocky Springs Station Member	331	17.0	314	8	NE	NE	---	---	NE	---	17.0	314	14.6	316	Dry	<314	Dry	<316	Dry	<316
GTA-28	Rocky Springs Station Member	328	18.0	310	8	NE	NE	---	---	NE	---	18.0	310	15.2	313	Dry	<310	Dry	<312	14.5	314
GTA-29	Rocky Springs Station Member (Qr)	311	23.0	288	10	12	17	299	294	NE	---	23.0	288	13.5	298	18	293	10.5	301	11.8	299
GTA-30	Rocky Springs Station Member	310	17.0	293	6	12	17	298	293	NE	---	17.0	293	15.0	295	Dry	<293	Dry	<295	13.8	296
GTA-8	Adamstown Member	306	10.0	296	10	NE	NE	---	---	NE	---	10.0	296	6.5	300	Dry	<296	Dry	<300	Dry	<300
GTA-9	Adamstown Member	293	7.0	286	10	NE	NE	---	---	NE	---	7.0	286	4.5	289	Dry	<286	Dry	<289	Dry	<289
GTA-10	Adamstown Member	298	14.7	283	10	NE	NE	---	---	12	286	14.7	283	11.0	287	14	284	Dry	<287	10.0	288
GTA-11	Adamstown Member	329	28.6	300	10	NE	NE	---	---	17	312	28.6	300	18.0	311	Dry	<300	Dry	<309	Dry	<311
GTA-12	Adamstown Member	332	8.0	324	12	NE	NE	---	---	NE	---	8.0	324	6.0	326	Dry	<324	Dry	<326	Dry	<326
GTA-21	Adamstown Member (Qr)	333	41.4	292	10	NE	NE	---	---	NE	---	17.0	316	13.6	319	Dry	<292	Dry	<319	Dry	<319
GTA-27	Adamstown Member	299	22.0	277	10	NE	NE	---	---	4	295	12.0	287	9.2	290	Dry	<277	Dry	<288	Dry	<290
GTA-31	Adamstown Member (Qr)	313	19.0	294	8	NE	NE	---	---	3.5	310	4.0	309	3.5	310	Dry	<294	Dry	<310	Dry	<310
GTA-32	Adamstown Member	308	11.5	297	7	NE	NE	---	---	NE	---	11.5	297	Pipe	---	Dry	<297	Dry	<297	Dry	<297
GTA-33	Adamstown Member	322	22.0	300	8	7	17	315	305	NE	---	22.0	300	12.2	310	Dry	<300	Dry	<307	Dry	<310

Notes:

= Rock core performed upon encountering auger refusal

NE = Not Encountered

The approximate cave-in depth observations are the shallowest cave-in depths observed within each boring.

< (El.) = Groundwater was not observed and is therefore anticipated to be at or below the specified cave-in depth for the borings, or the exploration depth for the borings with temporary pipes.

Pipe = Temporary 3/4 inch PVC pipe installed to facilitate groundwater readings. Cave-in depth/elevation could not be measured.

[1] (Qr) indicates the boring is mapped within the Weathering Residuum and (Qt) indicates the boring is mapped within the Terrace Deposits; however, the specified geologic member is mapped below the thin surficial layers.

[2] The existing ground surface elevations were estimated using GIS topography obtained from the Frederick County online database and should be considered approximate.

[3] Highly weathered rock was first encountered in Boring GTA-19 at a depth of approximately 17 feet, under which a cavity of soft material was encountered. Highly weathered rock was encountered again at a depth of approximately 27.5 feet. Relatively unweathered rock was encountered in Boring GTA-21 at a depth of approximately 17 feet, under which a cavity of soft material was encountered. Highly weathered rock was encountered again at a depth of approximately 41.4 feet.

[4] Auger refusal was encountered in Boring GTA-21 at a depth of approximately 17 feet. A 5-foot rock core was performed from 17 to 22 feet, under which a cavity of soft material was encountered. Highly weathered rock was encountered again at a depth of approximately 41.4 feet.

[5] Borings GTA-23 and GTA-24 were backfilled upon completion, due to their location within the environmentally impacted Soil Management Area. Subsequent groundwater/cave-in depth measurements could not be performed.

LOG OF BORING NO. GTA-3

PROJECT: **Former Alcoa Eastalco Works Property**
PROJECT NO.: **201536**
PROJECT LOCATION: **Frederick County, Maryland**

WATER LEVEL (ft): Dry | Dry |
DATE: 12/02/2020 | 12/03/2020 |
CAVED (ft): 19.2 | 16.5 |

DATE STARTED: **12/02/2020**
DATE COMPLETED: **12/02/2020**
DRILLING CONTRACTOR: **Connelly & Associates, Inc.**
DRILLER: **B. Dipasquale**
DRILLING METHOD: **3.25" HSA**
SAMPLING METHOD: **Split Spoon/Automatic Hammer**

WATER ENCOUNTERED DURING DRILLING (ft): **Dry**
GROUND SURFACE ELEVATION: **318**
DATUM: **Topo**
EQUIPMENT: **Diedrich D-50**
LOGGED BY: **CDN**
CHECKED BY: **DCG**

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
					318.0	0				
S-1	0.0	11	2-2-3	5			CL		Reddish Brown, moist, medium stiff, Lean CLAY with Sand.	Topsoil: 6 in. Qu = 2.75 tsf
S-2	2.5	12	3-4-7	11					Same, stiff, trace Sand	Qu = 3.25 tsf
S-3	5.0	15	4-5-5	10		6				Qu = 2.25
					311.0		ML		Brown, moist, soft, Sandy SILT.	
S-4	8.5	16	1-2-2	4		12				
S-5	13.5	15	1-1-1	2					Same, with Sand	
					301.0	18	CL		Reddish Brown to Brown, moist, very soft, Sandy Lean CLAY.	
S-6	18.5	10	WOH/18"	WOH/ 18						
					296.0		ROCK		Auger refusal encountered at 22.0 feet.	"Qu" indicates the unconfined compressive strength, given in tons per square foot (tsf), as measured using a pocket penetrometer.
R-1	22.0	18	RQD=81%		294.5	24	ROCK		Hard, slightly weathered, moderately fractured, gray with white, LIMESTONE (Recovery = 100%).	
R-2	23.5	35	RQD=6%						Hard, moderately weathered, highly fractured, dark gray with white, LIMESTONE (Recovery = 58%).	
R-3	28.5	37	RQD=32%		289.5	30	ROCK		Hard, moderately weathered, highly fractured, dark gray with white, LIMESTONE (Recovery = 88%).	
					286.0				Boring terminated at 32 feet.	
						36				

NOTES:

GEO-TECHNOLOGY ASSOCIATES, INC.
14280 Park Center Drive, Suite A
Laurel, MD 20707

LOG OF BORING NO. GTA-3

LOG OF BORING NO. GTA-3

PROJECT: **Former Alcoa Eastalco Works Property**
PROJECT NO.: **201536**
PROJECT LOCATION: **Frederick County, Maryland**

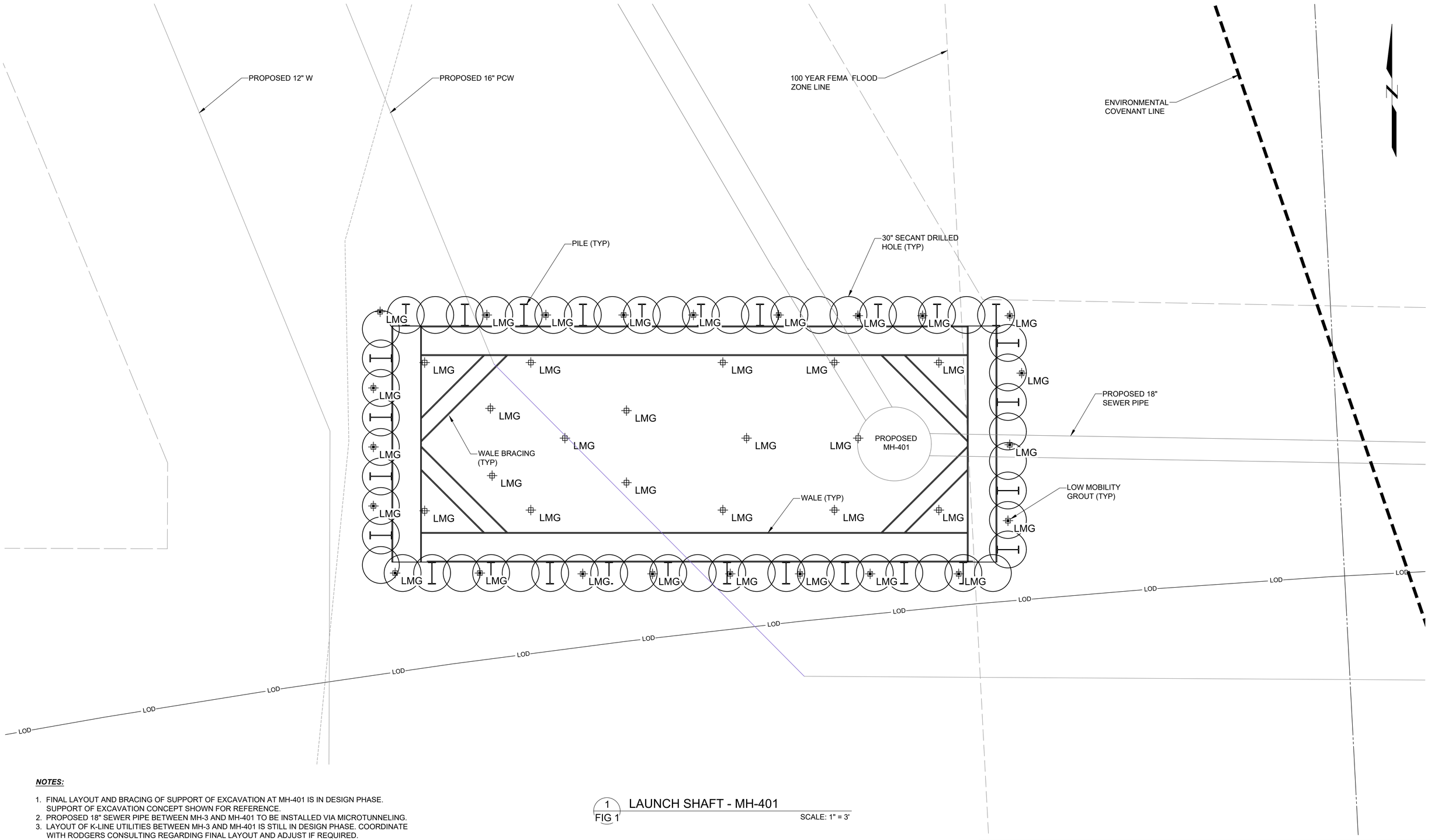
WATER LEVEL (ft):	Dry	Dry	
DATE:	12/02/2020	12/03/2020	
CAVED (ft):	19.2	16.5	

SAMPLE NUMBER	SAMPLE DEPTH (ft.)	SAMPLE RECOVERY (in.)	SAMPLE BLOWS/6 inches	N (blows/ft.)	ELEVATION (ft.)	DEPTH (ft.)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
						42			Rock Coring Times Depth (ft.) | Time (min:sec) 22.0 - 23.0 | 2:05 23.0 - 24.0 | 1:35 24.0 - 25.0 | 1:80 25.0 - 26.0 | 3:35 26.0 - 27.0 | 2:17 27.0 - 28.0 | 1:20 28.0 - 29.0 | 2:30 29.0 - 30.0 | 3:40 30.0 - 31.0 | 4:35 31.0 - 32.0 | 3:05	
						48				
						54				
						60				
						66				
						72				
						78				

GEO-TECHNOLOGY ASSOCIATES, INC.
14280 Park Center Drive, Suite A
Laurel, MD 20707

GEI Consultants

Attachment 2 - Secant Pile Wall and LMG Grouting General Design



NOTES:

1. FINAL LAYOUT AND BRACING OF SUPPORT OF EXCAVATION AT MH-401 IS IN DESIGN PHASE. SUPPORT OF EXCAVATION CONCEPT SHOWN FOR REFERENCE.
2. PROPOSED 18" SEWER PIPE BETWEEN MH-3 AND MH-401 TO BE INSTALLED VIA MICROTUNNELING.
3. LAYOUT OF K-LINE UTILITIES BETWEEN MH-3 AND MH-401 IS STILL IN DESIGN PHASE. COORDINATE WITH RODGERS CONSULTING REGARDING FINAL LAYOUT AND ADJUST IF REQUIRED.

1
FIG 1 LAUNCH SHAFT - MH-401

SCALE: 1" = 3'

Mountville Road - K Line Trenchless Design Quantum Loop Frederick, MD	GEI Consultants	MOUNTVILLE ROAD LAUNCH SHAFT AT MH-401
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig. 1

GEI Consultants

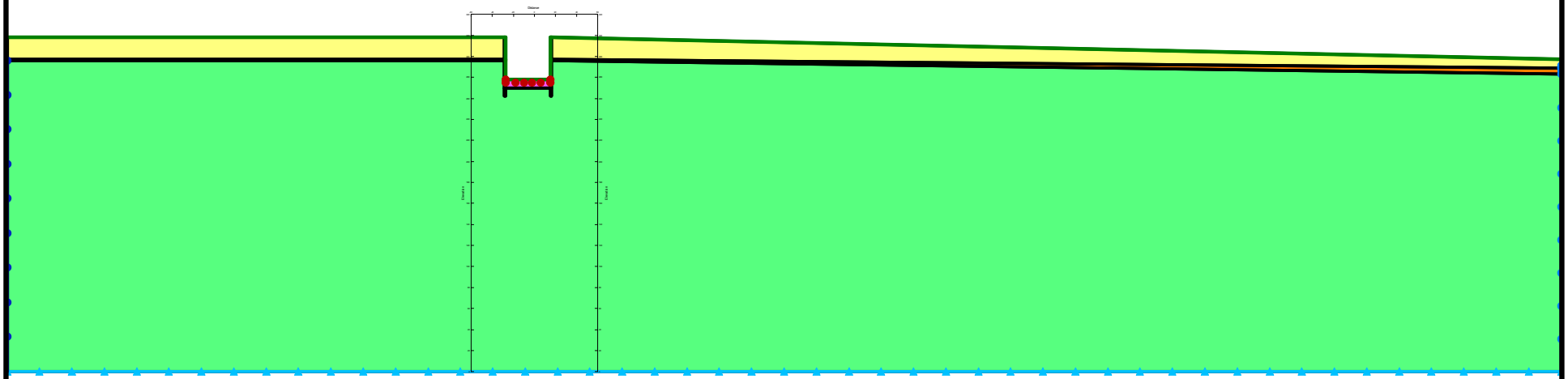
Attachment 3 – Calculation Package – Seepage Analysis

GEI Consultants

MH-401 Excavation

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Secant Piles-LS	Saturated Only	1.64e-07	0.1
	Secant Piles-RS	Saturated Only	1.11e-10	0.1
	Secant Piles-WR	Saturated Only	1.09e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

Project #2302756

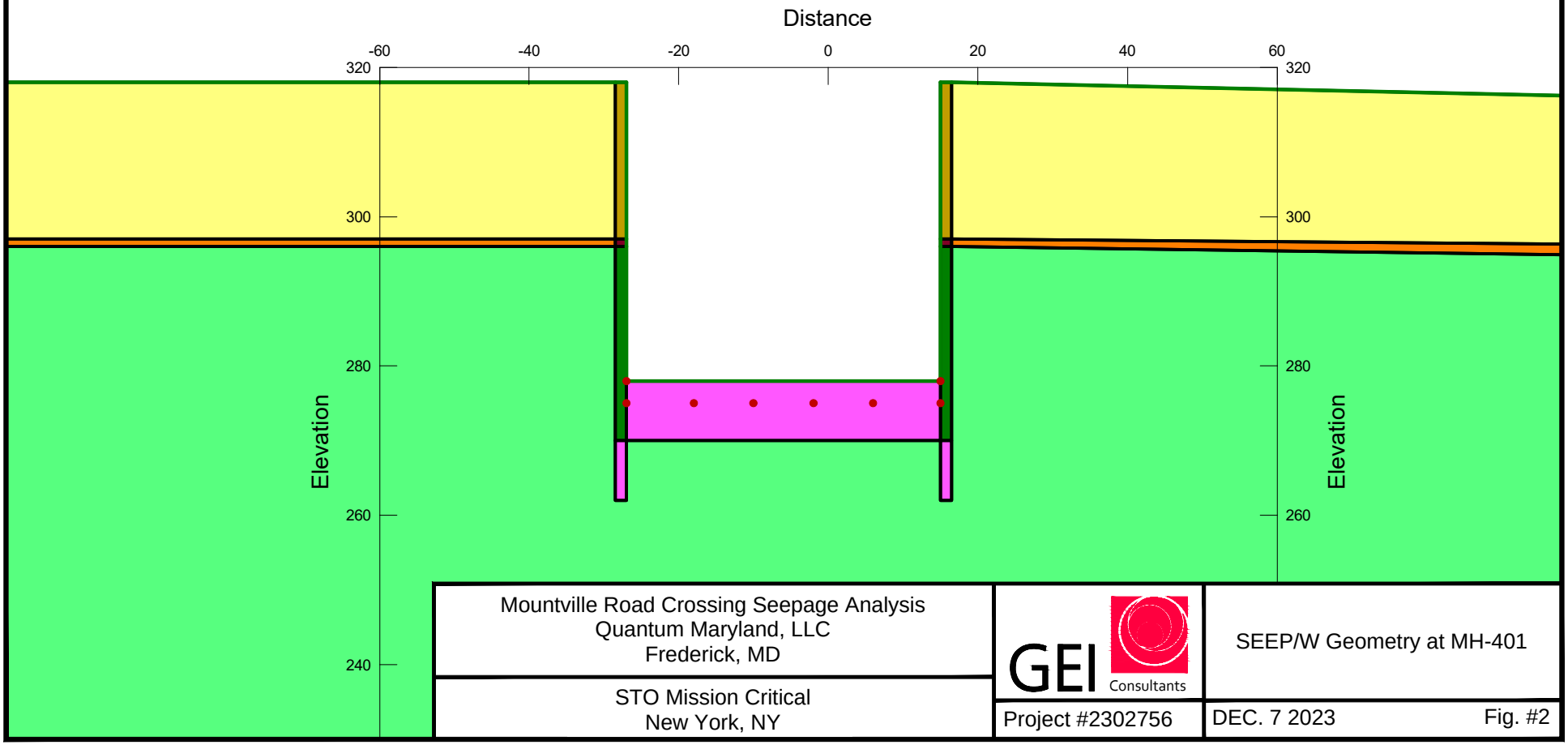
Full Extent of SEEP/W Model

DEC. 7 2023

Fig. #1

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Secant Piles-LS	Saturated Only	1.64e-07	0.1
	Secant Piles-RS	Saturated Only	1.11e-10	0.1
	Secant Piles-WR	Saturated Only	1.09e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Geometry at MH-401

