

**Worcester County Administration
1 West Market Street, Room 1103
Snow Hill, Maryland 21863**



INVITATION FOR BID

PROJECT: Berlin Homeowner Convenience
Center Bulkhead Repair

DEPARTMENT: Public Works

VENDOR:

NAME: _____

ADDRESS: _____

BID OPENING:

DATE: April 15, 2026

TIME: 2:00 p.m.

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SECTION I: INTRODUCTION

A. PURPOSE

1. The purpose of this Invitation for Bid Document is for Worcester County ("County") to contract for the furnishing of all labor, materials, transportation, tools, supplies, equipment, electrical work, and appurtenances necessary for the complete, and in-place, satisfactory construction, and testing of all work shown on the Contract Drawings and requirement by the Contract for Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repair project in conformity with the requirements contained herein ("Bid Document(s)").

B. CLARIFICATION OF TERMS

1. Firms or individuals that submit a bid for award of a contract ("Contract") are referred to as vendors ("Vendors") in this document. The Vendor that is awarded the Contract is herein referred to as the ("Successful Vendor").

C. QUESTIONS AND INQUIRES

1. Questions must be addressed in writing to the Worcester County Procurement Officer at purchasing@worcestermd.gov.
2. The last date to submit questions for clarification will be 12:00pm (noon) EST on Tuesday, March 31, 2026.
3. Addenda are posted on the County website at <https://www.co.worcester.md.us/> under County Info: Bid Board: at <https://www.co.worcester.md.us/commissioners/bids> at least five calendar days before bid opening.
4. It is the Vendor's responsibly to make sure all addenda are acknowledged in their bid. Failure to do so could result in the bid being disqualified.

D. FILLING OUT BID DOCUMENTS

1. Use only forms supplied by the County.
2. One unbound original and two bound copies of the bid form and any required attachments must be submitted in the solicitation and can be submitted in the same envelope unless otherwise instructed.
3. Bid Documents should be compiled as follows: (1) Cover letter, (2) Form of Bid, (3) References, (4) Exceptions Document and Signed addenda, if necessary (5) Individual Principal Document, (6) Vendor's Affidavit of Qualification to Bid, and (7) Non-Collusive Affidavit
4. Where so indicated by the make-up of the Bid Documents, sums will be expressed in both words and figures, and in the case of a discrepancy between the two, the amount written in words will govern. In the event there is a discrepancy between the unit price and the extended totals, the unit prices will govern.
5. Any interlineation, alteration, or erasure will be initialed by the signer of the Bid Documents.
6. Each copy of the Bid Documents will be signed by the person(s) legally authorized to bind the Vendor to a contract, using the legal name of the signer. Bid Documents submitted by an agent will have a current Power of Attorney attached certifying the agent's authority to bind the Vendor.
7. Vendor will supply all information and submittals required by the Bid Documents to constitute a proper and responsible completed Bid Document package.

8. Any ambiguity in the Bid Documents as a result of omission, error, lack of clarity or non-compliance by the Vendor with specifications, instructions, and/or all conditions of bidding will be construed in the light most favorable to the County.

E. SUBMISSION OF BID DOCUMENTS

1. All copies of the Bid Documents and any other documents required to be submitted with the Bid Documents will be enclosed in a sealed envelope. The envelope will be addressed to the Worcester County Commissioners and will be identified with the project name: **BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR** and the Vendor's name and address. If the Bid Documents are sent by mail, the sealed envelope will be enclosed in a separate mailing envelope with the notation "SEALED BID DOCUMENTS ENCLOSED" on the face thereof.
2. Bids must be mailed or hand carried to the **Worcester County Administration Office, 1 West Market Street, Room 1103, Snow Hill, MD 21863**, in order to be received **prior** to the announced bid deadline. *Bids received after said time or delivered to the wrong location will be returned to the Vendor unopened.*
3. **Bids are due and will be opened at the time listed on the front of this Bid Document.**
4. If you are delivering a bid in person please keep in mind to allow time to get through security and into the Administration Office. It is fully the responsibility of the Vendor to ensure that the bid is received on time.
5. The County will not speculate as to reasonableness of the postmark, nor comment on the apparent failure of a public carrier to have made prompt delivery of the bid.
6. Vendors, or their authorized agents, are expected to fully inform themselves as to the conditions, requirements, and specifications before submitting Bid Documents; failure to do so will be at the Vendor's own risk.
7. A fully executed Affidavit of Qualification to Bid will be attached to each Bid Document.
8. Minority vendors are encouraged to participate.
9. All Vendor submitted Bid Documents will be valid for a minimum of sixty days from the date of Bid Document opening.
10. Electronically mailed bids are **not** considered sealed bids and will **not** be accepted.

F. OPENING OF BIDS

1. Bid Documents received on time will be opened publicly and Vendors' names and total costs will be read aloud for the record.
2. The Contract will be awarded or all Bid Documents will be rejected within sixty days from the date of the Bid Document opening.

G. ACCEPTANCE OR REJECTION OF BIDS

1. Unless otherwise specified, the Contract will be awarded to the most responsible and responsive Vendor complying with the provisions of the Bid Documents, provided the bid does not exceed the funds available, and it is in the best interest of the County to accept it. The County reserves the right to reject the Bid Documents of any Vendor who has previously failed to perform properly in any way or complete on time contracts of a similar nature; or a Bid Document from a Vendor who, investigation shows, is not in a position to perform the Contract; or Bid Documents from any person, firm, or corporation which is in arrears or in default to the County for any debt or contract.

2. Completed Bid Documents from Vendors debarred from doing business with the State of Maryland or the Federal Government will not be accepted.
3. In determining a Vendor's responsibility, the County may consider the following qualifications, in addition to price:
 - a. Ability, capacity, and skill to provide the commodities or services required within the specified time, including future maintenance and service, and including current financial statement or other evidence of pecuniary resources and necessary facilities.
 - b. Character, integrity, reputation, experience and efficiency.
 - c. Quality of past performance on previous or existing contracts, including a list of current and past contracts and other evidence of performance ability.
 - d. Previous and existing compliance with laws and ordinances relating to contracts with the County and to the Vendor's employment practices.
 - e. Evidence of adequate insurance to comply with Contract terms and conditions.
 - f. Statement of current workload and capacity to perform/provide the Goods and/or Services.
 - g. Explanation of methods to be used in fulfilling the Contract.
 - h. The Vendor, if requested, will be prepared to supply evidence of its qualifications, listed above, and its capacity to provide/perform the Goods and/or Services; such evidence to be supplied within a specified time and to the satisfaction of the County.
4. In determining a Vendor's responsiveness, the County will consider whether the Bid Document conforms in all material respects to the Bid Documents. The County reserves the right to waive any irregularities that may be in its best interest to do so.
5. The County will have the right to reject any and all Bid Documents, where applicable to accept in whole or in part, to add or delete quantities, to waive any informalities or irregularities in the Bid Document received, to reject a Bid Document not accompanied by required Bid security or other data required by the Bid Documents, and to accept or reject any Bid Document which deviates from specifications when in the best interest of the County. Irrespective of any of the foregoing, the County will have the right to award the Contract in its own best interests.