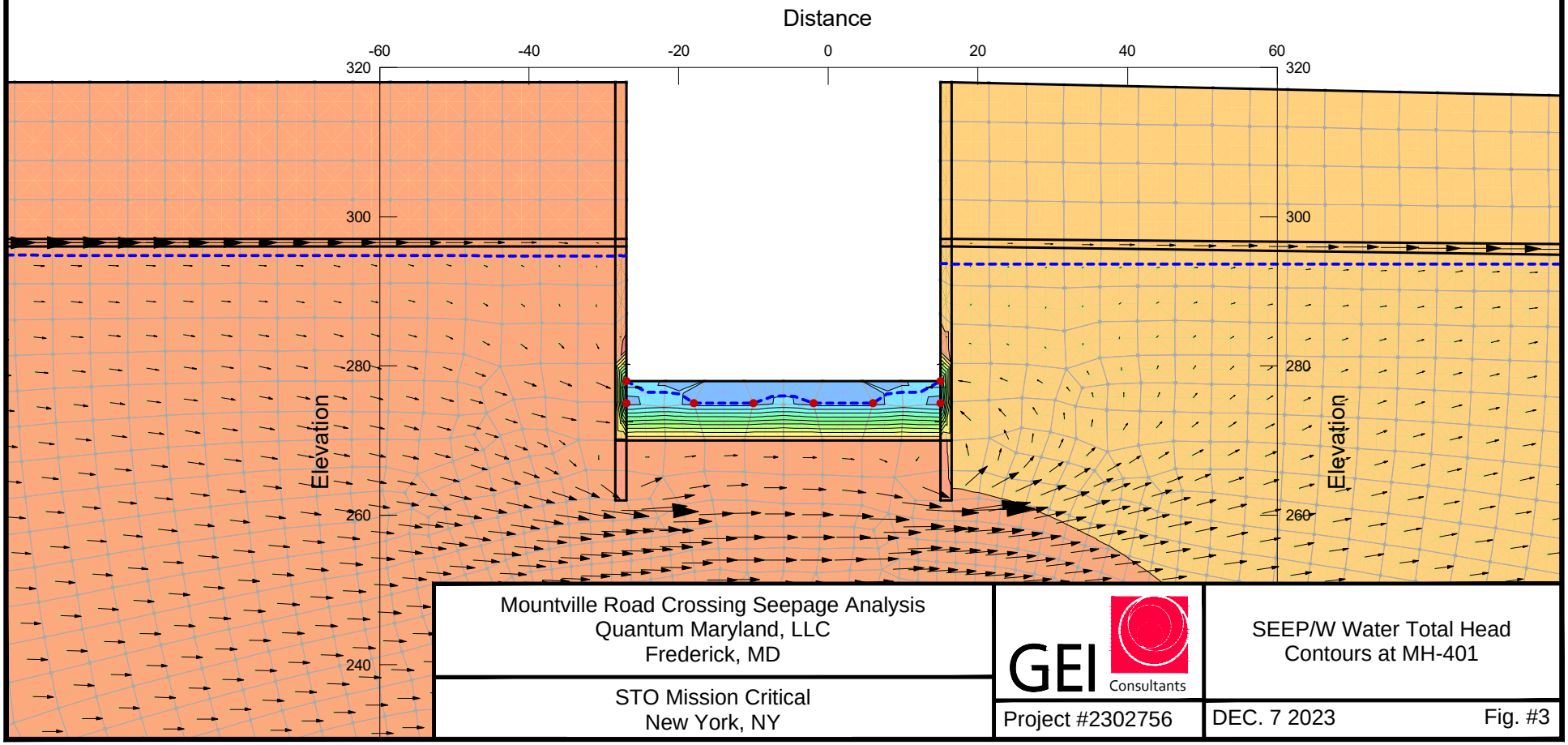
Project #2302756

DEC. 7 2023

Fig. #2

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Secant Piles-LS	Saturated Only	1.64e-07	0.1
	Secant Piles-RS	Saturated Only	1.11e-10	0.1
	Secant Piles-WR	Saturated Only	1.09e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

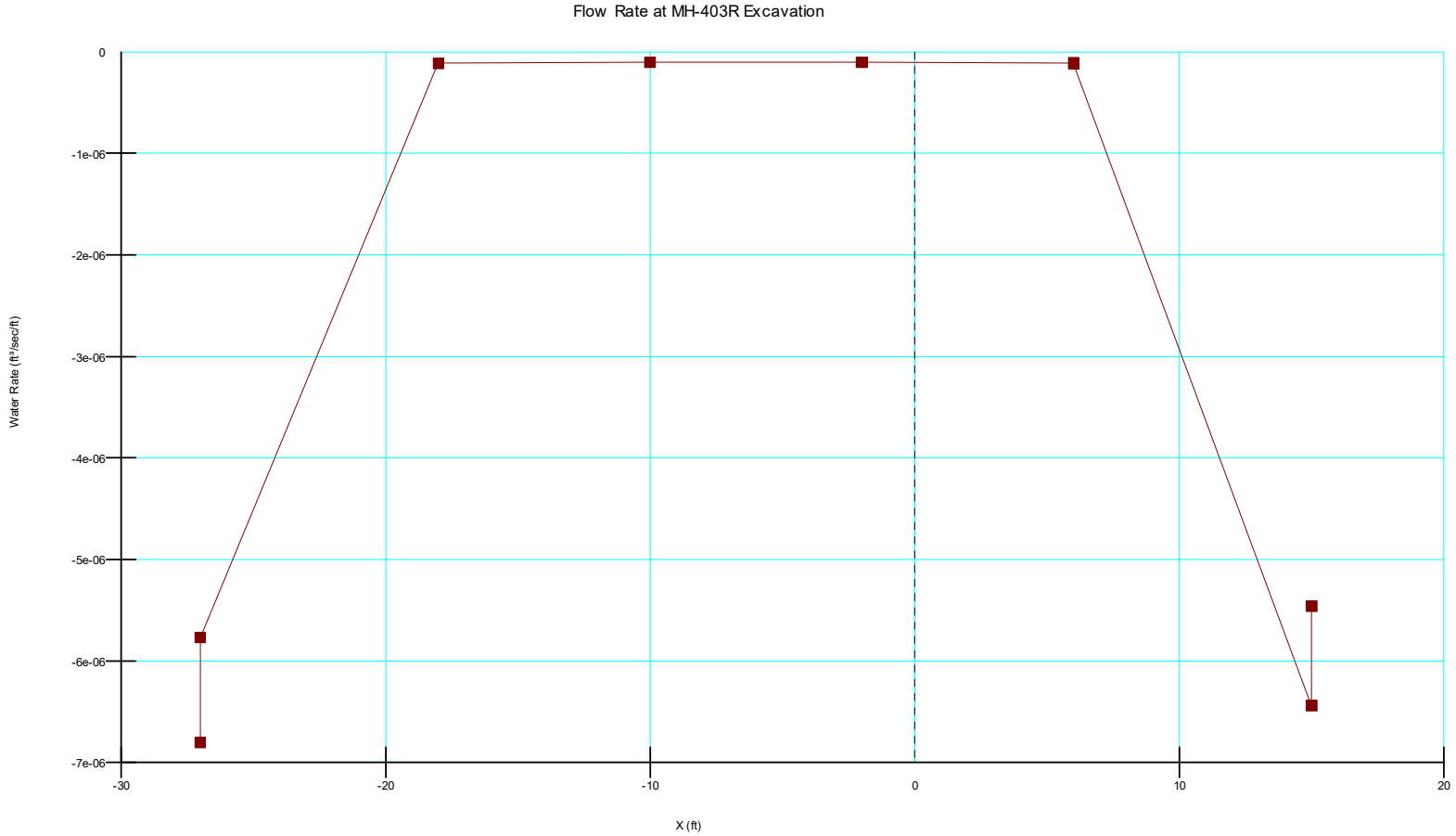
GEI Consultants

SEEP/W Water Total Head Contours at MH-401

Project #2302756

DEC. 7 2023

Fig. #3



Mountville Road Crossing Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rates at MH-401
STO Mission Critical New York, NY	Project #2302756	DEC. 7 2023 Fig. #4

Table 1: Water Flow Rate Results at MH-401 from SEEP/W Model

X (ft)	Water Rate (ft^3/sec/ft)	Perimeter Length (ft)	Flow Rate (gpd)	Flow Rate Sum (gpd)
-27	6.80E-06	118	518.9	1899.1
-27	5.77E-06	118	440.0	
-18	1.12E-07	118	8.5	
-10	1.02E-07	118	7.8	
-2	1.02E-07	118	7.8	
6	1.12E-07	118	8.5	
15	6.44E-06	118	491.3	
15	5.46E-06	118	416.3	

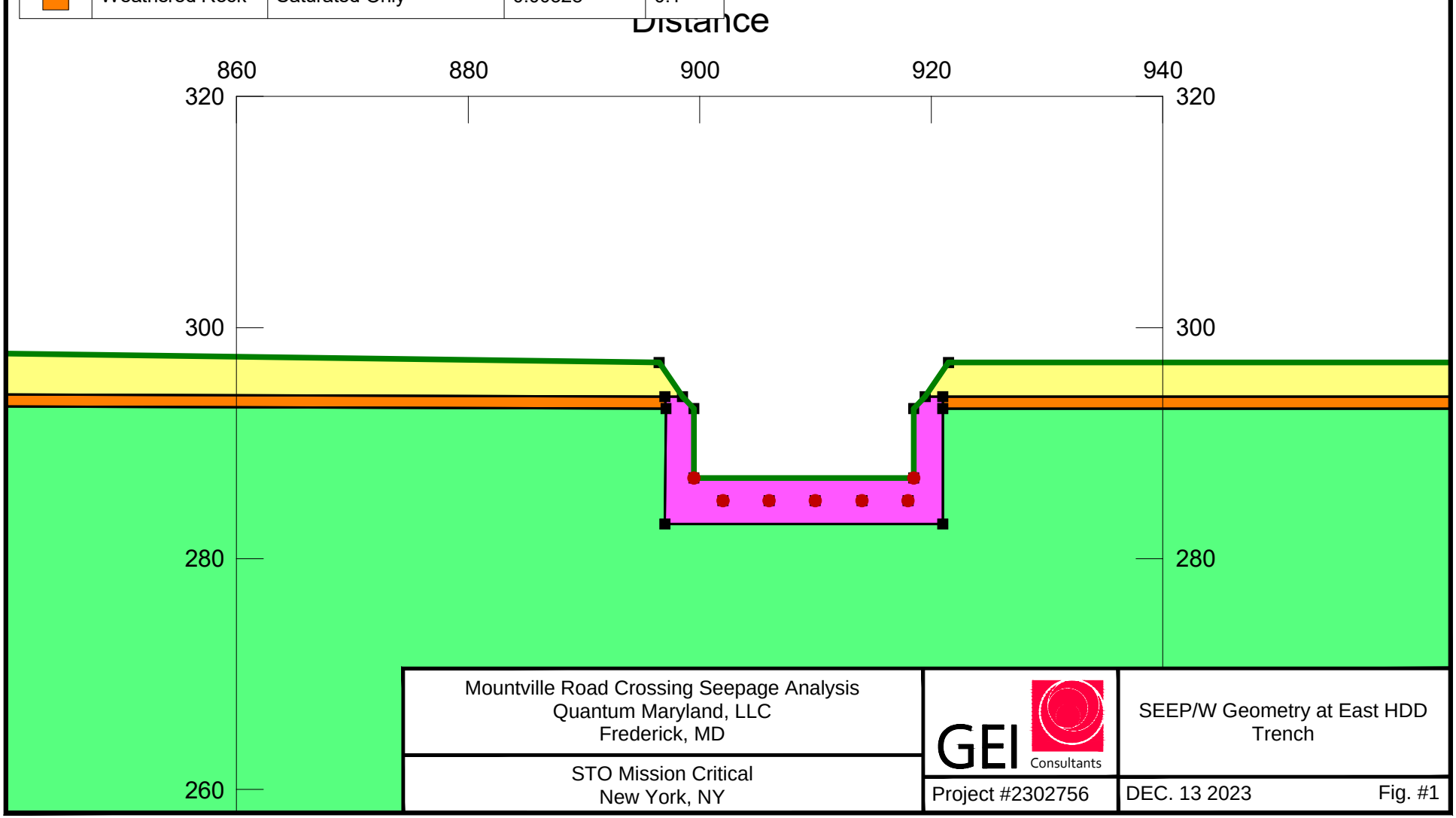
Mountville Road Crossing Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rate Results at MH-401	
STO Mission Critical New York, NY	Project #2302756	DEC. 7 2023	Fig. #5

GEI Consultants

Eastern HDD Excavation

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Geometry at East HDD Trench

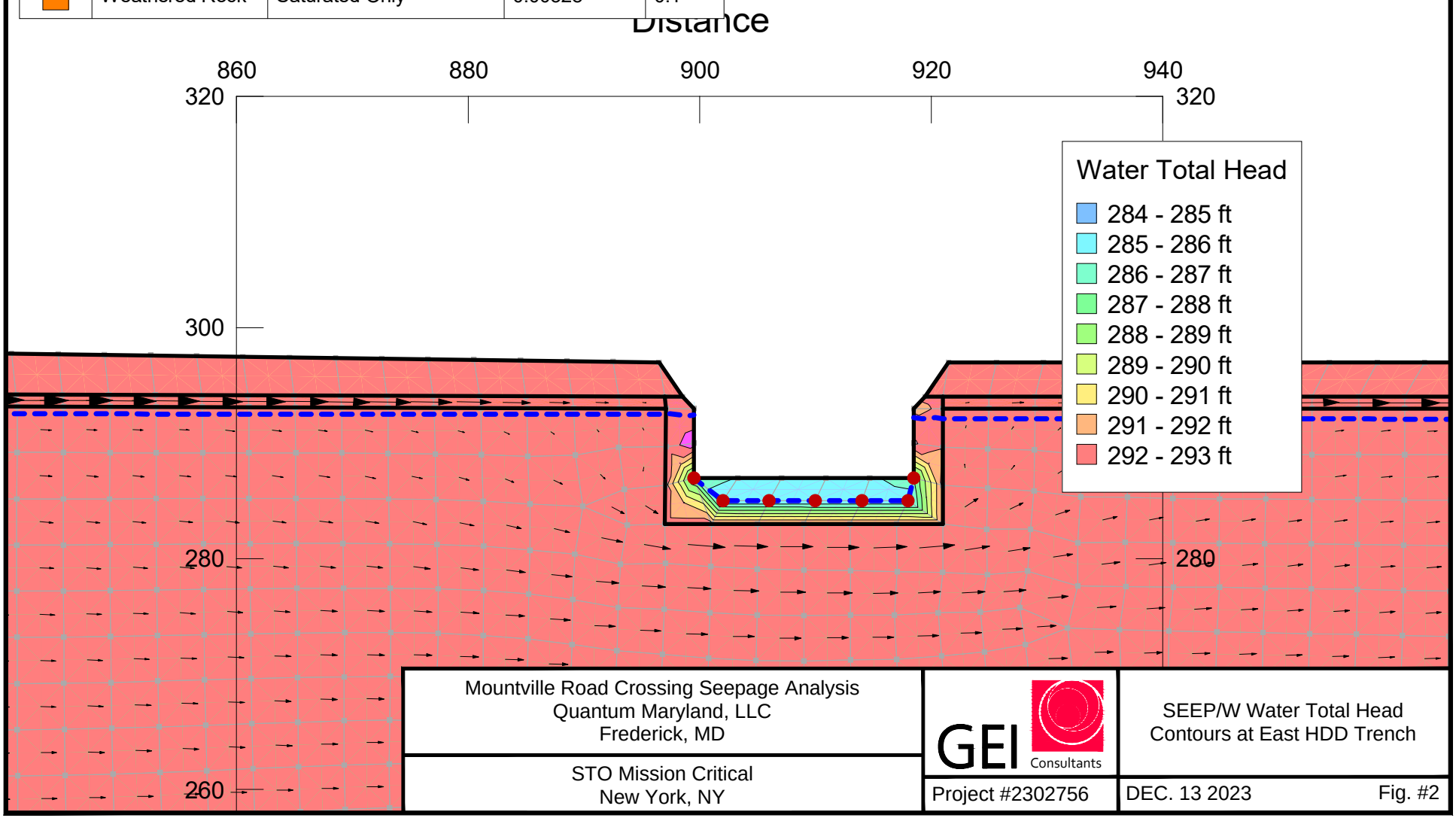
Project #2302756

DEC. 13 2023

Fig. #1

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

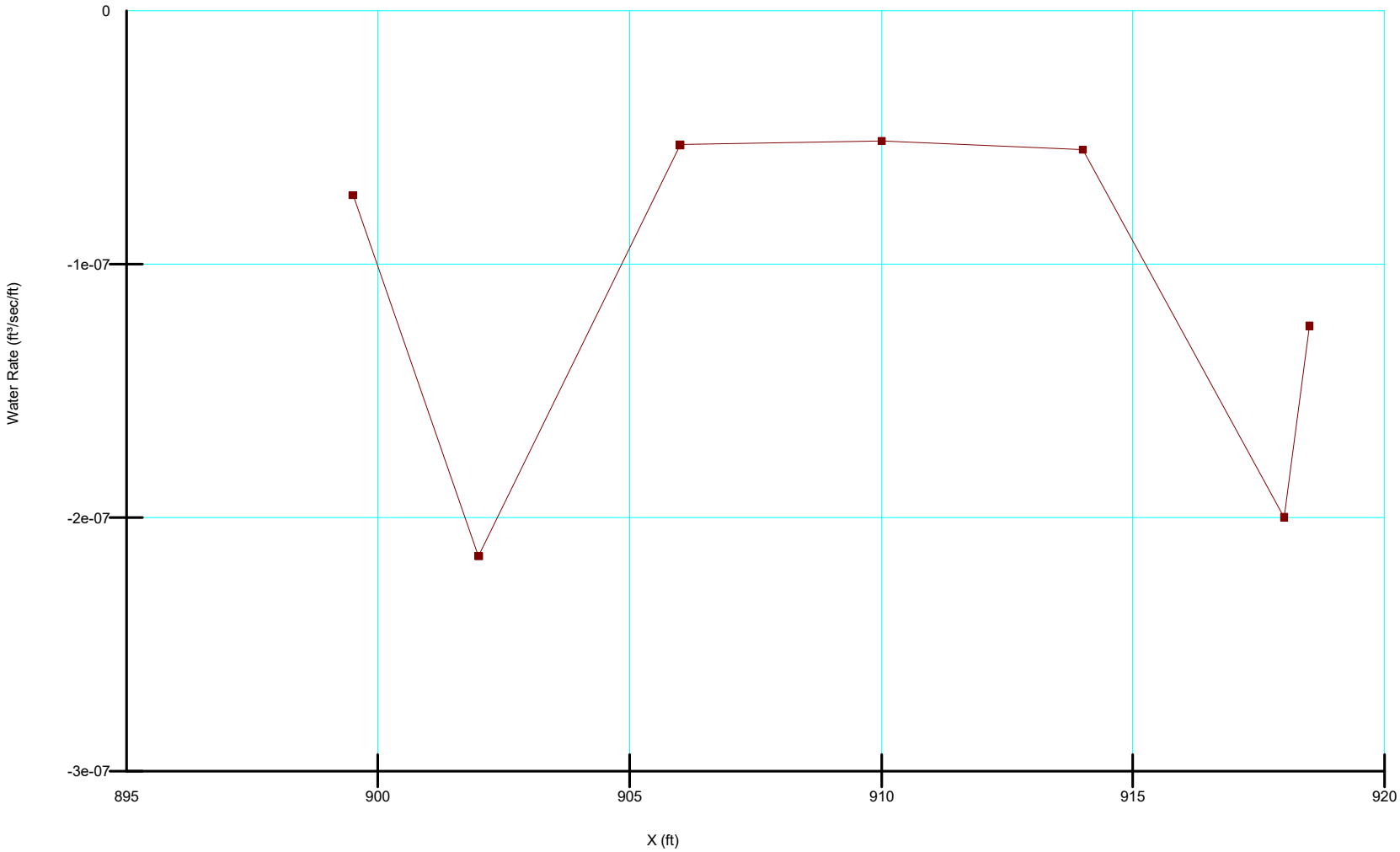
SEEP/W Water Total Head
Contours at East HDD Trench

Project #2302756

DEC. 13 2023

Fig. #2

Flow Rate at HDD East Pit - Adjacent to MH-3



Mountville Road Crossing Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rates at East HDD Trench
STO Mission Critical New York, NY	Project #2302756	DEC. 13 2023 Fig. #3

Table 1: Water Flow Rate Results at HDD East Pit from SEEP/W Model

X (ft)	Water Rate (ft^3/sec/ft)	Perimeter Length (ft)	Flow Rate (gpd)	Flow Rate Sum (gpd)
900	7.28E-08	56	2.6	27.9
902	2.15E-07	56	7.8	
906	5.30E-08	56	1.9	
910	5.14E-08	56	1.9	
914	5.49E-08	56	2.0	
918	2.00E-07	56	7.2	
919	1.24E-07	56	4.5	

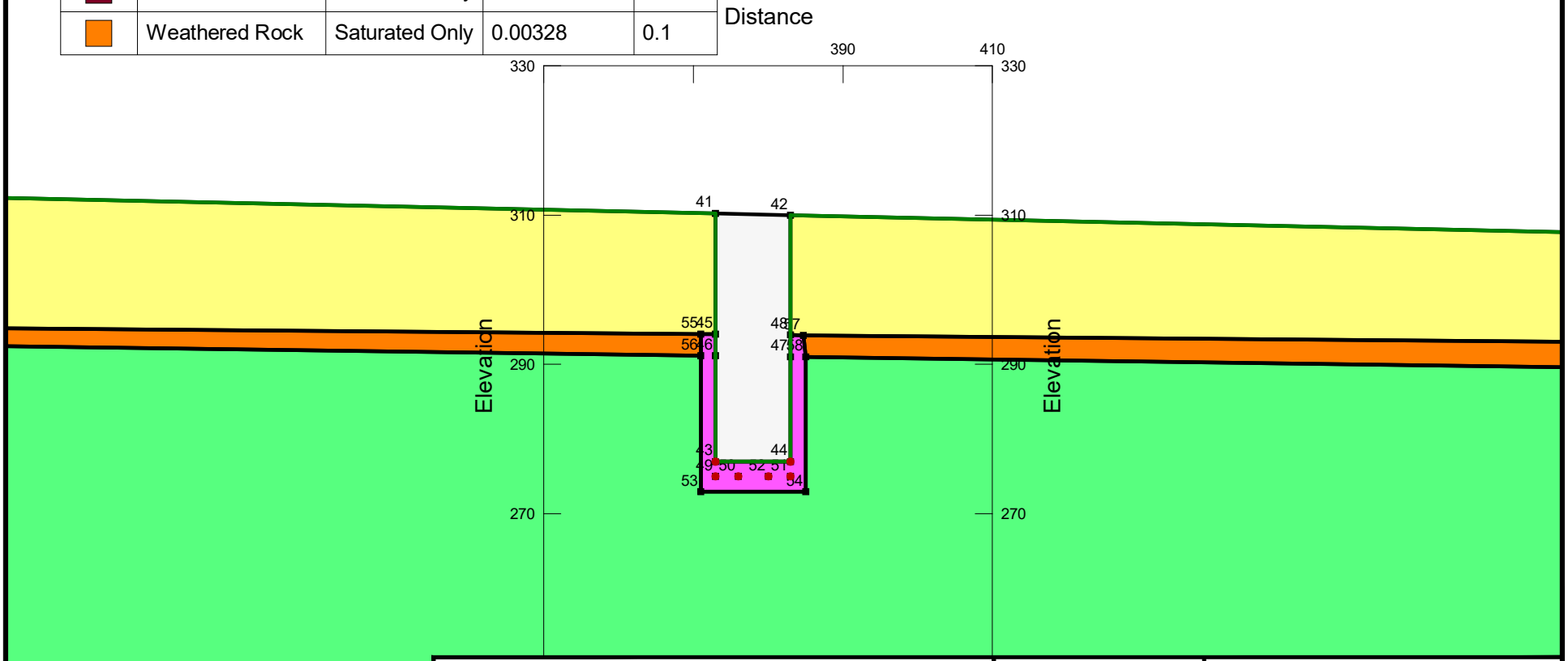
Mountville Road Crossing Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rate Results at East HDD Trench
STO Mission Critical New York, NY	Project #2302756	DEC. 13 2023 Fig. #4

GEI Consultants

MH-400 Open Excavation

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Secant Piles-LS	Saturated Only	1.64e-07	0.1
	Secant Piles-RS	Saturated Only	1.11e-10	0.1
	Secant Piles-WR	Saturated Only	1.09e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

SEEP/W Geometry at MH-400

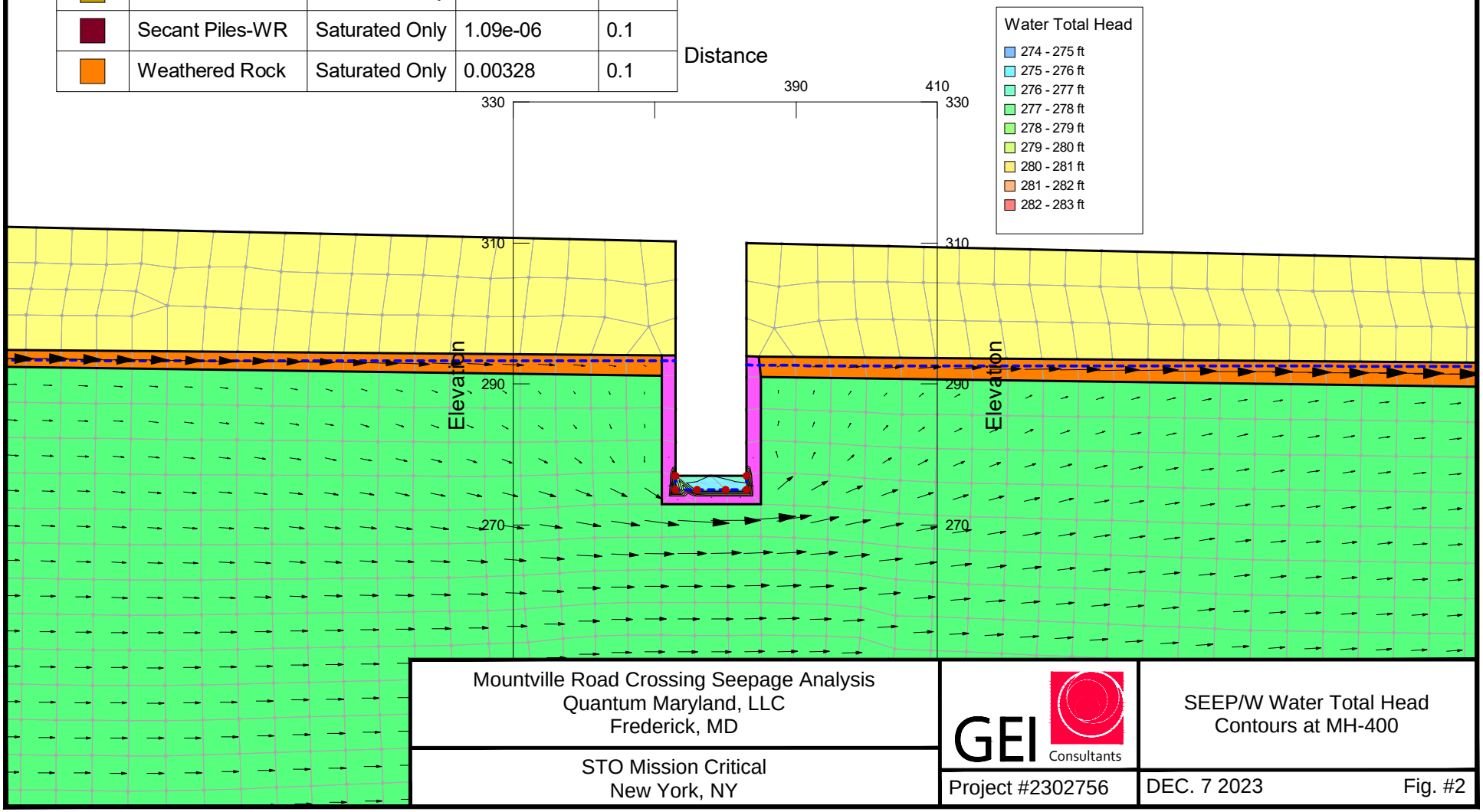
Project #2302756

DEC. 7 2023

Fig. #1

Color	Name	Hydraulic Material Model	Sat Kx (ft/sec)	Ky'/Kx' Ratio
	Limestone	Saturated Only	0.000492	0.1
	LMG Treated Area	Saturated Only	3.28e-08	0.1
	Residual Soils	Saturated Only	3.13e-07	0.1
	Secant Piles-LS	Saturated Only	1.64e-07	0.1
	Secant Piles-RS	Saturated Only	1.11e-10	0.1
	Secant Piles-WR	Saturated Only	1.09e-06	0.1
	Weathered Rock	Saturated Only	0.00328	0.1

Color	Name	Category	Kind	Parameters
	East Water Boundary	Hydraulic	Water Total Head	291.25 ft
	No Flow	Hydraulic	Water Rate	0 ft³/sec
	West Water Boundary	Hydraulic	Water Total Head	296 ft
	Zero Pressure	Hydraulic	Water Pressure Head	0 ft



Mountville Road Crossing Seepage Analysis
Quantum Maryland, LLC
Frederick, MD

STO Mission Critical
New York, NY

GEI Consultants

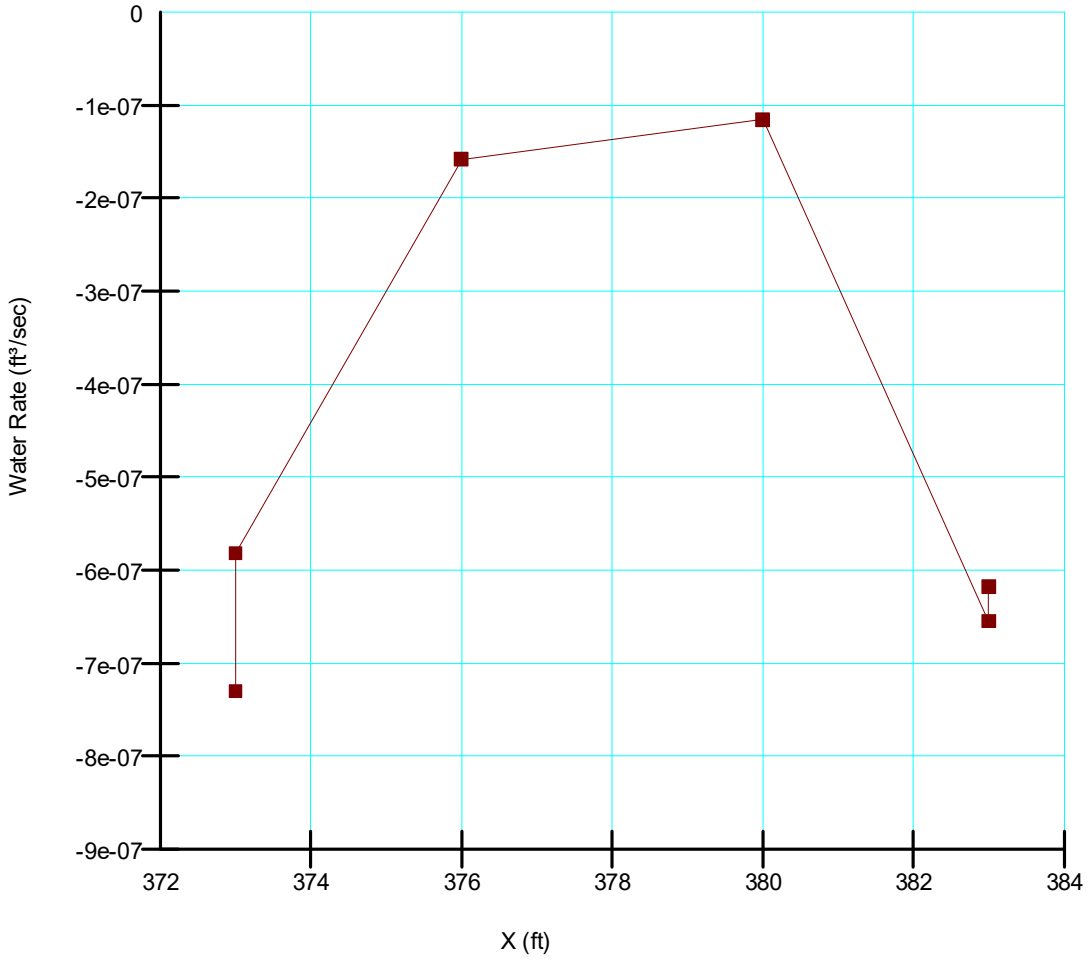
SEEP/W Water Total Head
Contours at MH-400

Project #2302756

DEC. 7 2023

Fig. #2

Flow Rate at MH-400 Excavation



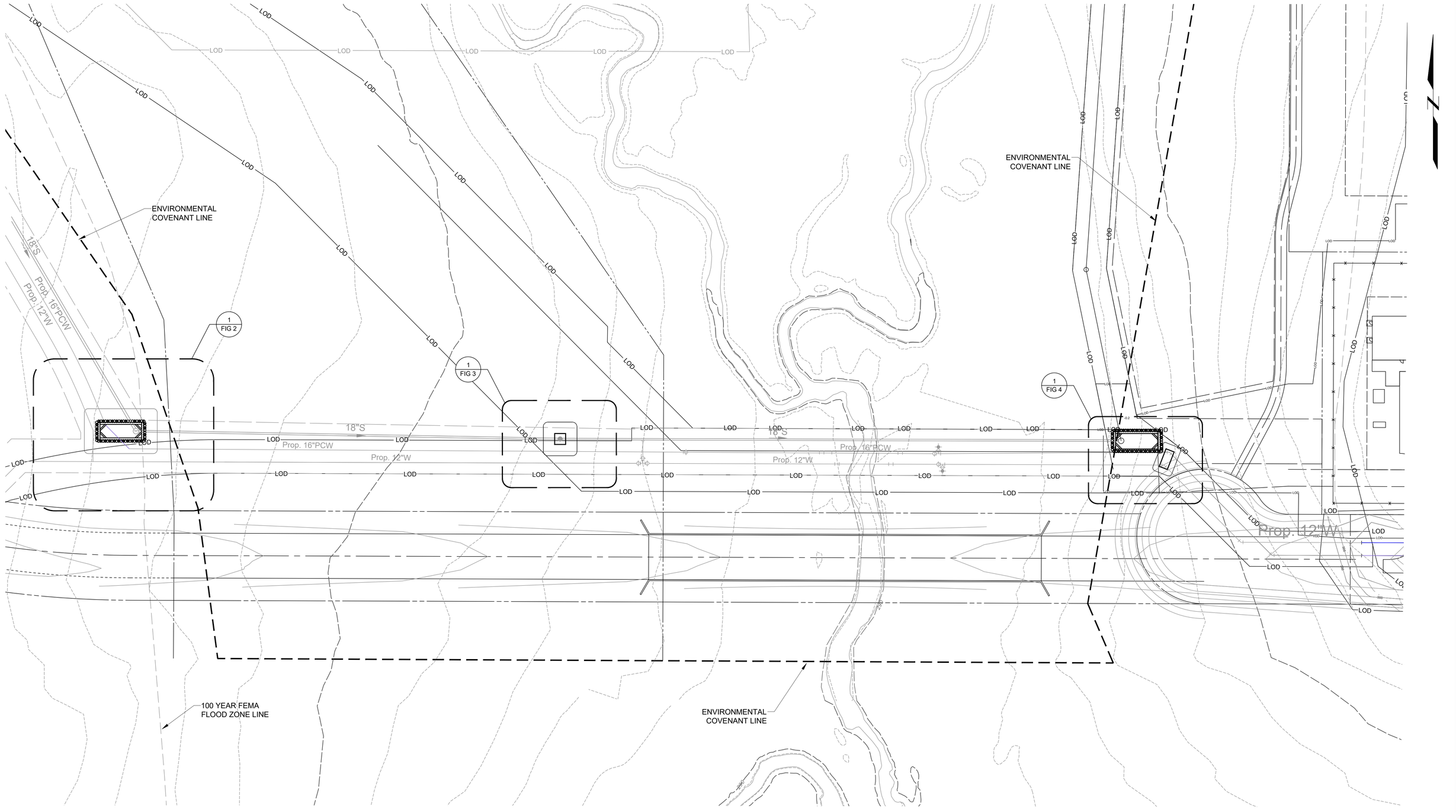
Mountville Road Crossing Seepage Analysis Quantum Maryland, LLC Frederick, MD		GEI Consultants	Flow Rates at MH-400
STO Mission Critical New York, NY		Project #2302756	DEC. 7 2023 Fig. #3

Table 1: Water Flow Rate Results at MH-400 from SEEP/W Model

X (ft)	Water Rate (ft^3/sec)	**Perimeter Length (ft)**	**Flow Rate (gpd)**	**Flow Rate Sum (gpd)**
373	7.30E-07	40	18.9	73.9
373	5.82E-07	40	15.0	
376	1.58E-07	40	4.1	
380	1.16E-07	40	3.0	
383	6.55E-07	40	16.9	
383	6.18E-07	40	16.0	

Mountville Road Crossing Seepage Analysis Quantum Maryland, LLC Frederick, MD	GEI Consultants	Flow Rate Results at MH-400
STO Mission Critical New York, NY	Project #2302756	DEC. 7 2023 Fig. #4