H. QUALIFICATIONS

1. The Vendor must be in compliance with the laws regarding conducting business in the State of Maryland.
All Vendors shall provide a copy Certificate of Status from the Maryland Department of Assessments and Taxation, evidencing the Vendor is in good standing with the State of Maryland. See https://sdatcert1.resiusa.org/certificate_net/ for information on obtaining the Certificate of Status. *Certificates of status are not available for trade names, name reservations, government agencies, sole proprietorships, and some other accounts as these are not legal entities and thus are not required for these categories of Vendors.* For more information on the Certificate of Status please see <http://www.dat.state.md.us/sdatweb/COSinfo.html>.
2. Worcester County reserves the right, at its sole discretion, to extend the date this documentation must be provided. The Vendor's inability to provide this documentation could result in the bid being rejected.

I. DESCRIPTIVE LITERATURE

1. The proposed descriptive literature fully describing the product bid is what is intended to be included as the price. Failure to do so may be cause for rejection of the bid.

2. Any items, systems or devices supplied in this bid that are proprietary in nature relative to maintenance, repair, servicing or updating must be disclosed on the bid form.

J. NOTICE TO VENDORS

1. Before a Vendor submits the Bid Documents it will need to become fully informed as to the extent and character of the Goods and/or Services required and are expected to completely familiarize themselves with the requirements of this Bid Document's specifications. Failure to do so will not relieve the Vendor of the responsibility to fully perform in accordance therewith. No consideration will be granted for any alleged misunderstanding of the material to be furnished or the Services to be performed, it being understood that the submission of a Bid Document is an agreement with all of the items and conditions referred to herein.

K. PIGGYBACKING

1. Worcester County may authorize, upon request, any governmental entity (hereafter Authorized User) within the County to purchase items under the contract awarded pursuant to this bid solicitation.
2. All purchase orders issued against the contract by an authorized User shall be honored by the Successful Vendor in accordance with all terms and conditions of this contract.
3. The issuance of a purchase order by an Authorized User pursuant to this provision shall constitute an express assumption of all contractual obligations, covenants, conditions and terms of the contract. A breach of the contract by any particular Authorized User shall neither constitute nor be deemed a breach of the contract as a whole which shall remain in full force and effect, and shall not affect the validity of the contract nor the obligations of the Successful Vendor thereunder respecting the County.
4. The County specifically and expressly disclaims any and all liability for any breach by an Authorized User other than the County and each such Authorized User and Successful Vendor guarantee to save the County, its officers, agents and employees harmless from any liability that may be or is imposed by the Authorized User's failure to perform in accordance with its obligations under the contract.

END OF SECTION

SECTION II: GENERAL INFORMATION

A. ECONOMY OF BID

1. Bid Documents will be prepared simply and economically, providing straightforward and concise description of the Vendor's capabilities to satisfy the requirements of the Bid Documents. Emphasis should be on completeness and clarity of content. Elaborate brochures and other representations beyond that sufficient to present a complete and effective Bid Document are neither required nor desired.

B. PUBLIC INFORMATION ACT (PIA)

1. Worcester County is subject to the Maryland Public Information Act and may be required to release bid submissions in accordance with the Act.
2. Any materials the Vendor deems to be proprietary or copyrighted must be marked as such; however, the material may still be subject to analysis under the Maryland Public Information Act.
 - a. The Vendor may invoke proprietary information or trade secret protection for submission of any data/material by (1) identifying the data/material in a written description, (2) clearly marking the data/material as proprietary, and (3) providing a written statement detailing the reasons why protection is necessary. The County reserves the right to ask for additional clarification prior to establishing protection.

C. CONTRACT AWARD

1. A written award by the County to the Successful Vendor in the form of a Purchase Order or other contract document will result in a binding Contract without further action by either party. If the Successful Vendor fails or refuses to sign and deliver the Contract and the required insurance documentation, the County will have the right to award to the next responsible and responsive Vendor. Contract will be executed by the Successful Vendor within fourteen calendar days of receipt of the Contract.
2. Bid Documents and Contracts issued by the County will bind the Vendor to applicable conditions and requirements herein set forth, unless otherwise specified in the Bid Documents, and are subject to all federal, state, and municipal laws, rules, regulations, and limitations.
3. County personal property taxes ("Taxes") must be on a current basis; if any such Taxes are delinquent, they must be paid before award of Contract. Failure to pay will result in the award of Contract to another Vendor.
4. The County reserves the right to engage in individual discussions and interviews with those Vendors deemed fully qualified, responsible, suitable and professionally competent to provide the required Goods and/or Services should the project size warrant it. Vendors will be encouraged to elaborate on their qualifications, performance data, and staff expertise.

D. AUDIT

1. The Successful Vendor agrees to retain all books, records, and other documents relative to the awarded Contract for five years after final payment, or until audited. The County, its authorized agents, and/or State auditors will have full access to and the right to examine any of said materials during said period.

E. NONPERFORMANCE

1. The County reserves the right to inspect all operations and to withhold payment for any goods not performed or not performed in accordance with the specifications in this Bid Document. Errors, omissions or mistakes in performance will be corrected at no cost to the County. Failure to do so

will be cause for withholding of payment for that Goods and/or Services. In addition, if deficiencies are not corrected in a timely manner, the County may characterize the Successful Vendor as uncooperative, which may jeopardize future project order solicitations.

F. MODIFICATION OR WITHDRAWAL OF BID

1. A Bid Document may not be modified, withdrawn, or cancelled by the Vendor during the stipulated time period following the time and date designated for the receipt of Bid Documents, and each Vendor so agrees in submitting Bid Documents.

G. DEFAULT

1. The Contract may be cancelled or annulled by the County in whole or in part by written notice of default to the Successful Vendor upon non-performance, violation of Contract terms, delivery failure, bankruptcy or insolvency, any violation of state or local laws, or the making of an assignment for the benefit of creditors. An award may then be made to the next most highly rated Vendor, or when time is of the essence, similar commodities and/or service may be purchased on the open market. In either event, the defaulting Vendor (or his surety) will be liable to the County for cost to the County in excess of the defaulted Contract price.
2. If a representative or warranty of either Party to the Contract is false or misleading in any material respect, or if either Party breaches a material provision of the Contract ("Cause"), the non-breaching Party will give the other Party written notice of such cause. If such Cause is not remedied within fifteen calendar days ("Cure Period") after receipt of such notice, (unless, with respect to those Causes which cannot be reasonably corrected or remedied within the Cure Period, the breaching Party will have commenced to correct or remedy the same within such Cure Period and thereafter will proceed with all due diligence to correct or remedy the same), the Party giving notice will have the right to terminate this Contract upon the expiration of the Cure Period.

H. COLLUSION/FINANCIAL BENEFIT

1. The Vendor certifies that his/her Bid is made without any previous understanding, agreement, or connection with any person, firm, or corporation making a Bid Document for the same project; without prior knowledge of competitive prices; and is in all respects fair, without outside control, collusion, fraud, or otherwise illegal action.
2. Upon signing the Bid Document, Vendor certifies that no member of the governing body of the County, or members of his/her immediate family, including spouse, parents or children, or any other officer or employee of the County, or any member or employee of a Commission, Board, or Corporation controlled or appointed by the County Commissioners has received or has been promised, directly or indirectly, any financial benefit, related to this Bid Document and subsequent Contract.