Attachment 4 – Groundwater Drawdown Figures



OVERALL EXCAVATION PLAN - K LINE AT MH-400, MH-401, AND NEAR MH-3

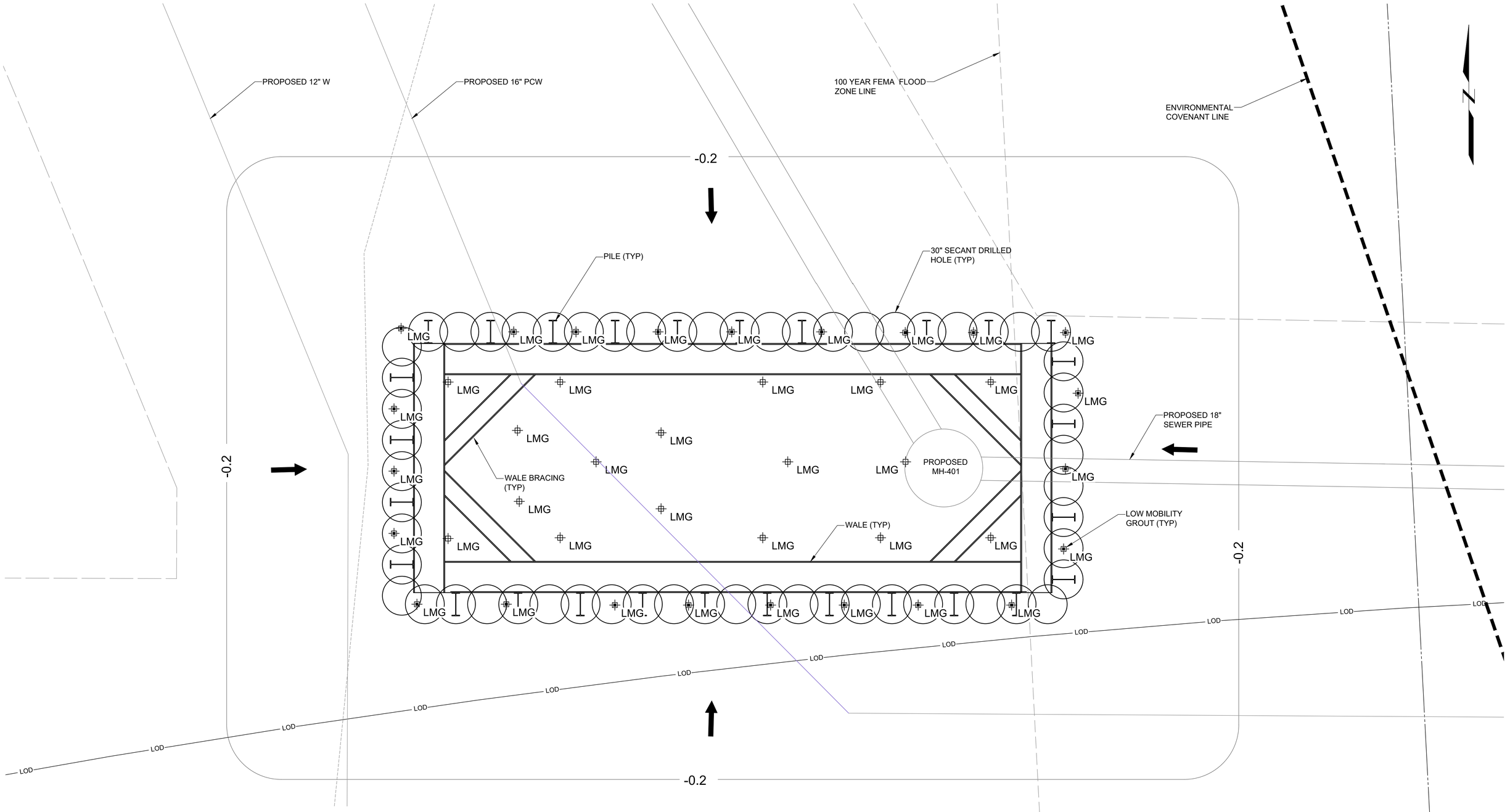
SCALE: 1" = 20'

NOTES:

1. FINAL LAYOUT AND BRACING OF SUPPORT OF EXCAVATION AT MH-401 IS IN DESIGN PHASE. SUPPORT OF EXCAVATION CONCEPT SHOWN FOR REFERENCE.
2. PROPOSED 18" SEWER PIPE BETWEEN MH-3 AND MH-401 TO BE INSTALLED VIA MICROTUNNELING.
3. LAYOUT OF K-LINE UTILITIES BETWEEN MH-3 AND MH-401 IS STILL IN DESIGN PHASE. COORDINATE WITH RODGERS CONSULTING REGARDING FINAL LAYOUT AND ADJUST IF REQUIRED.

0 40 80
SCALE, FEET

Mountville Road - K Line Trenchless Design Quantum Loop Frederick, MD	GEI Consultants	MOUNTVILLE ROAD OVERALL SITE PLAN AT MH-401 AND MH-3 GROUNDWATER DRAWDOWN
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig. 1



NOTES:

1. FINAL LAYOUT AND BRACING OF SUPPORT OF EXCAVATION AT MH-401 IS IN DESIGN PHASE. SUPPORT OF EXCAVATION CONCEPT SHOWN FOR REFERENCE.
2. PROPOSED 18" SEWER PIPE BETWEEN MH-3 AND MH-401 TO BE INSTALLED VIA MICROTUNNELING.
3. LAYOUT OF K-LINE UTILITIES BETWEEN MH-3 AND MH-401 IS STILL IN DESIGN PHASE. COORDINATE WITH RODGERS CONSULTING REGARDING FINAL LAYOUT AND ADJUST IF REQUIRED.

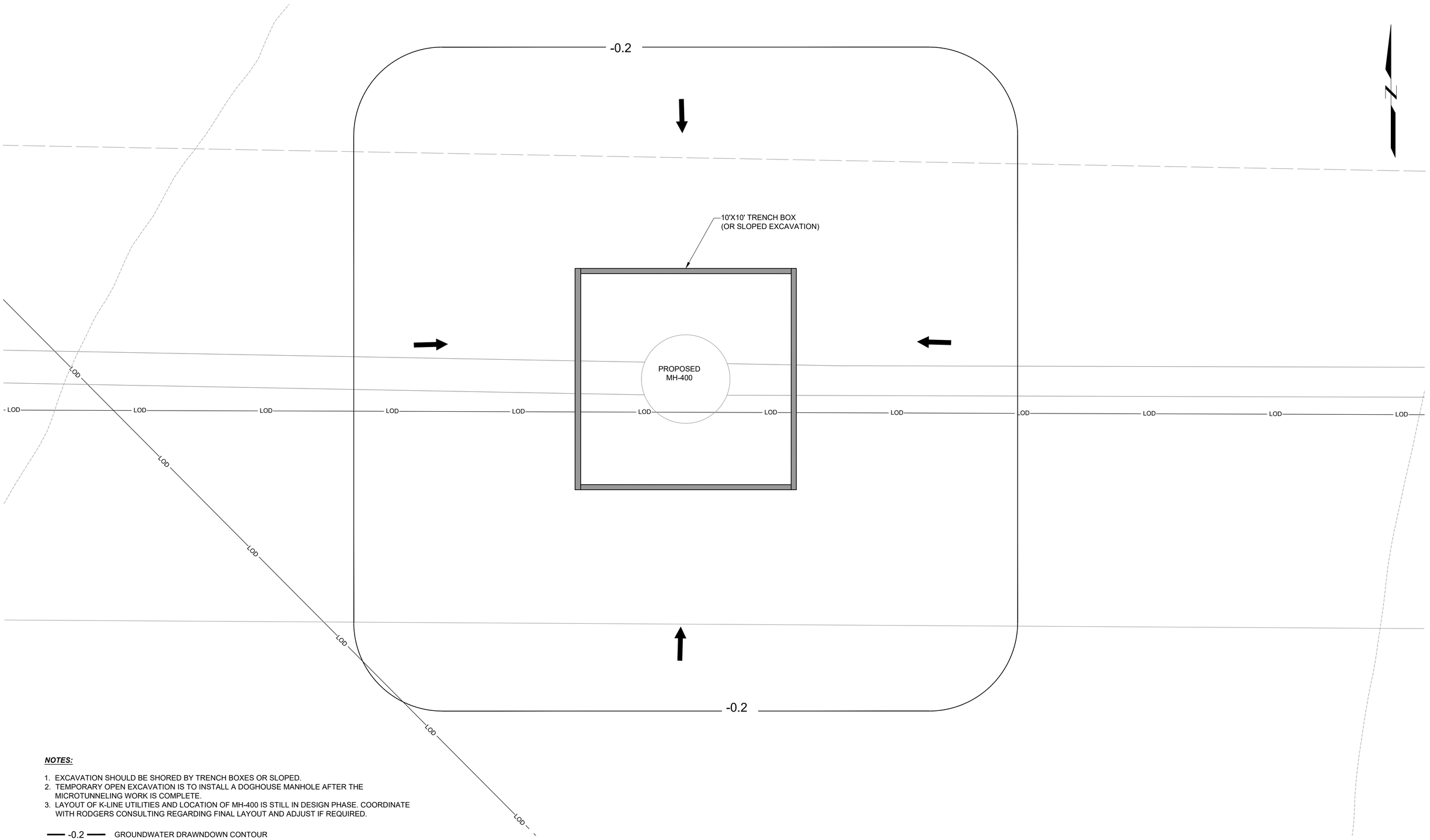
— -0.2 — GROUNDWATER DRAWNDOWN CONTOUR

➡ GROUNDWATER FLOW DIRECTION

1
FIG 1 LAUNCH SHAFT - MH-401

SCALE: 1" = 3'

Mountville Road - K Line Trenchless Design Quantum Loop Frederick, MD	GEI Consultants	MOUNTVILLE ROAD LAUNCH SHAFT AT MH-401 GROUNDWATER DRAWDOWN
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig. 2



NOTES:

1. EXCAVATION SHOULD BE SHORED BY TRENCH BOXES OR SLOPED.
2. TEMPORARY OPEN EXCAVATION IS TO INSTALL A DOGHOUSE MANHOLE AFTER THE MICROTUNNELING WORK IS COMPLETE.
3. LAYOUT OF K-LINE UTILITIES AND LOCATION OF MH-400 IS STILL IN DESIGN PHASE. COORDINATE WITH RODGERS CONSULTING REGARDING FINAL LAYOUT AND ADJUST IF REQUIRED.

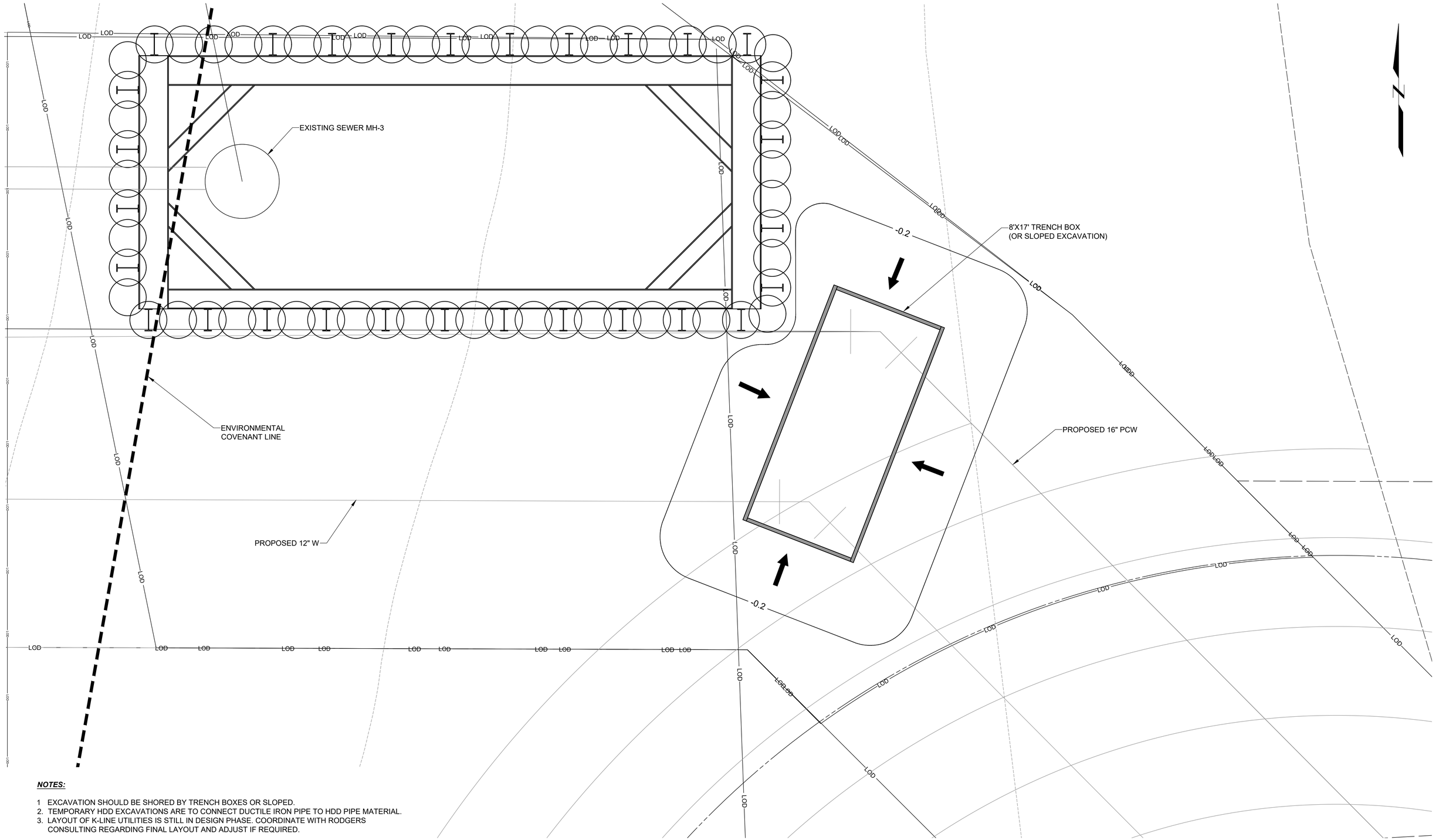
—— -0.2 —— GROUNDWATER DRAWNDOWN CONTOUR

➡ GROUNDWATER FLOW DIRECTION

1
FIG 3 EXCAVATION AT MH-400

SCALE: 1" = 2'

Mountville Road - K Line Trenchless Design Quantum Loop Frederick, MD	GEI Consultants	MOUNTVILLE ROAD EXCAVATION AT MH-400 GROUNDWATER DRAWDOWN
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig. 3



NOTES:

1 EXCAVATION SHOULD BE SHORED BY TRENCH BOXES OR SLOPED.
2. TEMPORARY HDD EXCAVATIONS ARE TO CONNECT DUCTILE IRON PIPE TO HDD PIPE MATERIAL.
3. LAYOUT OF K-LINE UTILITIES IS STILL IN DESIGN PHASE. COORDINATE WITH RODGERS CONSULTING REGARDING FINAL LAYOUT AND ADJUST IF REQUIRED.

-0.2 GROUNDWATER DRAWNDOWN CONTOUR

GROUNDWATER FLOW DIRECTION

1
FIG 4

HDD EXCAVATION NEAR MH-3

SCALE: 1" = 3'

Mountville Road - K Line Trenchless Design Quantum Loop Frederick, MD	GEI Consultants	MOUNTVILLE ROAD HDD EXCAVATION NEAR MH-3 GROUNDWATER DRAWDOWN
STRUCTURE TONE	Project 2302756	DECEMBER 2023 Fig.4

Appendix G

1. Water Management Procedures

Water and Sediment Management Process Flow Diagram
Quantum Maryland - EMP-3

Water Generation

Water Pumped or Trucked to Separator Tank based on proximity, source (EC, SMA), and quality (clear groundwater/stormwater vs grout contact water)

West Loop North Trench in EC (Manage in B-Sewer Tank Area B-1)

- West Loop North groundwater (MH-96 to MH-99)
- West Loop North stormwater in trench

West Loop North Trench in SMA (Manage in B-Sewer Tank Area B-2)

- West Loop North groundwater (crossing to MH-96)
- West Loop North stormwater in trench

West Loop North Crossing (SMA water staged in B-Sewer Tank Area B-2)

- Groundwater seepage from HDD launch pit
- Wash water from HDD operation

West Loop South Crossing (EC Water staged in EMP-1A Tank Area)

- Groundwater seepage from HDD launch pit
- Wash water from HDD operation

Multiple Separator/Tank Systems

Separator Tank 1
(Separates solids, contains sediment, may be neutralized)

Water

Field test water daily for pH

Neutralize as needed (See **Procedure N-1**)

Settle (typically overnight)

Decant clear water to Frac Tank #2, #3, etc. (flow through or settle during periods of low flow/overnight, no lower than 1 foot above sediment).

Sediment (Wet)

Solids may be allowed to build up in this tank for the duration of the work.

When solids are to be removed (at completion or contractor discretion), they must first be tested per sediment procedure.

(See **Procedure S-2**).

Frac Tank 2, etc
(Decanted water for testing/ holding)

Water

Log water volume daily

When full, label as such and no more water is added.

Verify no measurable sediment layer.

Field test pH.

Neutralize if needed per **Procedure N-1**.

Collect one water sample per **Procedure W-1**.

Review Data/Share results and recommendation with MDE.

Destination
(Dust Control or Off-Site Disposal)

Dust Control

Water for dust control must meet standards for all COCs listed in **Procedure W-1** (shorter list if W-1 list is reduced with MDE approval after second tank tested)

(See **Procedure W-1**)

When approved for dust control, pump water to water truck and apply per ESC plan. When tank is empty, log as empty and available for reuse

Disposal

Water for disposal requires testing for pH and fluoride and any additional parameters required by the disposal facility.

(See **Procedure W-1**).

Water can be tested for this short list if destined in advance for disposal, or water tested for dust control use which does not meet dust control standards and does meet disposal standards may be disposed

See **Process Flow Notes** sheet for **Procedures S-1, S-2, N-1, W-1** where referenced this sheet.

Quantum Maryland West Loop Water North and South
EMP-3 Process Flow Notes/Procedures

1. See **Process Flow Diagram** for overall process flow and references to these notes/Procedures.

2. General concepts (for context – this section General Concepts is not the procedure itself)
    a. All water generated within the scope of EMP-32 follows this same process.
    b. Multiple separator and tank systems are used to manage differing source and location of water generation. Sources and locations are listed on the flow sheet Water Generation box.
    c. The process diagram shows solids removed in separator tank #1 (sediment removal).
    d. Neutralization is included as needed in separator tank #1.
    e. The process builds in some flexibility up to this point (when to remove solids, when to neutralize if needed, etc). The next step creates a tank full of water for testing/decision making.
    f. Water (without sediment) is decanted into frac tank #2, 3, etc. That is where water is segregated, tested and held for decision making. This is done in a tank with no measurable sediment so one sample is representative of the tank and conditions don't change with agitation, etc or upon emptying.
    g. All water is destined for either off-site disposal or on-site dust control (no on-site discharge). The parameter lists/standards described herein are different for each use.
    h. Each frac tank and its log will be labelled with the frac tank unique identifier (typically around 6 digits) as well as whether it is in the Separator Tank #1 position or the decanted Frac Tank #2, 3, 4 position)

3. Numbered **Procedures** as/where referenced on **Process Flow Diagram** are as follows:

    Procedure S-1 (not used)

    Procedure N-1 (neutralization in Separator Tank #1)
    a. Collect aqueous sample using a bailer dropped to approximate center (1/2 depth) of tank. Field check pH.
    b. Measure sediment thickness. If measurable thickness is present, collect sediment sample from base of tank using bottom-filling sampler such as Sludge Judge® II by Nasco Sampling or equal. Field check pH.
    c. If pH is out of range for intended water use/disposition (6-9 s.u. for on-site dust control or 4-10.5 s.u. for disposal [conservative within RCRA non-hazardous range of 2 to 12.5]), implement neutralization using following steps.
    d. Circulate water in tank by pumping from low outlet back to tank inlet.
    e. Collect aqueous sample using a bailer dropped to approximate center (1/2 depth) of tank. Field check pH. Field check total alkalinity (as $CaCO_3$) using Hach Alkalinity Test Kit, Model AL-AP, mg/L Product Number: 2444301 (or equal).
    f. Estimate required addition of citric acid. The balanced reaction of $CaCO_3$ and citric acid is: $3CaCO_3 + 2H_3C_6H_5O_7 \rightarrow Ca_3(C_6H_5O_7)_2 + 3H_2O + 3\ CO_2$ (2 moles citric acid per 3

moles CaCO3). Using molecular weights of CaCO3 (100g/mol) and citric acid (192 g/mol):

grams citric acid needed = alkalinity (mg CaCO3/liter) x 1g/1000 mg x 1 mol CaCO3/100g x 192 g citric acid/mol x 2 mol citric acid/3 mol CaCO3 x 0.264 l/gal) x tank volume (gallons) = 0.00033792 x CaCO3 alkalinity x tank volume (in gallons)

g. Citric acid is obtained as a solid (the estimated quantity needed is the number of grams above) or as a 50% solution (approximately density of 1.24 kg/l, so 620 grams/liter)
h. These are only estimates. Using appropriate safety precautions, acid should be added slowly while continuously circulating the tank and periodically checking pH. Pause when approaching target range.
i. Stop water circulation. Check pH again after letting tank rest for several hours.