I. TAX EXEMPTION

1. In buying products directly from a Vendor, Worcester County is exempt from being *directly* charged Federal excise and Maryland sales tax. A copy of an exemption certificate shall be furnished upon request.
2. According to the Office of the Comptroller of Maryland, a *Contractor is responsible for paying sales tax* on his/her purchases relating to any projects or services and should incorporate it into their bid.
3. Successful Vendors **cannot** use the County tax exemption to buy materials or products used on County projects.

J. CONTRACT CHANGES

1. No claims may be made by anyone that the scope of the project or that the Vendor's Goods and/or Services have been changed (requiring changes to the amount of compensation to the Vendor or other adjustments to the Contract) unless such changes or adjustments have been made by an approved written amendment (Change Order) to the Contract signed by the Chief Administrative Officer (and the County Commissioners, if required), prior to additional Goods and/or Services being initiated. Extra Goods and/or Services performed without prior, approved, written authority will be considered as unauthorized and at the expense of the Vendor. Payment will not be made by the County.
2. No oral conversations, agreements, discussions, or suggestions, which involve changes to the scope of the Contract, made by anyone including any County employee, will be honored or valid. No written agreements or changes to the scope of the Contract made by anyone other than the Procurement Officer (with the Chief Administrative Officer and/or County Commissioners approval, if required) will be honored or valid.
3. If any Change Order in the Goods and/or Services results in a reduction in the Goods and/or Services, the Vendor will neither have, nor assert any claim for, nor be entitled to any additional compensation for damages or for loss of anticipated profits on Goods and/or Services that are eliminated.

K. ADDENDUM

1. No oral statements of any person will modify or otherwise affect or interpret the meaning of the Contract specifications, or the terms, conditions, or other portions of the Contract. All modifications and every request for any interpretation must be addressed to Worcester County's Procurement Officer and to be given consideration, must be received no later than the last day for questions listed in Section I, Subsection C.2.
2. Any and all interpretations, corrections, revisions, and amendments will be issued by the Procurement Officer to all holders of Bid Documents in the form of written addenda. Vendors are cautioned that any oral statements made by any County employee that materially change any portion of the Bid Documents cannot be relied upon unless subsequently ratified by a formal written amendment to the Bid Document.
3. All addenda will be issued so as to be received at least five days prior to the time set for receipt of Bid Documents, and will become part of the Contract and will be acknowledged in the Bid Document form. Failure of any Vendor to receive any such addenda will not relieve said Vendor from any obligation under the Bid Document as submitted.
4. Vendors are cautioned to refrain from including in their Bid Document any substitutions which are not confirmed by written addenda. To find out whether the County intends to issue an amendment reflecting an oral statement made by any employee, contact Worcester County's Procurement Officer during normal business hours.
5. The Worcester County Procurement Officer reserves the right to postpone the Bid Document opening for any major changes occurring in the five-day interim which would otherwise necessitate an Addendum.

L. EXCEPTIONS/ SUBSTITUTIONS

1. Any exceptions or substitutions to the specifications requested should be marked on the bid form and listed on a separate sheet of paper attached to the bid.

2. An exception to the specifications may disqualify the bid. The County will determine if the exception is an essential deviation or a minor item.
3. In the case of a minor deviation, the County maintains the option to award to that Vendor if it determines the performance is not adversely affected by the exception.

M. APPROVED EQUALS

1. In all specifications where a material or article is defined by describing a proprietary product or by using the name of a Vendor or manufacturer, it can be assumed that an approved equal can be substituted.
2. The use of a named product is an attempt to set a particular standard of quality and type that is familiar to the County. Such references are not intended to be restrictive.
3. However, the County shall decide if a product does in fact meet or exceed the quality of the specifications listed in the solicitation. It shall be the responsibility of the Vendor that claims his product is an equal to provide documentation to support such a claim.

N. DELIVERY

1. All items shall be delivered F.O.B. destination and delivery costs and charges included in the bid unless otherwise stated in the specifications or bid form.

O. INSURANCE

1. If required by the General Conditions or Terms and Conditions, the Successful Vendor shall provide the County with Certificates of Insurance within ten calendar days of bid award notification evidencing the required coverage.
2. Successful Vendor must provide Certificates of Insurance before commencing work in connection with the Contract.

P. BID EVALUATION

1. Bid tabulations will be posted on the County website at <https://www.co.worcester.md.us/commissioners/bids>. Click on the Expired Bids & Results tab and find the bid tabulation for the bid you are interested in. Bid tabulations will be posted as soon as reasonably possible after the Bid opening.

END OF SECTION

SECTION III: GENERAL CONDITIONS

A. DRAWINGS AND SPECIFICATIONS

1. Should any detail be omitted from the drawings or specifications, or should any errors appear in either, it shall be the duty of the Successful Vendor to notify the County's designated construction inspector.
2. In no case shall the Successful Vendor proceed with the work without notifying and receiving definite instructions from the County. Work wrongly constructed without such notification shall be corrected by the Successful Vendor at his own cost.

B. MATERIALS, SERVICES AND FACILITIES

1. It is understood that, except as otherwise specifically stated in the Proposal Documents, the Successful Vendor will provide and pay for all materials, labor, tools, equipment, water, light, power and transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the Work within the specified time.
2. Materials and equipment will be so stored as to insure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work will be located so as to facilitate prompt inspection.
3. Manufactured articles, materials, and equipment will be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.
4. Materials, supplies and equipment will be in accordance with samples submitted by the Successful Vendor and approved by the County.

C. INSPECTION AND TESTING

1. All materials and equipment used in the construction of the Work will be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the Proposal Documents.
2. The County or its representatives may, at any time, enter upon the work and the premises used by the Successful Vendor, and the Successful Vendor shall provide proper and safe facilities to secure convenient access to all parts of the work, and all other facilities necessary for inspection, as may be required.
3. The County will appoint such persons as deemed necessary to properly inspect the materials furnished or to be furnished, and the work done under the contract and to see that the same strictly corresponds with the drawings and specifications. All such materials and workmanship shall be subject to approval of the County. Approval or acceptance of payment shall not be misconstrued as approval of items or work not in conformance with specifications and drawings nor shall it prevent the rejection of said work or materials at any time thereafter during the existence of the contract, should said work or materials be found to be defective, or not in accordance with the requirements of the contract.
4. Work and material will be inspected promptly, but if for any reason should a delay occur, the Successful Vendor shall have no claim for damages or extra compensation.
5. The Successful Vendor shall pay for all inspection costs necessary to complete the work which may be incurred to comply with the requirements of any agency other than the County, such as a railroad, public service utility company, or any other governmental agency or any other agency whose jurisdiction affects the work in any manner unless otherwise specified herein.

D. APPROVAL OF SUBSTITUTION OF MATERIALS

1. Samples of materials shall be submitted by the Successful Vendor for approval before such materials are ordered from the manufacturers or distributors and shall be approved by the County before actual work is begun.
2. It is the intention of these specifications to permit all vendors bidding on this work to secure the fullest amount of competition on the various materials and specialties names herein. Wherever a material or article is defined by describing a proprietary product or by using the name of a vendor or manufacturer, the term or approved equal shall be presumed to be implied unless otherwise stated.

E. PROTECTION OF WORK, PROPERTY AND PERSONS

1. Successful Vendor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Successful Vendor will take all necessary precautions and programs in connection with the Work. Successful Vendor will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to, all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
2. Successful Vendor will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. Successful Vendor will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. Successful Vendor will notify owners of adjacent utilities when progress of the Work may affect them. The Successful Vendor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by Successful Vendor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable.
3. In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Successful Vendor, without special instruction or authorization from the County, will act to prevent threatened damage, injury or loss. Successful Vendor will give the County prompt Written Notice of any significant changes in the Work or deviations from the Proposal Documents caused thereby, and a Change Order will thereupon be issued covering the changes and deviations involved.

F. BARRICADES, DANGER, WARNING AND DETOUR SIGNS

1. The Successful Vendor shall provide, erect and maintain all necessary barricades, sufficient red lights, flares, danger signals and signs, provide a sufficient number of watchmen and take all necessary precautions for the protection of the work and safety of the public.

G. LICENSES AND PERMITS

1. The Successful Vendor shall have all necessary licenses required to do the work and give all notices and obtain and pay all necessary permits required by local laws and regulations for building.
2. State and Federal permits (if applicable) to undertake work have been obtained by the County and accompany these specifications.

H. SUPERVISION

1. The Successful Vendor shall maintain, at all times during the progress of work, a competent and experienced supervisor who shall represent the Successful Vendor, and all directions given to him shall be binding. Important decisions regarding directions, if requested by the supervisor, shall be confirmed in writing.
2. Supervision by the County or its representative does not relieve the Successful Vendor of responsibility for defective work executed under the direct control of the Successful Vendor. Responsibility for defective work rests upon the Successful Vendor, whether discovered by the County prior to final payment or subsequent thereto.

I. CLEAN UP

1. Upon completion of the items within a given location as specified and before monthly estimates will be paid, the construction area and all other areas occupied by the Successful Vendor during the construction of said Contract shall be cleaned of all surplus and discarded materials, bracing, forms, rubbish and temporary structures that were placed there by the Successful Vendor.
2. Disposal of the aforementioned shall be the responsibility of the Successful Vendor.

J. CHANGES IN WORK

1. The County, without invalidating the contract, may order extra work or make changes by altering, adding or deducting from the work with the contract sum being adjusted accordingly.
2. All such work shall be executed under the conditions of the original contract, except that any claim for the extension of time caused thereby shall be adjusted at the time of ordering such change.
3. The value of any such extra work or change shall be determined in one or more of the following ways:
 - a. By estimate and acceptance of lump sum.
 - b. By unit prices named in the contract or subsequently agreed upon.

K. TIME FOR COMPLETION

1. The Work contemplated under this Contract shall be considered as continuous and be completed within the timeframe(s) stated in Section IV of this Proposal Document.
2. The Successful Vendor will be allowed to work eight hours per day, Monday through Friday, except for holidays, fifty-two weeks per year.
3. The Successful Vendor will not be permitted to work on holidays observed by Worcester County or the State of Maryland or on Sundays unless otherwise authorized in writing.
4. In case of an emergency which may require that work be done on Saturdays, Sundays, and Holidays, the Successful Vendor shall request permission of the County to do so. If, in the opinion of the County, the emergency is bonafide, permission may be granted to the Successful Vendor to work such hours as may be determined are necessary by the County. Also, if in the opinion of the County a bonafide emergency exists, the Successful Vendor may be directed to work such hours as may be necessary whether or not the Successful Vendor requests permission to do so.
5. The Successful Vendor shall pay the County for all costs incurred for inspection services required for work permitted during holidays, weekends or in excess of eight hours per day.

L. LIQUIDATED DAMAGES

1. If the Successful Vendor shall fail to start and complete the project within the time frame stated above, the County shall assess liquidated damages in the amounts listed below per calendar day for each and every day the Successful Vendor fails to complete the contract.

<u>Amount of Contract</u>	<u>Liquidated Damages per Day</u>
Less than \$10,000	\$100.00
\$10,000 or less than \$100,000	\$250.00
\$100,000 or less than \$500,000	\$750.00
\$500,000 or more	\$1,000.00
Or will be based on actual cost to the County, whichever is greater.	

2. The designated County project manager reserves the option to extend the scheduled completion date or waive the liquidated damages clause in its entirety if he is of the opinion that extenuating circumstances deemed such action appropriate.

M. CORRECTION OF WORK

1. The Successful Vendor will promptly remove from the premises all Work rejected by the County for failure to comply with the Proposal Documents, whether incorporated in the construction or not, and the Successful Vendor will promptly replace and re-execute the Work in accordance with the Proposal Documents and without expense to the County and will bear the expense of making good all Work of other Vendors destroyed or damaged by such removal or replacement.
2. All removal and replacement Work will be done at the Successful Vendor's expense. If the Successful Vendor does not act to remove such rejected Work within ten days after receipt of Written Notice, the County may remove such Work and store the materials at the expense of the Successful Vendor.

N. CONSTRUCTION SAFETY AND HEALTH STANDARDS

1. It is a condition of this contract, and shall be made a condition of each sub-contract entered into pursuant to this contract, that the Successful Vendor and any sub-contractor shall not require any laborer or mechanic employed in performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards (Title 29, Code of Federal Regulations, Part 1926, formerly Part 1518, as revised from time to time, promulgated by the United States Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standard Act.) (83 Stat. 96).
2. Failure of Worcester County to inform the Successful Vendor of safety violations will not release the Successful Vendor of his responsibilities.

O. PERFORMANCE AND PAYMENT BONDS

1. The Successful Vendor will be required to provide the County with a Performance Bond and Payment Bond if the total Contract amount exceeds \$100,000, each in the amount of one hundred percent of the Contract Price, with a corporate surety approved by the County for the faithful performance of the Contract.
2. The Successful Vendor will within fourteen calendar days after the receipt of the Contract furnish the County with a Performance Bond and Payment Bond in penal sums equal to the amount of the Contract Price, conditioned upon the performance by the Successful Vendor of all undertakings,

covenants, terms, conditions and agreements of the Proposal Documents, and upon the prompt payment by the Successful Vendor to all persons supplying labor and materials in the prosecution of the Work provided by the Proposal Document. Such Bonds will be executed by the Successful Vendor and corporate bonding company licensed to transact such business in the state in which the Work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Circular Number 570. The expense of these Bonds will be borne by the Successful Vendor. If at any time a surety on any such Bond is declared bankrupt or loses its right to do business in the State of Maryland or is removed from the list of surety companies accepted on federal bonds, Successful Vendor will within ten calendar days after notice from the County to do so, substitute an acceptable Bond(s) in such form and sum and signed by such other surety or sureties as may be satisfactory to the County.

P. GUARANTEE

1. The Successful Vendor shall furnish the County with a one-year guarantee of workmanship and materials, dating from time of acceptance of the project and shall make good any defects which may occur during that period.
2. If any special guarantees in excess of the one-year period are specified by the manufacturer, these guarantees shall take precedence over the one-year period guarantee.
3. Upon completion of work, and before final payment or release of retainage, the Successful Vendor shall submit, and obtain from each subcontractor, material supplier and equipment manufacture general warranties and a notarized asbestos free guarantee.