Procedure S-2 (sediment removal from Separator Tank #1)

a. Sediment in Separator Tank #1 will be present under a water phase (either a small amount of water if clear water has been decanted to Frac Tank #2 or more water if not).
b. Sediment removed from this location will be destined for off-site disposal.
c. If a waste characterization has not yet been approved by a disposal facility, sample sediment for fluoride, PCBs, TCLP RCRA metals, pH and any additional parameters requested by the disposal facility. Share the results and the waste facility approval with MDE.
d. If a waste characterization has already been approved by a disposal facility (or once approved)
    i. a sample will be collected from the base of the tank and field checked for pH.
    ii. If outside acceptable range of 4-10.5 s.u. (conservative within RCRA non-hazardous range of 2 to 12.5), implement neutralization.
    iii. If within range, vac water into transport vehicle. Check pH in tanker prior to leaving the site.
    iv. Retain copy of disposal record.

Procedure W-1 (water sampling and decision-making in Frac Tank #2, 3, etc.)

a. Following the Flow Diagram, Frac Tank #2, 3, etc. will contain decanted water with no measurable sediment at the point where this **Procedure W-1** is referenced.
b. Based on the above, the representative sampling procedure (where this **Procedure W-1** is referenced in the "**Frac Tank #2**" box on the **Process Flow Diagram**) is to drop a bailer to at least the midpoint (1/2 depth) of the tank.
c. As referenced in the "D**estination**" box on the **Process Flow Diagram**, the analytical parameters depend on whether the water is proposed for use for dust control (subject to testing/approval) or is already destined for off-site disposal (such as when dust control water is not needed, or when fluoride or other concentrations in previous tanks of water suggest the water would not be approved for dust control if tested).
    i. Procedure for dust control (as referenced in the "**Destination/Dust Control**" box on the **Process Flow Diagram**:
        1) Label the tank and tank log as held subject to testing.

2) Verify no measurable sediment is present.
3) Collect a sample from the midpoint of the tank and field check for pH.
4) If outside acceptable range of 6-9 s.u., implement neutralization per **Procedure N-1,** wait minimum 1 hour and resample.
5) Analyze sample for pH, fluoride, free cyanide, VOCs, PAHs, PCBs, TPH-GRO/DRO, and priority pollutant metals (dissolved). After a minimum of two tanks of water have been sampled for these parameters, QL may request a reduction in the parameter list to remove parameters with no history of detection above a standard; the minimum list will include fluoride.
6) When results are returned (estimated 5 day lab turnaround), compare results to standards and share results and recommended disposition (acceptable for dust control or not) with MDE.
7) Water standards for dust control are as listed below (specific constituents of VOC, PAH, PCB, Metals groups listed below are based on site COCs. Any detected constituent of these groups not listed will be compared to MDE groundwater standards):

Media	COPC	Criteria	Basis
Water	pH	6-9 s.u.	
	Fluoride	4.0 mg/l	NPWDR
	Free cyanide	0.2 mg/L	NPWDR
	VOCs		
	PCE	5.0 ug/l	MDE GCS
	PAHs		
	Benz(a)anthracene	0.03 ug/l	MDE GCS
	Benzo(a)pyrene	0.2 ug/l	MDE GCS
	Benzo(b)fluoranthene	0.25 ug/l	MDE GCS
	Benzo(k)fluoranthene	2.5 ug/	MDE GCS
	Dibenz(a,h)anthracene	0.025 ug/l	MDE GCS
	Indeno(1,2,3-c,d)pyrene	0.25 ug/l	MDE GCS
	PCBs		
	Aroclor 1016	0.14 ug/l	MDE GCS
	Aroclor 1242	0.0078 ug/l	MDE GCS
	Aroclor 1248	0.0078 ug/l	MDE GCS
	TPH-GRO/DRO	47 ug/l	MDE GCS
	PP Metals		
	Arsenic	10 ug/l	MDE GCS
	Chromium (total)	100 ug/l	MDE GCS

NPWDR – US EPA National Primary Drinking Water Regulations

MDE GCS – Maryland Department of Environment Generic Cleanup Standards (October 2018, Interim Final Guidance Update No. 3)
If total chromium exceeds 100 ug/l, analyze hexavalent chromium.

8) If not approved for dust control, follow next procedure for disposal.
9) When approved by MDE for dust control, pump water to water truck and apply per ESC plan. When tank is empty, log as empty and available for reuse.

ii. Procedure for disposal (as referenced in the "**Destination/Disposal**" box on the **Process Flow Diagram**:

1) If a waste characterization has not yet been approved by a disposal facility, sample water for fluoride, PCBs, TCLP RCRA metals, pH and any additional parameters requested by the disposal facility. Share the results and the waste facility approval with MDE.
2) If a waste characterization has already been approved by a disposal facility (or once approved)
3) Collect a sample from the midpoint of the tank and field check for pH.
4) If outside acceptable range of 4-10.5 s.u. (conservative within RCRA non-hazardous range of 2 to 12.5), implement neutralization per **Procedure N-1**.
5) If within range, vac water into transport vehicle. A full tank will require multiple transport loads. Check pH in each tanker prior to leaving the site.
6) Retain copy of each disposal record.
7) When tank is empty, log as empty and available for reuse.
    a) If water was disposed due to exceeding a standard applicable to dust control water, log tank as empty and available for disposal use.
    b) At contractor option, tank may be rinsed and rinsewater pumped to filter box. The tank was already sediment-free to get to this point in the process. Review with MDE prior to logging tank as available for any use.

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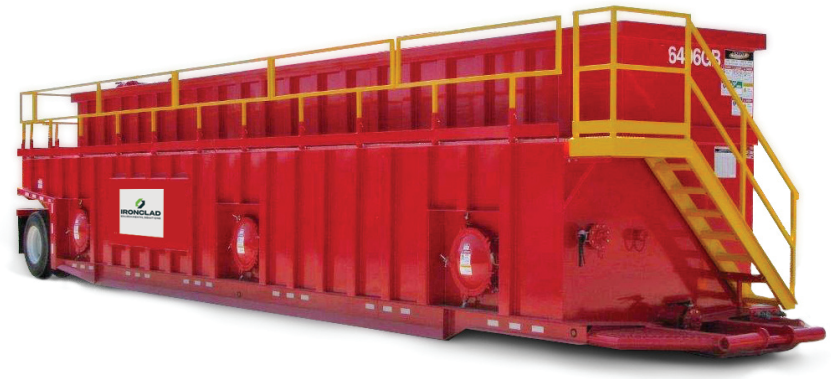
18,000 GALLON (430BBL)

Sabre Open-Top Tank

Designed to allow tank content access via an open top, the 18,000 Gallon Open Top Tank is outfi tted with a complete set of safety features, including a full length side walkway with permanent fixed handrails and a 48" wall between the operator and the product in the tank, a bare steel interior with optional weirs, and three side manways allowing easy access into the tank for cleaning.



*Photos are representational; actual products vary. Additional product plans and specifications may vary from those shown and are subject to in-stock availability.

Dimensions and Weights

Capacity: 18,060 gal (430 bbl)

Height: 13'

Width: 8'

Length: 45' 1"

Tare Weight: 26,820 lbs

Construction

Integrated full-length side-walkway
- No Guardrails to set up or take down
- No moving parts or pins to break
- No over-height issues
- Storage area is protected from walkway debris

Easy to clean design
- Smooth Wall Interior
- No corrugations
- No internal rods

3 easily accessible side hinged manways

2 front and 1 rear 4 inch valved fi ll/drain ports

Front and rear 3-inch fill line

Fixed rear axle for increased maneuverability

Nose rail cut-out for easy access when installing hose and fi ttings

Features

Safety Walkway eliminates need to walk on top of product

Grip strut stairs to help prevent slipping

Rails and stairs are painted safety yellow for high visibility

Safe Operation reminder decals attached

Attached strapping charts

Options

Bolt in Wiers

We proudly provide specialty-containment and waste-management solutions, with industry-leading service, safety, access and integrity.

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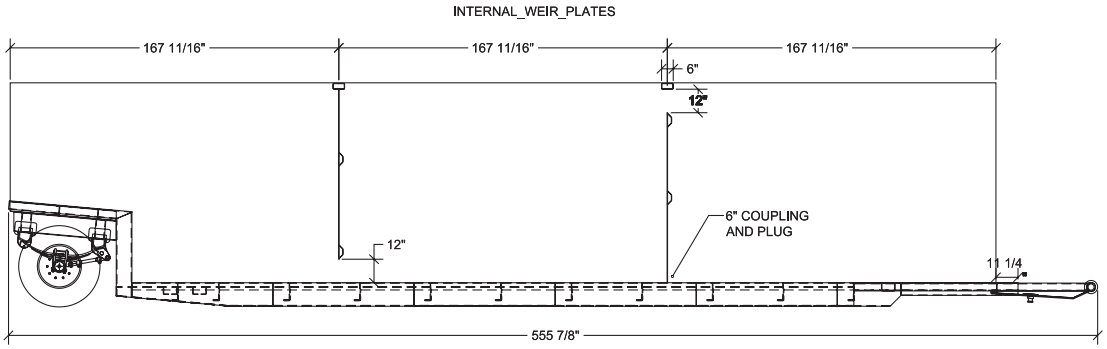
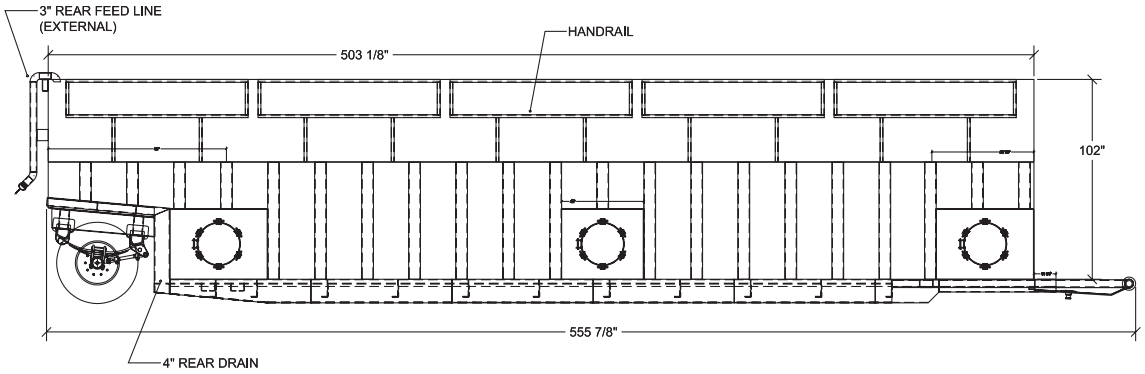
STEEL TANK

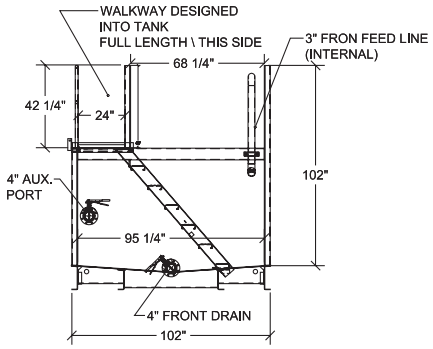
18,000 Gallon Sabre Open-Top Tank



Internal Weir View



Exterior Passenger Side View



Ladder Side View

*Some details not shown in all views. Overall dimensions are normal.

*Photos are representational; actual products vary. Additional product plans and specifications may vary from those shown and are subject to in-stock availability.

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Appendix H

STO Site HASP Guidance (same as EMP-2)

GEI Safety
EVERYONE LIVE SAFE EVERYDAY

GEI Consultants

Consulting
Engineers and
Scientists

Health and Safety Plan Guidance

Quantum Loophole/Quantum Maryland, LLC
Former Alcoa EASTALCO Works
5601 Manor Woods Road
Frederick County, Maryland

STO Mission Critical
330 West 34th Street
New York, NY 10001

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April 2024

Project No. 2302756

Edward Buskirk
Project Manager

Lesley Gastwirth, ASP
Regional Safety Manager

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Appendix

A. HASP Guidance Acknowledgement Form

1. Emergency Contact Information

Table 1. Emergency Contact Information

Site Information	
Project Name:	Former Alcoa EASTALCO Works
Project Address:	5601 Manor Woods Road, Frederick County, Maryland
Important Phone Numbers	
Emergency (Police/Fire/Medical):	911
Local Police:	(301) 600-2100
Fire Department:	(301) 600-1536
Hospital and Occupational Clinic Information *(See Attached Map and Directions in Appendix A)*	
Local Hospital: Frederick Health Hospital 400 W 7th Street, Frederick, MD 21701	(240) 566-33300
Contacts	
STO Project Manager Site Manager: Adam Finley	adam.finley@structuretone.com (571) 384.0029 cell
STO Site Safety Manager Andrew Kolodziejczak	andrew.kolodziejczak@structuretone.com (571) 400-1532 cell
Petillo Senior Project Manager Frank Ferraro	fferraro@petillo.com (973) 347-3337 direct
Clark Project Manager Brandon Deal	brandon.deal@clarkconstruction.com (301) 580-1809 direct
GEI Project Manager: Edward Buskirk	ebuskirk@geiconsultants.com (202) 609-7676 office (240) 761-0665 cell
GEI Program Manager: Bill Silverstein	wsilverstein@geiconsultants.com (856) 291-5723 office (484) 868-2145 cell
Tetra Tech Project Manager Amy McGivney	amy.mcgivney@tetratech.com (301) 528-3018 office (240) 863-1720 cell

2. Background

GEI Consultants, Inc. (GEI) has prepared this Health and Safety Plan (HASP) Guidance for Quantum Maryland, LLC (Owner) in support of the Environmental Covenant (EC) and Site Management Plan (SMP) for geotechnical explorations, infrastructure improvements, and future development at the former Alcoa Eastalco Works Property ("Site"), located in Frederick County, Maryland. The SMP outlines environmental remediation and management of the known areas of residual contamination at the Site, particularly within identified Soil Management Areas. A Site Location Map is presented as Figure 1, which identifies the approximate EC boundary, the smaller Soil Management Area (SMA), and location of infrastructure improvements.

This HASP Guidance is intended to address worker safety related to potential exposure to environmental constituents of concern during construction work. This HASP Guidance can be used, as appropriate, by Contractors but is not intended to be used as a Contractor-specific HASP. This document is intended to provide guidance to Contractors by identifying environmental contaminant hazards and controls at the Site. Contractors are responsible for the preparation and implement their own Site-specific HASP in accordance with all applicable federal, state, and local regulations and standards of care. Contractors will review and acknowledge this guidance by signing the form in Appendix A and referencing this document in their HASP.

In the event that a conflict in procedures or requirements exists between this HASP Guidance and any Contractor-specific HASP, the procedures or requirements that are most protective of human health will be applied. The Owner, or its representative, will review all Contractor-specific HASPs but will not be responsible for approving the completeness or measures specified in the Contractor-specific HASPs.

Per the EC and SMP, due to the historical use of the Site, potential risks to construction workers exist on Site through direct contact/ingestion of impacted groundwater and soil, and through the inhalation of dust. Each Contractor performing work where such exposure is possible will need to address mitigation steps in a Site-specific HASP. The HASP should meet the minimum requirements of OSHA's Hazardous Water Operations and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120 or 29 CFR 1926.65.

2.1 Site Description

The Site is the former ALCOA Eastalco Aluminum Company smelting facility located at 5601 Manor Woods Road in Frederick, Maryland. The former buildings on the Site have been razed and the Site currently consists of grassed land, and remnant paved roadways and parking areas.

This Site is planned to be developed with data center warehouses and associated infrastructure. The development will be served by publicly available water and sewer utilities.

According to the SMP, the surface and subsurface soil Contaminants of Potential Concern (COPCs) include polycyclic aromatic hydrocarbons (PAHs) and the polychlorinated biphenyls (PCBs) within the Soil Management Area. Arsenic and pesticides were also identified as COPCs in surface and subsurface soils by others. Fluoride was identified as a Site-related COPC in groundwater. Total cyanide was identified as a Site-related COPC in surface water. The HASP has been prepared to address the potential risks construction workers may encounter during Site work. Construction activities are expected to result in potential exposures to these COPCs. Management of these potential exposures is discussed in Section 5.2.

3. Roles and Responsibilities

The implementation of health and safety at this project location will be the shared responsibility of all staff implementing the proposed scope of work. The primary contacts for this project are listed below and identified in Table 1.

Overall Site Project Manager (PM) – Adam Finley (STO)

- The overall project PM will be responsible for confirming that Contractors on Site have an approved Site-specific HASP and that the Owner requirements are implemented. The PM will serve as the SSM's and Contractor's principal point of contact for project-related decisions and communication and will provide necessary updates to the Owner.

Overall Site Safety Manager (SSM) - Andrew Kolodziejczak (STO)

- The overall project SSM will be responsible for verifying on-Site personnel have attended and participated in the required safety briefing and completed the badging requirements before entering the Site. They will also be responsible for observing if Site personnel are operating safely on Site and notifying the PM of noncompliance situations and stopping work if danger is perceived. The SSM will be the primary point of contact for safety communications (incidents, spills, concerns, evacuations, etc.) and will report these to the PM/Owner and participate in incident investigations, as necessary.

It is recommended that Contractors designate and assign appropriately trained and qualified personnel to fulfill the following responsibilities for implementation of their HASPs. These titles and suggested names of the individuals assigned should be included in the Contractor-specific HASP. The titles identified below are general and other titles can be used, but the roles and responsibilities should remain consistent with the information provided below.

- Contractor Project Manager (CPM) – The CPM is responsible for confirming that the requirements of this HASP are implemented. The CPM will serve as the Contractor's principal point of contact for project-related decisions and communication. The CPM is responsible for preparing and overseeing implementation of the Contractor-specific HASP, as well as updating the HASP as conditions warrant. They are also responsible for verifying that the staff and subcontractors selected to work on this program are sufficiently trained for Site activities and have reviewed their HASP.
- Contractor Safety Manager (CSM) – The Contractor's CSM or designee will be responsible for confirming that the Contractor's HASP is properly implemented by Contractor's employees and subcontractors. The CSM will serve as the primary point of contact for communications between field personnel and

management. The CSM will be responsible for notifying the CPM and the SSM of field conditions that may require modification to the HASP. It is the responsibility of the CSM or designee to confirm that Site personnel are in conformance with the level of personal protection equipment (PPE) specified by the Contractor's HASP. It is incumbent upon the CSM to establish and maintain direct lines of communication with the SSM.