END OF SECTION

SECTION IV: BID SPECIFICATIONS

A. SCOPE

1. The County is seeking bids from qualified Vendors the furnishing of all labor, materials, transportation, tools, supplies, equipment, electrical work, and appurtenances necessary for the complete, and in-place, satisfactory construction and testing of all work shown on the Contract Drawings and requirement by the Contract for Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repair project in accordance with the terms and conditions and specifications set forth in this solicitation.

B. CONTRACT PRICING

1. Pricing must include all labor, materials, tools, and equipment to perform Work.
2. Pricing will not change during the Contract Period.

C. SUMMARY

1. See attachments for full project information.

D. GENERAL REQUIREMENTS

1. The Successful Vendor must be licensed to perform Work in the state of Maryland.

E. ATTACHMENTS

1. Contract Documents and Construction Specifications – Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repair project.
2. Project Drawings as prepared by EA Engineering, Science, and Technology, Inc. PBC dated November 2025.

F. PRE-BID CONFERENCE

1. A pre-bid conference will be held at 10:00am on Wednesday, March 18, 2026 at the Berlin Homeowner Convenience Center located at 9696 Mill Haven Road, Berlin, Maryland 21811.

G. PAYMENT

1. The County will make payment(s) to the Successful Vendor within thirty (30) calendar days from the receipt of a proper invoice for approved and accepted work performed.

H. QUESTIONS

1. The last day for questions is listed under Section I, Subsection C.2.

I. AWARD

1. The County intends to award to the lowest Responsive and Responsible Vendor meeting the specifications.

END OF SECTION

**THIS AND PREVIOUS SECTIONS, OTHER THAN THE COVER PAGE, DO NOT NEED TO BE
RETURNED WITH SUBMITTAL**

REFERENCES

List three references for which the Vendor has provided Goods/Services similar to those requested in the Bid Document within the last 12-36 months. Include contact name, address, telephone number, email address and services provided.

Company Name:		Company Name:	
Type of Project:		Type of Project:	
Address:		Address:	
Town, State, Zip Code:		Town, State, Zip Code:	
Contact Person:		Contact Person:	
Telephone Number:		Telephone Number:	
Email:		Email:	
Date of Service:		Date of Service:	
Company Name:			
Type of Project:			
Address:			
Town, State, Zip Code:			
Contact Person:			
Telephone Number:			
Email:			
Date of Service:			

Sign for Identification

Printed Name

EXCEPTIONS

The undersigned hereby certifies that, except as listed below, or on separate sheets attached hereto, the enclosed Completed Bid Document covers all items as specified.

EXCEPTIONS:

(If none, write none) _____

How did you hear about this solicitation?

- ☐ Worcester County's Website
- ☐ eMaryland Marketplace Advantage (eMMA)
- ☐ Newspaper Advertisement
- ☐ Direct email
- ☐ Other _____

The vendor hereby acknowledges receipt of the following addenda.

<u>Number</u>	<u>Date</u>	<u>Initials</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Sign for Identification

Printed Name

INDIVIDUAL PRINCIPAL

Vendor Name: _____

Signed By: _____ In the presence of: _____

Address of Vendor: _____ Town, State, Zip _____

Telephone No.: _____ Fax: _____ Email: _____

CO-PARTNERSHIP PRINCIPAL

Name of Co-Partnership: _____

Address: _____ Town, State, Zip _____

Telephone No.: _____ Fax: _____

Signed By: _____ In the presence of: _____
Partner Witness

Signed By: _____ In the presence of: _____
Partner Witness

Signed By: _____ In the presence of: _____
Partner Witness

CORPORATE PRINCIPAL

Name of Corporation: _____

Address: _____ Town, State, Zip _____

Telephone No.: _____ Fax: _____

Signed By: _____ In the presence of: _____
President Witness

Attest: _____
Corporate Secretary

Affix Corporate Seal

VENDOR'S AFFIDAVIT OF QUALIFICATION TO BID

I HEREBY AFFIRM THAT:

I, _____ am the _____
(Printed Name) (title)
and the duly authorized representative of the Vendor of
_____ whose address is
(name of corporation)

and that I possess the legal authority to make this affidavit on behalf of myself and the Vendor for which I am acting.

Except as described in paragraph 3 below, neither I nor the above Vendor, nor to the best of my knowledge and of its officers, directors or partners, or any of its employees directly involved in obtaining contracts with the State or any county, bi-county or multi-county agency, or subdivision of the State have been convicted of, or have pleaded nolo-contendere to a charge of, or have during the course of an official investigation or other proceeding admitted in writing or under oath acts or omissions which constitute, bribery, attempted bribery, or conspiracy to bribe under the provisions of Article 27 of the Annotated Code of Maryland or under the laws of any state or federal government (conduct prior to July 1, 1977 is not required to be reported).

(State "none" or, as appropriate, list any conviction, plea or admission described in paragraph 2 above, with the date, court, official or administrative body, the individuals involved and their position with the Vendor, and the sentence or disposition, if any.)

I acknowledge that this affidavit is to be furnished to the County, I acknowledge that, if the representations set forth in this affidavit are not true and correct, the County may terminate any Contract awarded and take any other appropriate action. I further acknowledge that I am executing this affidavit in compliance with section 16D of Article 78A of the Annotated Code of Maryland, which provides that certain persons who have been convicted of or have admitted to bribery, attempted bribery or conspiracy to bribe may be disqualified, either by operation of law or after a hearing, from entering into contracts with the State or any of its agencies or subdivisions.

I do solemnly declare and affirm under the penalties of perjury that the contents of this affidavit are true and correct.

Sign for Identification

Printed Name

NON-COLLUSIVE AFFIDAVIT

_____ being first duly sworn,
deposes and says that:

1. He/she is the _____, (Owner, Partner, Officer, Representative or Agent) of _____, the Vendor that has submitted the attached Bid Documents;
2. He/she is fully informed respecting the preparation and contents of the attached Bid Document and of all pertinent circumstances respecting such Bid Documents;
3. Such Bid Document is genuine and is not a collusive or sham Bid Document;
4. Neither the said Vendor nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, have in any way colluded, conspired, connived or agreed, directly or indirectly, with any other Vendor, firm, or person to submit a collusive or sham Bid Document in connection with the Work for which the attached Bid Document has been submitted; or to refrain from bidding in connection with such Work; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Vendor, firm, or person to fix the price or prices in the attached Bid Document or of any other Vendor, or to fix any overhead, profit, or cost elements on the Bid Document price or the Bid Document price of any other Vendor, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any disadvantage against (Recipient), or any person interested in the Work;
5. The price or prices quoted in the attached Bid Document are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Vendor or any other of its agents, representatives, owners, employees or parties in interest, including this affiant.

Signed, sealed and delivered in the presence of:

Witness

Witness

By: _____
Signature

Printed Name

Title

EXHIBIT A

WORCESTER COUNTY MARYLAND STANDARD TERMS AND CONDITIONS

The provisions below are applicable to all Worcester County ("County") contracts. These provisions are not a complete agreement. These provisions must be attached to an executed document that identifies the work to be performed, compensation, term, incorporated attachments, and any special conditions ("Contract"). If the Standard Terms and any other part of the Contract conflict, then the Standard Terms will prevail.

1. **Amendment.** Amendments to the Contract must be in writing and signed by the parties.
2. **Bankruptcy.** If a bankruptcy proceeding by or against the Contractor is filed, then:
 - a. The Contractor must notify the County immediately; and
 - b. The County may cancel the Contract or affirm the Contract and hold the Contractor responsible for damages.
3. **Compliance with Law.** Contractor must comply with all applicable federal, state, and local law. Contractor is qualified to do business in the State of Maryland. Contractor must obtain, at its expense, all licenses, permits, insurance, and governmental approvals needed to perform its obligations under the Contract.
4. **Contingent Fee Prohibition.** The Contractor has not directed anyone, other than its employee or agent, to solicit the Contract and it has not promised to pay anyone a commission, percentage, brokerage fee, contingent fee, or other consideration contingent on the making of the Contract.
5. **Counterparts and Signature.** The Contract may be executed in several counterparts, each of which may be an original and all of which will be the same instrument. The Contract may be signed in writing or by electronic signature, including by email. An electronic signature, a facsimile copy, or computer image of the Contract will have the same effect as an original signed copy.
6. **Exclusive Jurisdiction.** All legal proceedings related to this Contract must be exclusively filed, tried, and maintained in either the District Court of Maryland for Worcester County, Maryland or the Circuit Court of Worcester County, Maryland. The parties expressly waive any right to remove the matter to any other state or federal venue and waive any right to a jury trial.
7. **Force Majeure.** The parties are not responsible for delay or default caused by fire, riot, acts of God, County-declaration-of-emergency, or war beyond their reasonable control. The parties must make all reasonable efforts to eliminate a cause of delay or default and must, upon cessation, diligently pursue their obligations under the Contract.
8. **Governing Law.** The Contract is governed by the laws of Maryland and the County.
9. **Indemnification.** The Contractor must indemnify the County and its agents from all liability, penalties, costs, damages, or claims (including attorney's fees) resulting from personal injury, death, or damage to property that arises from or is connected to the performance of the work or failure to perform its obligations under the Contract. All indemnification provisions will survive the expiration or termination of the Contract.

10. Independent Contractor.

- a. Contractor is an “Independent Contractor”, not an employee. Although the County may determine the delivery schedule for the work and evaluate the quality of the work, the County will not control the means or manner of the Contractor’s performance.
- b. Contractor is responsible for all applicable taxes on any compensation paid under the Contract. Contractor is not eligible for any federal Social Security, unemployment insurance, or workers’ compensation benefits under the Contract.
- c. Contractor must immediately provide the County notice of any claim made against Contractor by any third party.

11. Insurance Requirements.

- a. Contractor must have Commercial General Liability Insurance in the amounts listed below. The insurance must include coverage for personal injury, discrimination, and civil rights violation claims. All insurance must name County, its employees, and agents as “ADDITIONAL INSURED”. A copy of the certificate of insurance must be filed with the County before the Contract is executed, providing coverage in the amount of \$1,000,000 per occurrence, \$2,000,000 general aggregate, and \$500,000 for property damage.
- b. Contractor must have automobile insurance on all vehicles used in the Contract to protect Contractor against claims for damages resulting from bodily injury, including wrongful death, and property damage that may arise from the operations in connection with the Contract. All insurance must name County, its employees, and agents as “ADDITIONAL INSURED”.
- c. Contractor must provide the County with a certification of Workers’ Compensation Insurance, with employer’s liability in the minimum amount required by Maryland law in effect for each year of the Contract.
- d. All insurance policies must have a minimum 30 days’ notice of cancellation. The County must be notified immediately upon cancellation.
- e. When insurance coverage is renewed, Contractor must provide new certificates of insurance prior to expiration of current policies.

12. Nondiscrimination. Contractor must not discriminate against any worker, employee, or applicant because of religion, race, sex, age, sexual orientation, physical or mental disability, or perceived disability. This provision must be incorporated in all subcontracts related to the Contract.

13. Ownership of Documents; Intellectual Property.

- a. All documents prepared under the Contract must be available to the County upon request and will become the exclusive property of the County upon termination or completion of the services. The County may use the documents without restriction or without additional compensation to the Contractor. The County will be the owner of the documents for the purposes of copyright, patent, or trademark registration.
- b. If the Contractor obtains, uses, or subcontracts for any intellectual property, then it must provide an assignment to the County of ownership or use of the property.
- c. The Contractor must indemnify the County from all claims of infringement related to

the use of any patented design, device, materials, or process, or any trademark or copyright, and must indemnify the County, its officers, agents, and employees with respect to any claim, action, costs, or infringement, for royalties or user fees, arising out of purchase or use of materials, construction, supplies, equipment, or services covered by the Contract.

14. **Payments.** Payments to the Contractor under the Contract will be within 30 days of the County's receipt of a proper invoice from the Contractor. If an invoice remains unpaid 45 days after the invoice was received, interest will accrue at 6% per year.
15. **Records.** Contractor must maintain fiscal records relating to the Contract in accordance with generally accepted accounting principles. All other relevant records must be retained by Contractor and kept accessible for at least three years after final payment, termination of the Contract, or until the conclusion of any audit, controversy, or litigation related to the Contract. All subcontracts must comply with these provisions. County may access all records of the Contractor related to the Contract.
16. **Remedies.**
 - a. **Corrections of errors and omissions.** Contractor must perform work necessary to correct errors and omissions in the services required under the Contract, without undue delays and cost to the County. The County's acceptance will not relieve the Contractor of the responsibility of subsequent corrections of errors.
 - b. **Set-off.** The County may deduct from any amounts payable to the Contractor any back-charges, penalties, or damages sustained by the County, its agents, or employees caused by Contractor's breach. Contractor will not be relieved of liability for any costs caused by a failure to satisfactorily perform the services.
 - c. **Cumulative.** These remedies are cumulative and without waiver of any others.
17. **Responsibility of Contractor.**
 - a. The Contractor must perform the services with the standard of care, skill, and diligence normally provided by a Contractor in the performance of services similar the services.
 - b. Notwithstanding any review, approval, acceptance, or payment for the services by the County, the Contractor will be responsible for the accuracy of any work, design, drawings, specifications, and materials furnished by the Contractor under the Contract.
 - c. If the Contractor fails to conform with subparagraph (a) above, then it must, if required by the County, perform at its own expense any service necessary for the correction of any deficiencies or damages resulting from the Contractor's failure. This obligation is in addition to any other remedy available to the County.
18. **Severability/Waiver.** If a court finds any term of the Contract to be invalid, the validity of the remaining terms will not be affected. The failure of either party to enforce any term of the Contract is not a waiver by that party.
19. **Subcontracting or Assignment.** The Contractor may not subcontract or assign any part of the Contract without the prior written consent of the County. The County may withhold consent for any reason the County deems appropriate.