3.1 Responsibility of All Field Personnel

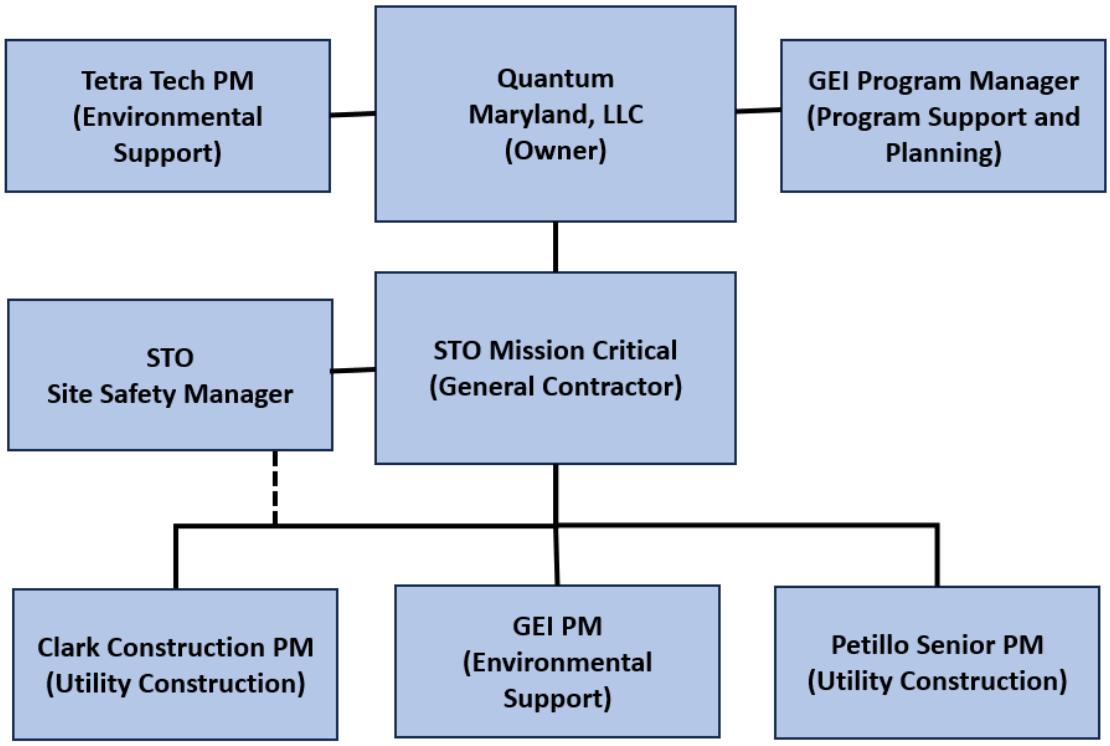
All field personnel covered by the Contractor's HASP are responsible for following the health and safety procedures in this HASP guidance and for performing their work in a safe and responsible manner. The specific responsibilities that apply to all field personnel include:

- Reading and signing the HASP prior to the start of on-Site work.
- Bringing forth any questions or concerns regarding the content of the HASP to the CPM or the CSM.
- Attending and actively participating in the required Project Safety Briefing prior to beginning on-Site work and any subsequent safety meetings.
- Complying with the requirements of this HASP and the requests of the CSM.
- Stopping work in the event that an immediate danger situation is perceived.
- Reporting accidents, injuries, and illnesses, regardless of their severity by following the Site-specific incident reporting procedures.

3.2 Lines of Authority

The Contractor will have responsibility for safety of its employees during the work performed at the Site. The CSM will have a cell phone available to contact the appropriate local authorities, in the event of an emergency. The CSM will be available for communication with the CPM, PM, SSM, and the Owner's representative, as applicable.

Project Lines of Authority



3.2.1 Stop Work Authority

Site personnel have the authority to stop work activities if an unanticipated hazard is encountered or a potential unsafe condition is observed. Site personnel should contact the SSM and PM to discuss the stop work conditions and potential control methods that can be implemented.

4. Personnel Training

4.1.1 General

The Contractor's HASP must describe what training is necessary to safely conduct the specific job and what types of employees receive training. The Contractor will distribute its HASP to appropriate employees and subcontractors involved in the project. Prior to commencing fieldwork, the Contractor's CSM should discuss the contents of the HASP with Contractor's workers and subcontractors. The CSM should provide documented specialty training, as appropriate, to the Contractor's employees based on their specific work task and responsibility. These documents shall be made available to the Owner or Owner's representative if requested.

It is the responsibility of the Contractor to confirm that its employees and subcontractors engaged in implementation of project activities comply with applicable Occupational Safety and Health Administration (OSHA) regulations.

Except for Spent Potlining (SPL) that was managed when the aluminum smelter was in operation, hazardous waste has not been identified at the Site to date. However, if necessary, pursuant to 29 CFR 1910.120, hazardous waste Site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations. Personnel who have not met the requirements for initial training or are not "current" in their training should not be allowed to work during any Site activities in which they may be exposed to environmental hazards. For a Site worker to be considered "current" for training purposes, their date of last training (initial, refresher, or manager/supervisory) must be within the last twelve months.

4.1.2 Site-Specific Training

Prior to commencement of field activities, personnel assigned to the Site should be provided with training to specifically address the activities, procedures, monitoring, and equipment for the project operations. This training will be delivered on Site as part of the Site badging process. It will include project layout, hazards, and emergency services at the project, and will highlight the provisions contained within the HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity.

The Site-specific training should also provide information regarding potential health hazards specific to the Site contaminants, the likelihood of exposure, and the precautionary measures to be implemented to protect against these hazards.

4.1.3 On-Site Safety Briefings

Periodic on-Site health and safety briefings should be performed by the SSM/CSM or designee, as necessary, to assist Site personnel in safely conducting their work activities. It is recommended that the briefings be performed on a daily basis and documented. The briefings should include information on new operations to be conducted, or changes in work practices or the Site's environmental conditions. The briefings should also provide a forum to facilitate conformance with health and safety requirements and to identify health and safety performance deficiencies noted during daily activities.

4.1.4 Additional Training

Additional training, if required for completion of field tasks during the project, will be identified and provided as the work progresses.

4.2 Medical Monitoring

Each Contractor, with assistance from an appropriate and qualified occupational health physician, is responsible for compliance with medical monitoring, if applicable. Personnel that will enter any hazardous waste sites must certify that they are participating in a medical surveillance program that complies with OSHA regulations for hazardous waste operations (i.e., 29 CFR 1910.120 and 29 CFR 1926.65). A copy of their medical clearance will be submitted to the SSM prior to the start of field activities.

5. Potential Hazards

5.1 Physical Hazards

5.1.1 General Hazards

A variety of physical hazards may be present during Site activities, as with any construction site. Rubble, debris, and sloping/uneven terrain at the Site can contribute towards slip, trip, and fall hazards. Other primary physical hazards on the Site may be those associated with heavy equipment operation, working near excavations, the use of hand and power tools, electrical hazards, handling and storage of solvents and fuels, fall potential. These hazards are not unique and should be generally familiar to hazardous waste site workers. Although these hazards are mentioned here, this HASP Guidance is not intended to address specific physical hazards of a construction site. General safe work practices for these types of potential hazards are outlined in Section 6.0.

5.1.2 Site Personal Safety

Field activities have the potential to take Site personnel into areas that may pose a risk to personal safety. To protect yourself, take the following precautions:

- If deemed necessary by the PM or CPM, use the buddy system (teams of a minimum of two persons).
- Let the SSM/CSM know when you begin work in these areas and when you leave.
- Call in regularly.
- Pay attention to what is going on around you.
- If you arrive in an area and it does not look safe to get out of your vehicle, lock the doors and drive off quickly but safely.

Site personnel must not knowingly enter a situation where there is the potential for physical and violent behaviors. If Site personnel encounter hostile individuals or a confrontation develops in the work area, suspend work activities, immediately leave the area of concern, and contact local 911 for assistance. Notify the SSM and CSM of any incidents once you are out of potential danger.

In the event of an emergency, prompt communication with local emergency responders is essential. At least one charged and otherwise functioning cell phone to facilitate emergency communications will be on Site. Confirmation of cellular phone operation will be confirmed at the start of each working day.

5.1.3 Weather

Rain, lightning, wind, and similar weather conditions can create hazardous conditions that may warrant a suspension of Site activities by the PM/CPM or SSM/CSM. Depending on the prevalent weather conditions, heat or cold stress related illnesses may be of concern to the workers during Site activities.

Heat stress hazards are possible during field activities. Personnel should be familiar with the signs and symptoms of heat stress, including heat exhaustion (dizziness, light-headedness, slurred speech, rapid pulse, confusion, fainting, fatigue, copious perspiration, cool skin that is sometimes pale and clammy, and nausea) and heat stroke (hot, dry, flushed skin, delirium, and coma [in some cases]). Other factors, such as a worker's acclimatization, level of physical fitness, and age, may increase or decrease his or her susceptibility to heat stress. Before assigning a task to an individual worker, these factors should be considered to confirm that the task will not endanger the worker's health.

To prevent heat-related illness, PMs should plan for proper hydration (drinking plenty of water), acclimatization (getting used to weather conditions), and schedules that alternate work with rest. Site personnel should also be trained to recognize the symptoms of heat-related illnesses, know how to administer first aid for heat-related illnesses, and activate emergency medical services quickly when needed. Water and shade will be available to all project Site personnel and located as close as practicable to the work areas when temperatures exceed 80°F. Additional preventative measures include conducting pre-shift meetings to encourage Site personnel to drink plenty of water, working in the buddy system or regular communication for observations of heat-related illness, and reminding Site personnel of their right to take a cool-down rest when necessary.

Cold stress hazards are most likely to occur at low temperatures or low wind chill factors, with wet, windy conditions also contributing to risks. Cold exposure and hypothermia are possible during field activities. Workers should be familiar with the signs and symptoms of cold stress.

5.1.1 Manual Lifting

Manual lifting of objects and equipment may be required. Failure to follow proper lifting technique can result in back injuries and strains. Site personnel should use a buddy system and/or power equipment to lift heavy loads whenever possible and should evaluate loads before trying to lift them (i.e., they should be able to easily tip the load and then return it to its original position). Carry heavy loads with a buddy and use these proper lifting techniques: 1) make sure footing is solid; 2) straighten back with no curving or slouching; 3) center body over feet; 4) grasp the object firmly and as close to your body as possible; 5) lift with legs; and 6) turn with your feet, do not twist.

5.1.2 Noise

Use of heavy equipment, running motors, power tools, etc., may lead to elevated noise levels. The SSM/CSM shall evaluate if noise monitoring or hearing protection is warranted. Site personnel who will perform suspected or established high-noise tasks and operations will wear hearing protection. Other Site personnel who do not need to be in proximity of the noise should distance themselves from the equipment generating the noise.

5.1.3 Confined Space Entry

Work in confined spaces will be performed in accordance with 29 CFR 1910.146 and the Contractor's Permit Required Confined Space Entry program. Confined space work will not be performed without first notifying and receiving approval from PM in addition to notifying the SSM. Permits will be generated and managed by the Contractor performing the entry. The CPM will work with the SSM/CSM to address confined space hazards as applicable prior to the start of the project. Prior to entry and throughout the duration of the entry, atmospheric monitoring will be evaluated. Action levels for atmospheric monitoring are defined in Section 9 of this guidance document. The CPM managing the permit, or their designee, will contact local emergency responders to plan for potential rescue. This correspondence will be documented on the Confined Space Permit and communicated to the project team.

5.1.4 Excavations and Trenches

The safety requirements for excavations and trenches must be determined by a competent person who can identify existing and predictable hazards and work conditions that are unsanitary, hazardous, or dangerous to on-Site personnel. The competent person must also have the authorization to take prompt corrective measures to eliminate unsatisfactory conditions. No one should enter trenches without the review of protective systems in place and ingress/egress routes, and only after specific approval is granted by the SSM/CSM and designated competent person/engineer.

5.1.5 Utilities

The Site may have shallow, buried utilities and also overhead utilities in certain areas. It will be necessary for parties disturbing the existing ground surface and conducting operations with heavy equipment having high clearances to exercise caution in performing project-related work with respect to the presence of utilities. Utility companies with active, buried lines in the Site area will be asked by the Contractor performing intrusive activities to mark their facilities. Site personnel will use these data to choose work locations. Prior to the start

of any intrusive activities, Contractors must contact May to mark out underground public utilities. A private utility company should be utilized for any utilities that need to be located away from public right of ways.

No excavating, drilling, boring, or other intrusive activities will be performed until an underground utility survey, conducted by knowledgeable persons or agencies, has been made. Even when a utility search has been completed, drilling, boring, and excavation should commence with caution until advanced beyond the depth at which such utilities are usually located. Utilities will be considered "live" or active until reliable sources demonstrate otherwise.

Overhead transmission and distribution lines will be carried on towers and poles which provide adequate safety clearance over roadways and structures. Clearances will be adequate for the safe movement of vehicles and for the operation of construction equipment.

Overhead or above-ground electric lines should be considered active until a reliable source has documented them to be otherwise. Elevated work platforms, ladders, scaffolding, man-lifts, and drill or vehicle superstructures will be erected a minimum of 20 feet (the actual distance is dependent upon the voltage of the line) from overhead electrical lines until the line is de-energized, grounded, or shielded so arcing cannot occur between the work location or superstructure.

5.1.6 Hand and Power Tools

To complete the various tasks for the project, personnel may use hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will be worn by the operating personnel when using hand and power tools and Ground Fault Circuit Interrupter (GFCI)-equipped circuits will be used for power tools. Inspect all power and extension cords for integrity before use. Specific safety protocols and PPE for tools will be provided in the Contractor's HASP.

5.1.7 Biological Hazards

Biological hazards present at the Site may include poisonous plants, insects, and animals. Workers should be familiar with the appearance of poison ivy and should wear impervious clothing, as necessary, to prevent contact with poison ivy. Ticks may be present and can carry disease, such as Lyme disease or Rocky Mountain spotted fever. Wear protective clothing or secure pant legs to lower legs or boots, and apply bug repellent to this area. Other animals may be present on the Site, and contact should be avoided.

5.2 Chemical Hazards

Chemicals may be introduced into the body by ingestion, inhalation, or absorption through the skin. Because not all chemicals have the same level of toxicity, the length of time for the exposure and the concentration of the chemical are important in determining the risk. Inhalation and skin contact are the most common routes of entry.

5.3 Constituents of Concern Potential Concern

As noted in Section 2.0, sampling and analysis data has identified various COPCs in soil above Maryland Department of the Environment's Non-Residential cleanup criteria. Based on this information, the preliminary geotechnical explorations and future development at the Site is expected to encounter soil containing elevated concentrations of the identified COPCs. Note that the COPC remedial goals are based on long- term exposure scenarios. Short-term exposure to identified COPC impacted soils at these concentrations is generally considered to be a low-level health risk, particularly with the exposure reduction precautions that are described herein.

The characteristics of COPC at the Site are discussed below for safety information purposes. These COPC will be used to determine the action levels and PPE necessary for Site personnel which reduces the potential for exposure.

5.3.1 Site-Specific COC

Polycyclic Aromatic Hydrocarbons

PAHs are a group of chemicals consisting of numerous carbon atoms joined together to form multiple rings. Most are formed from the incomplete combustion of plant or animal matter, or carbon fuels, such as coal or petroleum. These compounds are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. PAHs may cause contact dermatitis. Direct contact can be irritating to the skin and produce itching, burning, swelling, and redness. Direct contact or exposure to the vapors may be irritating to the eyes. Conjunctivitis may result from prolonged exposure. High levels of exposure to PAHs, though not anticipated during work activities conducted during this project, may increase the risk of cancer including lung, kidney, and skin cancer. The major route of entry for the work activities to be conducted at this Site is through direct contact. Exposure is most likely when handling soil and water samples. Inhalation may occur when the soil is disturbed causing respirable and nuisance dust particles to become airborne.

Polychlorinated Biphenyls

PCBs have previously been identified during Site investigations. Exposure to PCBs can occur through unbroken skin without immediate pain or irritation. PCBs detected at the Site

are not expected to be at concentrations that exposure symptoms would occur. Acute effects of exposure to high concentrations of PCB can include eye, skin, nose, and throat irritation. Chronic effects of PCB exposure can include skin swelling and redness, gastro-intestinal disturbances, and neurological effects such as headache, dizziness, nervousness, and numbness of extremities. PCBs are suspected human carcinogens that can cause liver cancer. PCBs can accumulate in fatty tissues and result in health effects after the initial exposure has occurred. The primary route of exposure for PCBs is inhalation, dermal contact, and ingestion.

Arsenic

Arsenic is a naturally occurring element widely distributed in the earth's crust. In the environment, arsenic is combined with oxygen, chlorine, and sulfur to form inorganic arsenic compounds. Organic arsenic compounds are used as pesticides, primarily on cotton plants. It can be harmful to the eyes, skin, liver, kidney, lungs and lymphatic system, exposure to arsenic is also known to cause cancer. Acute exposure to arsenic can cause vomiting, abdominal pain, diarrhea, numbness of the extremities, muscle cramping and even death. Chronic exposure to arsenic can cause cancer, skin lesions, and potentially cardiovascular disease and diabetes. Effects of arsenic on utero and early childhood exposure can have negative impacts to cognitive development and even deaths in young adults. Common routes of exposure include ingestion and inhalation that cause illness, dermal exposure also causes illness but typically to a lesser extent.

Cyanide

Cyanide is usually found joined with other chemicals to form compounds. Examples of simple cyanide compounds are hydrogen cyanide, sodium cyanide and potassium cyanide. Hydrogen cyanide is a colorless gas with a faint, bitter, almond-like odor. Hydrogen cyanide is toxic because it is a chemical asphyxiate. It replaces the oxygen in the blood and thereby suffocates the cells. Sodium cyanide and potassium cyanide are both white solids with a bitter, almond-like odor in damp air. Cyanide and hydrogen cyanide are used in electroplating, metallurgy, organic chemicals production, photographic developing, manufacture of plastics, fumigation of ships, and some mining processes. Short-term (acute) effects – Short-term exposures to low levels of cyanide via inhalation, skin absorption or ingestion can lead to the following symptoms in a matter of minutes: rapid breathing and heart rate, restlessness, dizziness, weakness, headache, and nausea/vomiting. Long-term exposures to low levels of cyanide may result in breathing difficulties, eye irritation, chest and/or heart pain, vomiting, loss of appetite, headaches, nosebleeds, and enlargement of the thyroid gland.

Fluoride

Fluoride is a common, naturally occurring mineral found in rocks which is released into the soil, water, and air. Fluorides, hydrogen fluoride, and fluorine are chemically related. Fluorine is a naturally occurring, pale yellow-green gas with a sharp odor. It combines with metals to make fluorides such as sodium fluoride and calcium fluoride, both white solids. Sodium fluoride dissolves easily in water, but calcium fluoride does not. Fluorine also combines with hydrogen to make hydrogen fluoride, a colorless gas. Hydrogen fluoride dissolves in water to form hydrofluoric acid. Fluorine and hydrogen fluoride are used to make certain chemical compounds. Other fluoride compounds are used in making steel, chemicals, ceramics, lubricants, dyes, plastics, and pesticides. Fluorides are often added to drinking water supplies and to a variety of dental products, including toothpaste and mouth rinses, to prevent dental cavities. It can be harmful to the skeletal system and teeth. Systemic exposure effects include pulmonary edema, nausea, vomiting, gastric pain, and cardiac arrhythmia. Too much intake of fluoride can result in cardiac arrest. Common routes of exposure are ingestion, inhalation, and dermal uptake.

Volatile Organic Compounds

Volatile organic chemicals (VOCs) such as Perchloroethylene (PCE) and breakdown products Trichloroethylene (TCE), Dichloroethylene (DCE), and vinyl chloride are present as soil and groundwater contaminants. These compounds are at environmental concentrations and are not expected to be at concentrations that exposure symptoms would occur. These compounds generally have a depressant effect on the Central Nervous System (CNS), may cause chronic liver and kidney damage, and some are suspected human carcinogens. Acute exposure may include headache, dizziness, nausea, and skin and eye irritation. The primary route of exposure to VOCs is through inhalation and therefore respiratory protection is the primary control against exposure to VOCs.