20. **Termination.** If the Contractor violates any provision of the Contract, the County may terminate the Contract by written notice. All finished or unfinished work provided by the Contractor will, at the County's option, become the County's property. The County will pay the Contractor fair compensation for satisfactory performance that occurred before termination less the amount of damages caused by the Contractor's breach. If the damages are more than the compensation payable to the Contractor, the Contractor will remain liable after termination and the County can affirmatively collect damages.
21. **Termination of Contract for Convenience.** Upon written notice, the County may terminate the Contract when the County determines termination is in the County's best interest. Termination for convenience is effective on the date specified in the County's written notice. The County will pay for reasonable costs allocable to the Contract for costs incurred by the Contractor up to the date of termination. But the Contractor will not be reimbursed for any anticipatory profits that have not been earned before termination.
22. **Termination of Multi-year Contract.** If funds are not available for any fiscal period of the Contract after the first fiscal period, then the Contract will be terminated automatically as of the beginning of unfunded fiscal period. Termination will discharge the Contractor and the County from future performance of the Contract, but not from their rights and obligations existing at the time of termination.
23. **Third Party Beneficiaries.** The County and Contractor are the only parties to the Contract and are the only parties entitled to enforce its terms. Nothing in the Contract gives any benefit or right to third persons unless individually identified by name and expressly described as intended beneficiaries of the Contract.
24. **Use of County Facilities.** Contractor may only County facilities that are needed to perform the Contract. County has no responsibility for the loss or damage to Contractor's personal property which may be stored on County property.
25. **Whole Contract.** The Contract, the Standard Terms, and attachments are the complete agreement between the parties and supersede all earlier agreements, proposals, or other communications between the parties relating to the subject matter of the Contract.

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Contract Documents and Construction Specifications

Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repair

Prepared for

Worcester County Department of Public Works
6113 Timmons Road
Snow Hill, Maryland 20863

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
11200 Racetrack Road, Unit A101
Ocean Pines, Maryland 21811
(410) 641-5341

December 2025
EA Project No. 1060953

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Contract Documents and Construction Specifications

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**WORCESTER COUNTY MARYLAND
BIDDING DOCUMENTS**

**CONSTRUCTION SPECIFICATIONS
FOR**

**WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS
BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR**

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SECTION A: INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

Terms used in these Instructions to Bidders, which are defined in the Standard General Conditions of the Construction Contract (EJCDC C-700, 2018 ed.), have the meanings assigned to them in the General Conditions. The term “Bidder” means one who submits a Bid directly to Owner, as distinct from a Sub-Bidder, who submits a Bid to a Bidder. The term “Successful Bidder” means the lowest, qualified, responsible and responsive Bidder to whom Owner (on the basis of Owner’s evaluation as hereinafter provided) makes an award. The term “Bidding Documents” includes the Advertisement of Invitation to Bid, Instructions to Bidders, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

2. COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of the Bidding Documents may be obtained from Owner, via the County’s website address <https://www.co.worcester.md.us/commissioners/bids>.

2.2 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

To demonstrate qualifications to perform the Work, each Bidder must submit along with his bid the following information:

- Resume for the full-time onsite superintendent showing that the superintendent has experience in the installation of HDPE, Ductile Iron, Schedule 80 PVC pipe or similar for sewer force main. Experience must include the installation of at least 10 miles of pipe or similar via open trench and or directional drill method.
- Shall have experience with rehab of fiberglass wetwells, wetwell appurtenance installation, and concrete fabrication.

Further, within five (5) days of Owner’s request, Bidder shall submit additional written evidence, such as financial data, additional previous experience on similar projects, equipment availability, present commitments, and other such data, as may be requested. Each Bid must contain evidence of Bidder’s qualifications to do business in the state where the project is located or covenant to obtain such qualification prior to award of the Contract.

4. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

4.1 It is the responsibility of each Bidder before submitting a Bid, to (a) examine the Contract Documents thoroughly; (b) visit the site and make all subsurface investigations necessary to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work; (c) consider federal, state, and local Laws and Regulations that may affect cost, progress, performance, or furnishing of the Work; (d) study and carefully correlate Bidder's observations with the Contract Documents, and (e) notify Engineer of all conflicts, errors, or discrepancies in the Contract Documents.

4.2 Reference is made to the Supplementary Conditions for identification of:

4.2.1 Those reports of explorations and tests of subsurface conditions at the site which have been utilized by Engineer in preparation of the Contract Documents. Bidder may rely upon the accuracy of the technical data contained in such reports, but not upon nontechnical data, interpretations or opinions contained therein or for the completeness thereof for the purposes of bidding or construction.

4.2.2 Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which have been utilized by Engineer in preparation of the Contract Documents. Bidder may rely upon the accuracy of the technical data contained in such drawings, but not upon the completeness thereof for the purposes of bidding or construction.

Copies of such reports and drawings will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein, upon which Bidder is entitled to rely as provided in Article 4, are incorporated therein by reference. Such technical data has been identified and established in the Supplementary Conditions.

4.3 Information and data reflected in the Contract Documents, with respect to Underground Facilities at or contiguous to the site, is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities or others, and Owner does not assume responsibility for the accuracy or completeness thereof, unless it is expressly provided otherwise in the Supplementary Conditions.

4.4 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities, and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Article 4 of the General Conditions.

4.5 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance, or furnishing of the Work and which Bidder deems necessary to determine its Bid

for performing and furnishing the Work in accordance with the time, price, and other terms and conditions of the Contract Documents.

4.6 On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up, and restore the site to its former condition upon completion of such explorations.

4.7 The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by the Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor.

4.8 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Contract Documents and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

5. INTERPRETATIONS AND ADDENDA

5.1 All questions about the meaning or intent of the Contract Document are to be directed to Owner. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda, mailed or delivered to all parties, and recorded by Owner as having received the Bidding Documents. Questions received less than five (5) days prior to the date for opening Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5.2 Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer.

6. BID SECURITY

6.1 Each Bid must be accompanied by Bid security made payable to Owner in an amount of five (5) percent of the Bidder's maximum Bid price and in the form of a certified or bank check or a Bid Bond, issued by a surety meeting the requirements of Article 5 of the General Conditions.

6.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Contract security, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Agreement and furnish the required Contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seventh day after the Effective Date of the Agreement or the sixty-first day after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security with Bids which are not competitive will be returned within seven (7) days after the Bid opening.

7. CONTRACT TIME

The numbers of days within which, or the dates by which, the Work is to be substantially completed and also completed and ready for final payment (the Contract Time) are set forth in the Bid Form and the Agreement.

8. LIQUIDATED DAMAGES

~~Provisions for liquidated damages are \$500 per day, for the first 30 days. Beyond 30 days, damages increase to \$1,000 per day, as set forth in the Agreement.~~

9. SUBSTITUTE OR "OR-EQUAL" ITEMS

The Contract, if awarded, will be on the basis of materials and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or-equal" item. Substitute or "or-equal" materials or equipment may be furnished or used by Contractor if acceptable to Engineer; application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in Article 6 of the General Conditions and may be supplemented in the General Requirements.

10. SUBCONTRACTORS, SUPPLIERS, AND OTHERS

10.1 If the Instructions to Bidders and/or the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) to be submitted to Owner in advance of the Effective Date of Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall submit to Owner a list of all such Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work for which such identification is

required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person, or organization if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, other person or organization, may request the apparent Successful Bidder to submit an acceptable substitute prior to the Notice of Award, in which case that Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

10.2 In Contracts where the Contract Price is on the basis of Cost-of-the-Work Plus a Fee, the apparent Successful Bidder, prior to the Notice of Award, shall identify in writing to Owner those portions of the Work that such Bidder proposes to subcontract and after the Notice of Award may only subcontract other portions of the Work with Owner's written consent.