Table 2. Primary Constituents of Concern Data

Constituent	Exposure Limit(s)	Route of Exposure	Primary Hazard/ Symptoms of Exposure
PAH (Polycyclic Aromatic Hydrocarbons)	0.2 mg/m^3 of air, or 5 mg/m^3 of mineral oil mist over an 8-hr TWA	Ingestion, Inhalation, skin contact	Skin erythema, burns, warts, eye irritation/photosensitivity, cough, and bronchitis
PCBs (polychlorinated biphenyls)	0.5 mg/m^3 (Skin)	Inhalation, skin absorption, ingestion, skin contact	Irritate eyes; chloracne; liver damage

Constituent	Exposure Limit(s)	Route of Exposure	Primary Hazard/ Symptoms of Exposure
Arsenic	0.01 mg/m^3 A.L. 0.005mg/m^3	Inhalation, skin absorption, ingestion, skin contact	Ulceration of nasal septum, dermatitis, GI disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen

Notes:
Fluoride and total cyanide are not listed on this table since they do not have established occupational exposure limits. Both are inorganic constituents; therefore, exposure controls would be the same as for PCBs and arsenic.
A.L. - Action Level
C - ceiling limit, not to be exceeded
mg/m^3 - micrograms per cubic meter
ppm - parts per million
TWA - Time-weighted average (8 hours)

6. Safe Work Practices

6.1 Task Hazard Assessment

Prior to the start of work, Contractors will determine what tasks are covered in the scope of work and then develop a hazard assessment for each of these tasks. The Site-specific tasks, potential hazards, and control measures established to reduce the risk of injury or illness will be identified in the Contractor-specific HASP. The overall chemical hazard assessment for this Site is low, given the Site history, previously detected contaminant concentrations, and the scope of proposed redevelopment.

Use of personal protective equipment, along with good personal hygiene practices and proper decontamination procedures, will significantly reduce the potential for exposure through dermal contact or ingestion of chemicals at the Site.

6.2 Routine Safe Work Practices

The following general safe work practices are recommended; however, this list is not intended to be comprehensive.

- Approved and appropriate safety equipment shall be worn where required, including hard hats, protective gloves, appropriate work boots, hearing protection, eye protection, etc.
- When working in areas where flammable vapors may be present, particular care must be exercised with tools and equipment that may be sources of ignition.
- No smoking, eating, or drinking should occur in contaminated areas. Do not unnecessarily touch a contaminated surface or allow your clothing, tools, or other equipment to do so.
- Appropriate lifting techniques should be used when lifting or moving heavy items
- Handheld power tools should be used and maintained in accordance with the manufacturer's specifications, including with the correct shield, guard, or attachment recommended by the manufacturer.
- Heavy equipment will be in use throughout the Project. Individuals not directly involved in heavy equipment operations should maintain a safe distance.
- Excavations should adhere to appropriate OSHA guidelines.
- Use the buddy system and line-of-sight, as necessary.
- Practice contamination prevention on- and off-Site.

- Plan activities ahead of time.
- Apply immediate first aid to any and all cuts, scratches, and abrasions.
- Report all accidents, no matter how minor, immediately to the SSM/CSM.
- Be alert to your own and others' physical condition.
- Do not proceed with work unless adequate light exists, and appropriate supervision is present.
- Designated eating, break, and smoking areas should be established at the beginning of the project

7. Site Control

7.1 Site Control/Access

Figure 1 depicts the Site layout including major site features/landmarks, locations of Emergency Muster Points, the EC and SMA boundaries, locations of landfills, and the locations of waste disposal areas. The Site boundary is surrounded by perimeter fencing and Site access is controlled by a gate attendant. Work locations throughout the site for utility installation, etc., are identified by super silt fence present at the boarders of work zone Limit of Disturbance areas (LODs)

Based on the Site evaluations performed to date, the establishment of specific work zones, beside the LODs, is not proposed for this project. If an exclusion zone needs to be established for safety reasons, caution tape will be placed around the area, to prevent access by unauthorized personnel, and entry/exit procedures should be provided.

The Contractor's HASP should describe how Site control will be maintained. The Contractor should confirm through the assigned SSM that Site control is maintained by establishing egress and ingress points for work activities and modifying them, as appropriate, as the project and work areas progress. The Site should be properly secured to restrict unauthorized access by visitors or other personnel.

7.1.1 Subcontractors

Subcontractors to each Contractor are required to work in a responsible and safe manner. Prior to working on Site, subcontractors will be required to submit the following information:

- Project/task-specific Health and Safety Plan for review by the CPM.
- Proof of appropriate training completion for each individual working on Site. Required certifications will, in some cases, depend on the task underway.
- Verification that a medical monitoring program has been implemented for those who require it.

Individuals working on Site will be required to sign an acknowledgement of their Site-specific HASP. As stated above, subcontractors are responsible for providing their Site personnel with their company's health and safety plan, and their personnel will adhere to those standards if more specific to the task at hand or more stringent than the ones provided in this HASP guidance.

Communication is crucial in maintaining safe and effective workspaces. Many sites may have multiple tasks being completed at once, so it is important to keep track of everyone on Site. Expected communication includes (but is not limited to):

- No work will be completed on Site without the CPM and SSM's knowledge and approval.
- Subcontractors will be required to check in upon arrival to the Site. Individuals should be oriented to the Site and Site hazards during their first day.
- Thorough communication about changing hazards or plans is required.
- Communication is expected to inform the Contractor SSM when work has concluded for the day.
- Any safety incident, near miss, or stop work (standdown) event must be communicated to the CPM/PM or CSM/SSM. Subcontractor reports associated with these events must be provided to in a timely manner.
- Subcontractors should provide appropriate equipment inspection reports upon request.

7.2 Site Zones

Site zones are intended to control the potential spread of contamination and to assure that only authorized individuals are permitted into potentially hazardous areas. This project is being conducted under the requirements of 29 CFR 1910.120, and any personnel working in an area where the potential for exposure to Site contaminants exists, will only be allowed access after proper training and medical documentation.

7.3 Buddy System

Site personnel should be in line-of-sight or communication contact with another on-Site person. The other on-Site person should be aware of his or her role as a "buddy" and be able to help in the event of an emergency. Some projects may not support the need for the buddy system to be implemented. If this is the case, the CPM is required to conduct regular check-ins with the Site personnel.

7.4 Sanitation for Temporary Work Sites

Sanitation requirements identified in the OSHA Standard 29 CFR 1926.51 "Sanitation" specifies that Site personnel working at temporary project sites have at least one sanitary facility available to them at the contractor "trailer park" located north of the Manor House in the 300 Lots as well as at work locations throughout the Site.

7.5 Illumination

Illumination requirements identified by OSHA are directed to work efforts inside buildings and/or during non-daylight hours. Activities planned for the Site are anticipated to occur outside during daylight hours. However, if work areas do not meet illumination requirements, they will be equipped with appropriate illumination that meets or exceeds requirements specified in OSHA Standard 29 CFR 1926.56. Personnel will not work on sites that are not properly lighted.

7.6 Smoking

Smoking is prohibited at or in the vicinity of hazardous operations or materials. Where smoking is permitted, safe receptacles will be provided for smoking materials.

7.7 Alcohol and Drug Abuse Prevention

Alcohol and drugs will not be allowed on the Site. Project personnel under the influence of alcohol or drugs will not be allowed to enter the Site. Project personnel may be subject to random drug and/or alcohol testing if required by the Owner.

7.8 Communication

Cell phones may be used as part of the communication method; however, safe driving practices while using wireless devices should be followed. Never use a cell phone while operating any equipment or vehicle or when safety hazards are present.

The following are sample hand signals that can be used, when necessary, during Site operations. Hand signals should be reviewed during Site-specific training.

Hand Signal	Meaning
Thumbs up	OK, all right, I understand
Thumbs down	No, negative
Hands on top of head	Need assistance
Gripping partner's wrist/place hands on waist	Leave area immediately, no debate
Hand gripping throat	Out of air, can't breathe

8. Decontamination

One of the most important aspects of decontamination is the prevention of contamination, when present. This will minimize worker exposure and cross-contamination of materials. Procedures for contamination avoidance include:

Personnel

- Do not directly handle or touch contaminated materials.
- Make sure that there are no cuts or tears on PPE.
- Fasten all closures in suits, if used.
- Particular care should be taken to protect any skin injuries.
- Stay upwind of airborne contaminants, if present.

Heavy Equipment

- If contamination is known or suspected, care should be taken to limit the amount of contamination that comes in contact with the heavy equipment (drill rig, tires, etc.).
- Equipment used within the Soil Management Area must be decontaminated at the conclusion of the work, and before being removed from the work area.
- Dust control measures should be implemented if dust generation becomes excessive.

8.1 Decontamination Procedures

If contaminated materials are encountered, they should be handled in a manner to prevent additional contamination. Discarded materials, waste materials, or other objects shall be handled in such a way as to protect Site workers and the public from exposure to Site contaminants. Contaminated materials (e.g., clothing, gloves, etc.) will be bagged or drummed, as necessary, labeled, and segregated for proper disposal. Uncontaminated materials shall be collected and bagged for appropriate disposal as normal domestic waste. Waste material should be disposed in accordance with applicable regulations and protocols.

9. Air Monitoring

Air monitoring, in the form of personal or work zone monitoring, will be performed to identify and quantify airborne levels of hazardous substances and atmospheric hazards to determine the appropriate level of worker protection needed on Site. A summary of air monitoring protocols is presented below. ***If Action Levels are exceeded, immediately implement site action(s) according to Action Table below and notify the CPM and SSM/CSM***.

9.1 Calibration

Air monitoring equipment will be calibrated and maintained in accordance with manufacturer's requirements. Calibrations will be recorded in the project notes daily or on a daily calibration form.

9.2 Action Levels

The tables below provide a summary of real time air monitoring Action Levels and contingency plans for work zone activities. The below Action Levels are determined by halving the Permissible Exposure Limits (PELs) or Threshold Limit Values (TLVs) as set forth by OSHA and the American Conference of Government Industrial Hygienists (ACGIH).

9.2.1 VOC Monitoring and Control

Significant volatilization of COPC is also unlikely. However, the SSM will assess the need for real time monitoring of organic vapors. Air monitoring reduces the risk of overexposure by indicating when action levels have been exceeded and when PPE must be upgraded or changed. Based on the volatile organic compounds' (VOC's) permissible exposure limit (PEL) listed in Table 2 determines the action level including respiratory protection at the Site. The project's action level is half of the PEL listed in Table 2.

Exposure to organic PCOC can be evaluated and/or controlled by:

- Monitoring worker breathing zone atmospheric concentrations for organic PCOC in the breathing zone with a PID.
- When possible, engineering control measures will be utilized to suppress the volatile organic vapors. Engineering methods can include utilizing a fan to promote air circulation, utilizing volatile suppressant foam, providing artificial ground cover, or covering up the impacted material with a tarp to mitigate volatile odors.

- When volatile suppression engineering controls are not effective and organic vapor meters indicate concentrations above the action levels, then appropriate respiratory protection (i.e., air purifying respirator with organic vapor cartridge) will be employed.

Air Monitoring Instrument	Action Level (above background)	Site Action
Action Levels for the following parameters are 15-minute time weighted averages (TWA), not a single exceedance.		
PID (Monitoring for VOCs)	0.0 – 50 ppm	No respiratory protection is required if VOCs are not present. (If benzene or naphthalene are constituents of interest at this Site, follow the action levels below for benzene and/or naphthalene.)
	> 50 ppm	Stop work, withdrawal from work area, institute engineering controls, if levels persist, upgrade to Level C. Notify CPM and CSM.

9.2.2 Dust Monitoring and Control

Some COC hazards may become hazardous when they are associated with dust/particles and become airborne. For worker safety, dust levels must be managed to eliminate this hazard. Dust generated during activities can cause irritation to the respiratory system and eyes. Contaminants can also be carried in airborne dust causing potential exposure to workers through skin contact and inhalation. Constituent concentrations on Site are expected to be low therefore the exposure hazard through inhalation should be minimal; however, contaminant contact through skin and clothing can introduce additional exposures.

For dust generated during Site activities which exceed Site-specific limits, engineering controls such as water application will be used to control dust concentrations. However, if excessive dust concentrations cannot to be handled through engineering controls, then respirators will be required to be worn.

Air Monitoring Instrument	Action Level (above background)	Site Action
Action Levels for the following parameters are 15-minute time weighted averages (TWA), not a single exceedance.		
Particulate Meter	150 µg/m^3	Implement work practices to reduce/minimize airborne dust generation, e.g., spray/misting of soil with water. Don respirator with particulate filters if action levels remain in exceedance.

9.2.3 H_2S, CO, and Explosive Atmosphere Monitoring and Control

The SSM/CSM monitor operational areas for hydrogen sulfide (H_2S) and/or carbon monoxide (CO) prior to the start of work each day. Periodic readings will be taken throughout the day and prior to any confined space entry. Oxygen (O_2) values are based on the maximum use limits of a full-face respirator if a chemical was displacing oxygen. Results will be compared to the published exposure limits/action levels listed below.

Air Monitoring Instrument	Action Level (above background)	Site Action
Action Levels for the following parameters are real time and should not be exceeded at any point.		
O_2 Meter	< 20.7%	Stop work, withdraw from work area, ventilate area, notify CPM and CSM.
	> 21.1%	Stop work, withdraw from work area, notify CPM and CSM.
H_2S Meter	< 5.0 ppm	No respiratory protection is required.
	> 5.0 ppm	Stop work, cover excavation, withdraw from work area, institute engineering controls, notify CPM and CSM.
HCN Meter	< 1.0 ppm	Run colorimetric tube or CMS Drager chip. Continue monitoring with real-time meter and continue work if colorimetric tube or CMS Drager chip reading is less than 2.0 ppm.
	> 1.0 ppm HCN Concentrations < 2.0 ppm	Run colorimetric tube or CMS Drager chip and confirm concentration is less than 2.0 ppm, notify CPM and CSM. Run colorimetric tube or CMS Drager chip for sulfur dioxide, hydrogen sulfide, and/or phosphine chip potential interferences. Continue to monitor with real-time meter.
	> 2.0 ppm	Stop work and move (with continuous HCN monitoring meter) at lease 25 ppm upwind of the excavation until continuous meter reads less than 1 ppm, notify CPM and CSM. Run colorimetric tube or CMS Drager hydrogen cyanide chip and re-evaluate activity, continue monitoring with a real-time meter, resume work if concentrations read less than 1.0 ppm.
Lower Explosive Limit	< 10% LEL	Investigate potential causes, allow excavation to ventilate, use caution during procedures.
	> 10% LEL	Stop work, allow excavation/borehole to ventilate to < 10% LEL, if ventilation does not result in a decrease to < 10% LEL, withdraw from work area, notify CPM and CSM.
Carbon Monoxide	> 35 ppm	Stop work, withdraw from work area, ventilate area, notify CPM and CSM.

10. Personal Protective Equipment

The equipment used to protect the body against contact with chemical hazards is divided into four categories (Levels A [most protective] through D [least protective]), according to the degree of protection needed. For most work conducted at the Site, Level D PPE will be used. Use of Level A or Level B PPE is not anticipated. If conditions indicating the need for Level A or Level B PPE are encountered, personnel will leave the Site and notify the CPM. Site personnel will not re-enter the Site until conditions allow.

The level of PPE is based primarily on:

- The type, toxicity, and measured concentration of the chemical substance; and
- The potential or measured exposure to substances in the air, or other direct contact.

10.1 Site-Specific Levels of Protection

Level D is the expected level of protection for this construction work. At a minimum, Level D PPE consists of the following:

- Coveralls or long sleeve shirts and long pants, unless otherwise directed by the SSM
- High visibility safety vest
- Safety boots
- Hard hat
- Safety glasses
- Protective work gloves
- Hearing protection
- Nitrile gloves (when handling impacted media)
- Poly-coated Tyvek/boot covers (if impacted media includes splash hazards)

As noted in Section 2, several COPCs have been detected in soil samples above residential comparison values established in the SMP. Activities associated in areas of the Site may involve contact with soil and/or groundwater impacted with the COPCs. It is the responsibility of each Contractor to review this HASP Guidance and other project documents to make its own determination as to the appropriate level of PPE for its personnel and subcontractors, as well as applicable action levels for use of more protective PPE.

The level of protection used by field personnel will be enforced by the SSM/CSM. Levels of protection may be upgraded or downgraded at the discretion of the SSM. This decision shall be based on real-time air monitoring, Site history data, and prior Site experience. Any changes in the level of protection shall be documented.

10.2 OSHA Requirements for PPE

Personal protective equipment used during this field investigation must meet the OSHA standards outlined in Table 3.

Table 3. OSHA Standards for PPE

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1 1968
Respiratory	29 CFR 1910.134	ANSI Z88.1 1980
Head	29 CFR 1910.135	ANSI Z89.1 1969
Foot	29 CFR 1910.136	ANSI Z41.1 1999 or ASTM F-2412-2005, and ASTM F-2413-2005

CRF = Code of Federal Regulations
ANSI = American National Standards Institute
ASTM = American Society for Testing and Materials

10.3 Reassessment of Protection Program

The level of protection provided by PPE selection shall be upgraded if conditions change such that there is a possibility of overexposure to the present hazards. Some indicators of the need for reassessment are:

- Change in job tasks during a work phase.
- Contaminants other than those previously identified are encountered; and
- Change of work scope, which affects the degree of contact with contaminants.

The SSM shall be consulted when information is limited or when clarification is required.

11. Emergency Procedures

11.1 Pre-Emergency Planning

Pre-emergency planning consists of this emergency response plan, assigning emergency functions to on-Site personnel, training of personnel as necessary, and confirming that emergency procedures and equipment are in place. Such emergency equipment should include, at a minimum, first aid supplies, fire extinguishers, a non-phosphate soap and water solution and potable water rinse, and potable water for eye washing.

11.2 Emergency Plan

This emergency plan and that of the individual Contractors should be reviewed by personnel working at the Site, prior to the start of work. This emergency plan will be available for use during Site work.

Various individual Site characteristics will determine preliminary actions taken in the event of a Site emergency. The CSM will inform personnel about the nature and duration of work expected on the Site, the types of contaminants, and the possible health or safety effects of emergencies involving these contaminants. The CSM shall make necessary arrangements to be prepared for emergencies.

The SSM/CSM shall implement the emergency plan whenever conditions at the Site warrant such action. The SSM will be responsible for coordination of the evacuation, emergency treatment, and emergency response.

11.3 Evacuation

In the event of an emergency situation, such as fire, explosion, or other event that requires evacuation, the SSM or CSSM will initiate evacuation procedures by directly contacting on-Site workers (Figure 1). All personnel will evacuate to a predetermined location, to be identified during the pre-construction meeting. The location shall be upwind of the Site, if possible. The default assembly point shall be the main construction trailer, unless otherwise established.

Where Site evacuation could possibly be a health and safety consideration, the Contractor's HASP should define the primary evacuation route and also identify an alternate evacuation route based on the scheduled Site operations and possible obstructions. A system should be in place to confirm that Site personnel can easily evacuate the work area. It is recommended that daily evacuation routes will be reviewed with Site workers at the start of each day.

11.4 Emergency Response

In the event of a safety or health emergency at the Site, the Contractor must have emergency response systems in place. The written HASP should note the potential emergencies associated with this specific project and describe methods anticipated to perform an emergency response. The Contractor's HASP should have a list of emergency response telephone numbers, which will be maintained at the worksite by the SSM or designee in a readily accessible location for use in case of an emergency.

If an employee working in a contaminated area is injured, first-aid procedures should be followed, and if necessary, the injured person will be transported to the nearest medical facility. Some common first-aid procedures are summarized below; however, these should be considered general recommendations, only.

- Eye Exposure – Wash the eyes immediately at the emergency eyewash station for at least 15 minutes, using large amounts of water and lifting the lower and upper lids occasionally to help flush the eye. Do not rub eyes or keep eyes tightly closed. Obtain medical attention immediately.
- Skin Exposure – Use copious amounts of soap and water to wash/rinse the affected area thoroughly, then provide appropriate medical attention. For reddened or blistered skin, consult a physician.
- Ingestion – Do not induce vomiting. Call poison control center or seek medical help.
- Inhalation – Move the person to fresh air. If breathing has stopped, perform artificial respiration. Obtain medical attention as soon as possible.

11.5 Emergency Decontamination

If emergency medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The Site SSM or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary.

11.6 Medical Support

In case of minor injuries, on-Site care will be administered with the Site first aid kit. First-aid kits will be available at all support trailers and in all vehicles. For serious injuries, call 911 and request emergency medical assistance. Seriously injured persons should not be moved unless they are in immediate danger. Notify the CSM, SSM, CPM, and PM of the emergency. Table 1 of this HASP contains Site personnel and services and their contact information. In addition, Figure 1 includes maps to the nearest hospital with emergency services.

11.7 Severe Weather

The contingency plan for severe weather includes reviewing the expected weather to determine if severe weather is in the forecast. Severe weather includes high winds over 40 miles per hour (mph), heavy rains or snow squalls, floods, thunderstorms, tornados, and lightning storms. If severe weather is approaching, the decision to evacuate Site personnel will be the responsibility of the SSM/CSM or their designee. Notification of evacuation will be made to all affected personnel. The SSM or their designee will account for personnel and subcontractor personnel and report their status to the CPM. If safe, work can resume 30 minutes after the last clap of thunder or flash of lightning.

11.8 Spills or Material Release

If a hazardous waste spill or material release occurs, if safe, the CSM or their representative will immediately assess the magnitude and potential seriousness of the spill or release based on the following:

- SDS for the material spilled or released.
- Source of the release or spill of hazardous material.
- An estimate of the quantity released and the rate at which it is being released.
- The direction in which the spill or air release is moving.
- Personnel who may be or may have been in contact with the material, or air release, and possible resultant injury or sickness.
- Potential for fire and/or explosion resulting from the situation.
- Estimates of area under influence of release.

If the spill or release is determined to be within the on-Site emergency response capabilities, the CSM will notify the SSM and verify implementation of the necessary corrective action. If the release is beyond the capabilities of the Site personnel, personnel will be evacuated from the immediate area and the local fire department will be contacted. The SSM will notify the CPM.

12. Incident Reporting and Recordkeeping

12.1 Incident Reporting

In the event that a health and safety incident occurs, specific reporting procedures must be followed so that appropriate corrective action can be taken. The following general steps must be followed when an incident occurs:

1. For incidents involving life-threatening situations or serious injury that require emergency response personnel (Police, Fire, EMS), call 9-1-1 from a safe area.

2. Stop work activity to address any injury, illness, property damage, spill, or other emergency.

3. Notify your Supervisor/Project Manager of the incident or injury.

4. Complete an incident report and submit it to the STO SSM, Andrew Kolodziejczak.

5. Resume work activity if all steps above have been completed and it is safe to do so.

The Contractor's HASP must define methods by which accidents are reported, investigated, and prevented in the future. It is recommended that the CPM and the CSM investigate the facility/site conditions to determine: (1) the severity of the incident; (2) the cause of the incident; (3) the means to prevent the incident from recurring; and (4) personnel responsible for implementing the corrective action.

The Contractor's HASP will include an incident reporting form so that consistent and appropriate information is obtained regarding employee exposures or incidents. The form should be filed at the Contractor's office with the employee's medical and safety records to serve as documentation of the incident and the actions taken.

The Contractor's incident form must be completed and forwarded to the STO PM and SSM within 24 hours of an incident. All incidents will be investigated in a timely manner. The CSM and/or the CPM will schedule the investigation and will include project supervisors, involved Contractors, and the owner; the injured/involved employee(s); and the project SSM. Root cause analysis will be performed to assess the apparent cause and identify corrective measures to be implemented to prevent recurrence.

12.2 On-Site Safety Documentation

The SSM or designee should maintain applicable daily Site conditions, activities, meetings, personnel, and significant events will be recorded related to safety. Daily safety meetings, calibration records and personnel monitoring results, if applicable, will also be maintained with the project files.

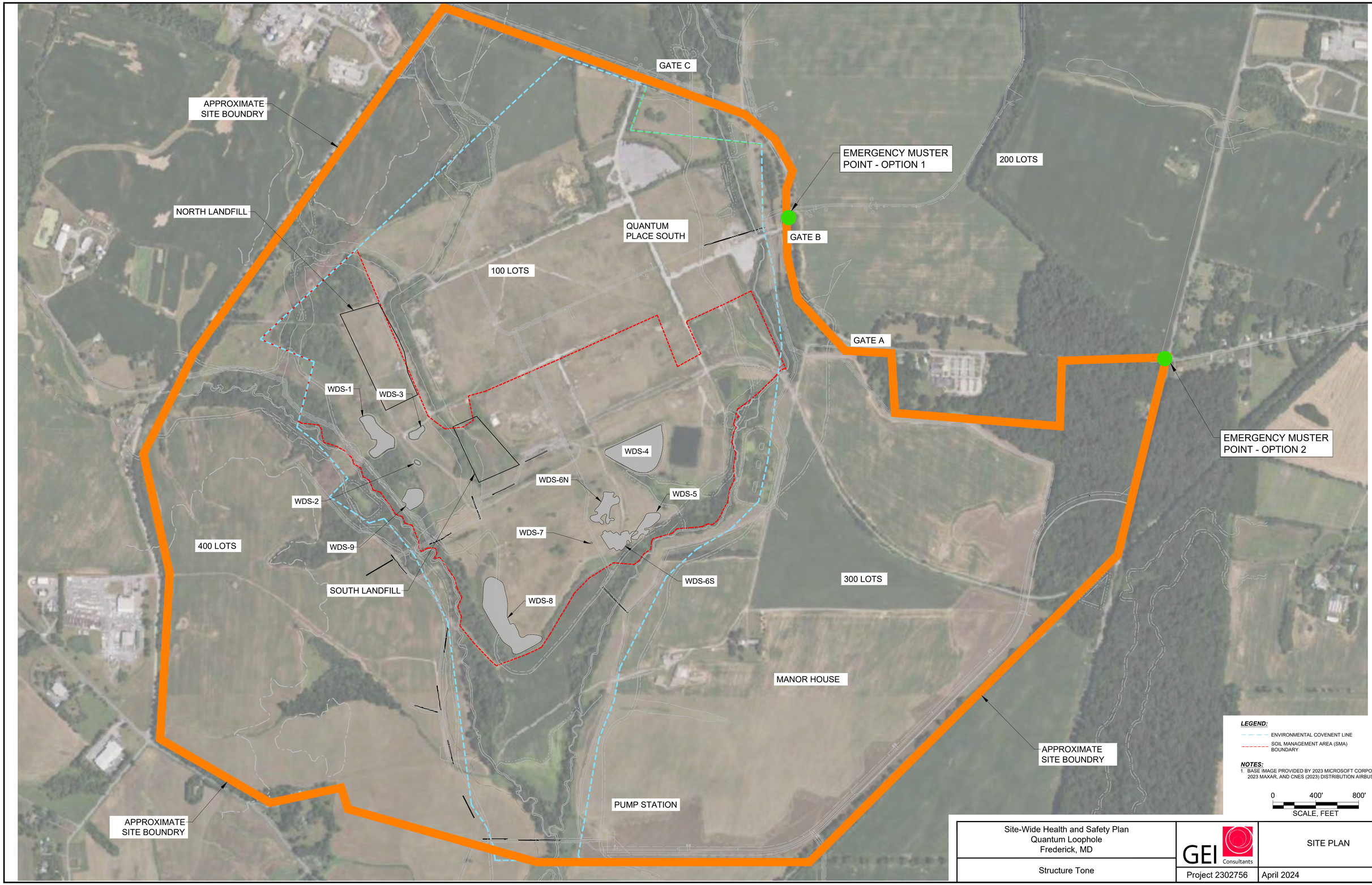
12.3 Safety Data Sheets

Potential hazards associated with chemicals brought on Site (e.g., decontamination chemicals, sample preservatives, fuels, calibration fluids) for the work will be mitigated through training, administrative controls (e.g., proper labeling and storage), and proper use of PPE. Safety data sheets (SDSs) for all chemicals brought on Site shall be managed and maintained by the Contractor's CSM through their Hazard Communication Program and will be included in their HASP. A copy of Contractor SDS's will be provided to STO's SSM.

12.4 Familiarity with HASP Guidance

All Contractors should be provided with a copy of this HASP Guidance and should sign the HASP Guidance Acknowledgement Form in Appendix B. Contractors will review and acknowledge this guidance by signing the form in Appendix B and referencing this document in their HASP.

Figures



Site-Wide Health and Safety Plan Quantum Loophole Frederick, MD	GEI Consultants	SITE PLAN
Structure Tone	Project 2302756	April 2024 Fig. 1

Route to the Primary Hospital

From: Project Location (5601 Manor Woods Road)
To: Frederick Memorial Hospital

1. Depart ALCOA EASTALCO by turning LEFT onto MANOR WOODS RD
2. Travel WEST toward BALLENGER CREEK PIKE / MD-351 (0.5 mi)
3. Turn RIGHT onto BALLENGER CREEK PIKE / MD-351, travel NORTH-EAST (5.1 mi)
4. Take LEFT EXIT RAMP onto US-15 [US-340] (0.4 mi)
5. Road name changes to US-340 [S. Jefferson ST] (0.3 mi)
6. Take RAMP on RIGHT to US-15 N / US-40 E (2.3 mi)
7. Take the 7TH ST exit, EXIT 15 (0.1 mi)
8. Take ramp toward FREDERICK (0.04 mi)
9. Turn LEFT onto WEST 7TH ST (0.4 mi)
10. Arrive at FREDERICK MEMORIAL HOSPITAL on RIGHT (0.01 mi)

Total mileage: 9.15 miles

PRIMARY HOSPITAL (EMERGENCY)

Frederick Memorial Hospital
400 West 7th Street
Frederick, Maryland 21701
(240)566-3300

0 3,500 7,000
Approximate Scale
1 inch = 7,000 feet
NORTH

Notes

1. Base image obtained from Google (©2020 Google).

Former Alcoa EASTALCO Works 5601 Manor Woods Road Frederick County, Maryland	GEI Consultants	**Route to Nearest Hospital**
STO Mission Critical New York, New York	PROJECT 2302756	April 2024 Figure 2

AES\SHEET\NEW LOGO2004\85X11P.PPT

Appendix A

HASP Guidance Acknowledgement Form

HASP GUIDANCE
ACKNOWLEDGEMENT FORM

By signing below, signee affirms that they have read, understand, and will abide by the contents of this HASP Guidance. All contractors should independently assess the available information and implement appropriate measures to protect the health and safety of their employees and subcontractors.

Date	Company	Name	Signature

Appendix I

Cap Inspection Form

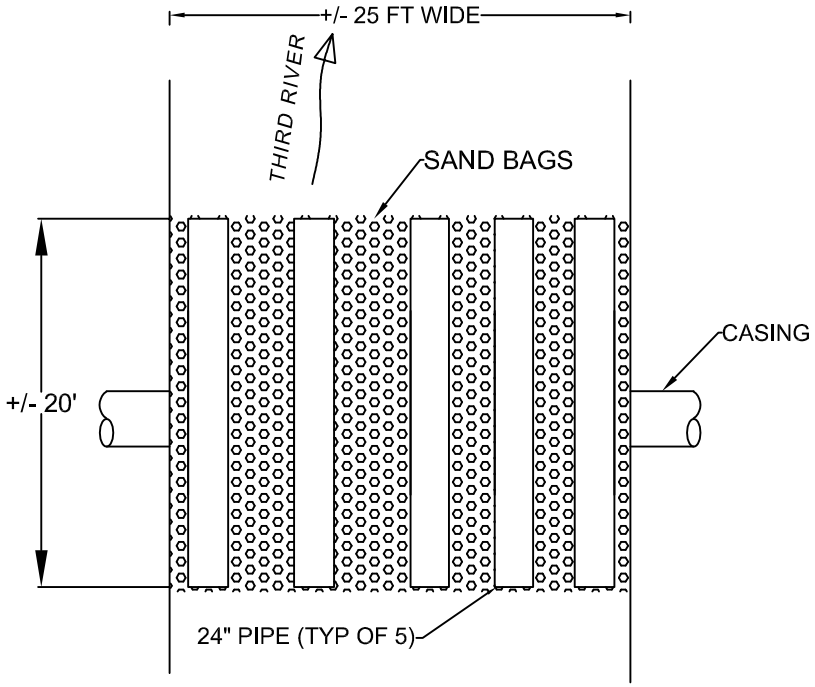
Location:		**Date/Time:**	
Inspector:		**Weather:**	

CAP INSPECTION FORM

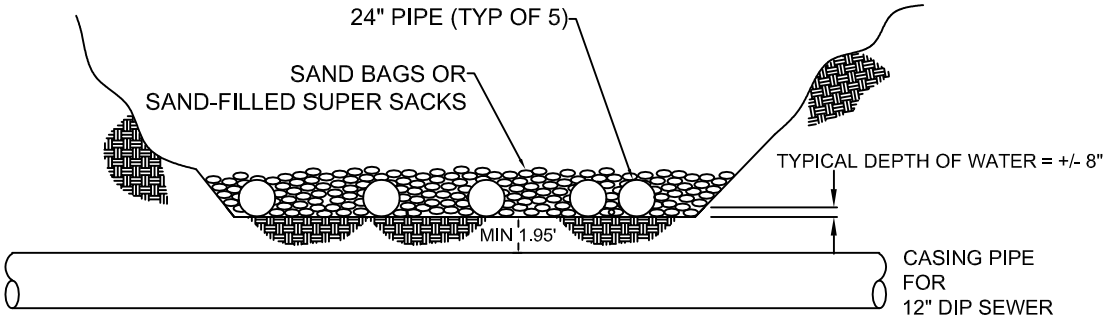
SMA Capped Areas					
Soil Cover Integrity (Vegetation conditions, evidence of burrowing mammals or root system)					
SMA Cap 1					
Vegetation	☐Healthy	☐Sparse	☐Bare Spots	☐Trees or Saplings	☐Other
Cover Condition	☐Healthy	☐Erosion	☐Burrowing	☐Settling or Ruts	☐Other
Drainage Condition	☐Healthy	☐Ponding	☐Deterioration	☐Other	
Overall Condition & Notes					
SMA Cap 2					
Vegetation	☐Healthy	☐Sparse	☐Bare Spots	☐Trees or Saplings	☐Other
Cover Condition	☐Healthy	☐Erosion	☐Burrowing	☐Settling or Ruts	☐Other
Drainage Condition	☐Healthy	☐Ponding	☐Deterioration	☐Other	
Overall Condition & Notes					
Landscaped Areas					
Vegetation	☐Healthy	☐Sparse	☐Bare Spots	☐Trees or Saplings	☐Other
Trees	☐Healthy	☐Poor Health	☐Dead	☐Fallen	☐Other
Shrubs	☐Healthy	☐Poor Health	☐Dead	☐Fallen	☐Other
Vent Risers and Piping at Light Poles	☐Good Condition	☐Cracked	☐Broken/Damaged	☐Other	
Cover Condition	☐Healthy	☐Erosion	☐Burrowing	☐Settling or Ruts	☐Other
Drainage Condition	☐Healthy	☐Ponding	☐Deterioration	☐Other	
Overall Condition & Notes					
RESPONSE ACTIONS					
Responses Required					
Work Completed (Description, Date, Contractor, etc.)					
List Attached Photographs/Sketches					

Appendix J

HDD Stream Protection and Contingency Plans



PLAN VIEW



SECTION VIEW

PROPOSAL TO PROTECT THE RIVER BOTTOM AND PROVIDE DOWNPRESSURE FOR TUNNELING WHILE UNDERCROSSING THE "THIRD RIVER"

NRlogo.jpg

01/10/2017

Quantum Loop Trenchless Technology Options Frederick, MD	GEI Consultants	Stream Improvement Option
Structure Tone	Project 2302756	February 2024 Fig. #

1433 Highway 34 South
Suite B1
Farmingdale, NJ 07727
Phone: 732-557-6100
Fax: 732-736-8904

Washington Suburban Sanitary Commission
Broad Creek Augmentation Project

Conveyance System – South Contract
WSSC Contract No. CT4231E05

Prince George's County, Maryland

SUBMITTAL INFORMATION

Submission Date: 6/23/2016

Submittal No. / Review Cycle: 02441-014

Item / Submittal Title: Tunnel 7 Microtunneling Inadvertent Returns Conting...

Specification Section: 02441 **Drawing No.:** N/A

Page No.: 5 **Drawing Title:** N/A

Para No.: 1.6 **Date / Rev No.:** N/A

Certification Statement: By this submittal, we hereby represent that we have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and pertinent data and we have checked and coordinated each item with other applicable approved drawings and all Contract requirements.

CONTRACTORS SUBMITTAL COMMENTS

Contractor's Certification of Submittal: Peter Sudkamp

QUANTUM LOOP FREDERICK, MD	GEI Consultants	INADVERTANT FLUID RETURN CONTINGENCY PLAN EXAMPLE
STRUCTURE TONE	Project 2302756	MARCH 2024

Northeast Remsco Construction, Inc.

State of Maryland Board of Public Works

Wetlands License No. 12-0286(R7)

Contingency Plan for Inadvertent Returns

During the Microtunnel Installation of 60" Casing Beneath

Piscataway Creek and Adjacent Tidal Wetlands

During operation of the microtunnel equipment, fluid loss to the surface is unlikely. However if fluid loss to the surface is experienced, the following steps will be taken:

i. Close the slurry circuit and stop the machine. This will stop the migration of slurry to the surface.

ii. Notify the affected parties (MDE, WSSC, and Engineer).

- WSSC: Austin Freeman - 301-206-8328
- MDE: Greg Hazzard - 443-677-9155
- Gannett Fleming: Rich Heinick – 717-805-5498

iii. Containment of the fluids will be handled through the deployment of sediment curtains if it occurs within the waterway, or through the use of absorbent materials or construction of dirt berms if it occurs on dry land. Ultimately the fluids will be removed by vacuum excavation or by other mechanical means.

iv. The likely cause of the inadvertent returns and the specific course of action will be determined. Options to consider include:

a. Adjusting the feed water / face pressure.

b. Advancing the machine slowly working with, and then without, the slurry circuit by alternately opening and closing the bypass valve in the machine.

c. Reformulation of the slurry to introduce additives to "plug" the path to the surface.

v. After an appropriate course of action is selected, mining will resume with vigilante monitoring to ensure slurry loss has been stopped or contained.