10.3 No Contractor shall be required to employ any Subcontractor, Supplier, other person or organization against whom Contractor has reasonable objection.

11. BID FORM

11.1 The Bid Form (Form of Proposal) is included with the Bidding Documents; additional copies may be obtained from Worcester County.

11.2 All blanks on the Bid Form must be completed in ink or typed.

11.3 Bids by corporations must be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal must be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation must be shown below the signature.

11.4 Bids by partnerships must be executed in the partnership name and signed by a partner, whose title must appear under the signature, and the official address of the partnership must be shown below the signature.

11.5 All names must be typed or printed below the signature.

11.6 The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form).

11.7 The address and telephone number for communications regarding the Bid must be shown.

12. SUBMISSION OF BIDS

~~12.1 Bids shall be submitted before 1:00 PM (EDT) on _____ at the office of the Worcester County Commissioners, One West Market Street, Room 1103, Snow Hill, Maryland 21863, as indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque, sealed envelope, marked with the Project title, and name and address of the Bidder and accompanied by the Bid security and other related documents. If the Bid is sent through the mail or other delivery system, the sealed envelope shall be enclosed in a separate envelope with the notation "BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR" on the face of it.~~

13. MODIFICATION AND WITHDRAWAL OF BIDS

13.1 Bids may be modified or withdrawn by an appropriate document duly executed (in the manner that Bid must be executed) and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.

14. OPENING OF BIDS

~~Bids will be opened and read aloud publicly at before 1:00 PM (EDT) on _____. An abstract of the amounts of the base Bids and major alternates will be made available to Bidders after the opening of Bids. Bids will be reviewed, with a recommendation anticipated to be presented to the County Commissioners at their regular meeting.~~

15. BIDS TO REMAIN SUBJECT TO ACCEPTANCE

All bids will remain subject to acceptance for ninety (90) days after the day of the Bid opening, but Owner may, in his sole discretion, release any Bid and return the Bid security prior to that date.

16. AWARD OF CONTRACT

16.1 Owner reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time, or changes in the Work and to negotiate Contract terms with the Successful Bidder, and the right to disregard all nonconforming, nonresponsive, unbalanced, or conditional Bids. Also, Owner reserves the right to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive, or the Bidder is unqualified or of doubtful financial ability, or fails to meet any other pertinent standard or criteria established by Owner. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

16.2 In evaluating Bids, Owner will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data as may be requested in the Bid Form or prior to the Notice of Award.

16.3 Owner may consider the qualifications and experience of Subcontractors, Suppliers, and other persons and organizations proposed for those portions of the Work as to which the identity of Subcontractors, Suppliers, and other persons and organizations must be submitted as provided in the Supplementary Conditions. Owner also may consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

16.4 Owner may conduct such investigations, as Owner deems necessary, to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Document to Owner's satisfaction within the prescribed time.

16.5 If the Contract is to be awarded, it will be awarded to the lowest Bidder whose evaluation by Owner indicates that the award will be in the best interests of the Project.

16.6 If the Contract is to be awarded, Owner will give the Successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening.

17. CONTRACT SECURITY

Article 5 of the General Conditions and the Supplementary Conditions set forth Owner's requirements as to performance and payment Bonds. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by the required performance and payment Bonds.

18. SIGNING OF AGREEMENT

When Owner gives a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement with other written Contract Documents attached. Within fifteen (15) days thereafter, Contractor shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner with the required Bonds. Within ten (10) days thereafter, Owner shall deliver one fully signed counterpart to Contractor. Each counterpart is to be accompanied by a complete set of the Drawings with appropriate identification.

19. ~~PREBID CONFERENCE~~

~~A prebid conference will be held at before 10:00 AM (EDT) on _____ at the Department of Public Works Central Landfill Facility, 7091 Central Site Lane, Newark, MD 21841. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference.~~

20. SALES AND USE TAXES

The Owner's exemption from Maryland State Sales and Use Taxes on materials and equipment cannot be passed on to the Contractor. Contractor shall add such taxes within the Contract Price.

21. RETAINAGE

Provisions concerning retainage are set forth in the Agreement.

22. AWARD OF BIDS/ALTERNATES

The successful Bidder, for purpose of Contract award, shall be the conforming responsible Bidder offering the low unit price bid for the Base Bid Items. After the successful Bidder has been determined by this method, the Owner reserves the right to select alternates out of the listed sequence and to make award for only those items so selected and to accept any or all of the balance of the alternates within one hundred and eighty (180) days of award of the Contract.

SECTION B: GENERAL CONDITIONS OF THE CONTRACT

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By



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GUIDELINES FOR USE OF EJCDC® C-700, STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

1.0 PURPOSE AND INTENDED USE OF THE DOCUMENT

EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), is the foundation document for the EJCDC Construction Series. The General Conditions define the basic rights, responsibilities, risk allocations, and contractual relationship of the Owner and Contractor, and establish how the Contract is to be administered.

2.0 OTHER DOCUMENTS

EJCDC documents are intended to be used as a system and changes in one EJCDC document may require a corresponding change in other documents. Other EJCDC documents may also serve as a reference to provide insight or guidance for the preparation of this document.

These General Conditions have been prepared for use with either EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price), or EJCDC® C-525, Agreement Between Owner and Contractor for Construction Contract (Cost-Plus-Fee) (2018 Editions). The provisions of the General Conditions and the Agreement are interrelated, and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC® C-800, Supplementary Conditions of the Construction Contract (2018).

The full EJCDC Construction series of documents is discussed in the EJCDC® C-001, Commentary on the 2018 EJCDC Construction Documents (2018).

3.0 ORGANIZATION OF INFORMATION

All parties involved in a construction project benefit significantly from a standardized approach in the location of subject matter throughout the documents. Experience confirms the danger of addressing the same subject matter in more than one location; doing so frequently leads to confusion and unanticipated legal consequences. Careful attention should be given to the guidance provided in EJCDC® N-122/AIA® A521, Uniform Location of Subject Matter (2012 Edition) when preparing documents. EJCDC® N-122/AIA® A521 is available at no charge from the EJCDC website, www.ejcdc.org, and from the websites of EJCDC's sponsoring organizations.

If CSI MasterFormat™ is used for organizing the Project Manual, consult CSI MasterFormat™ for the appropriate document number (e.g., under 00 11 00, Advertisements and Invitations), and accordingly number the document and its pages.

4.0 EDITING THIS DOCUMENT

Remove these Guidelines for Use. Some users may also prefer to remove the two cover pages.

Although it is permissible to revise the Standard EJCDC Text of C-700 (the content beginning at page 1 and continuing to the end), it is common practice to leave the Standard EJCDC Text of C-700 intact and unaltered, with modifications and supplementation of C-700's provisions set forth in EJCDC® C-800, Supplementary Conditions of the Construction Contract (2018). If the Standard Text itself is revised, the

user must comply with the terms of the License Agreement, Paragraph 4.0, Document-Specific Provisions, concerning the tracking or highlighting of revisions. The following is a summary of the relevant License Agreement provisions:

1. The term “Standard EJCDC Text” for C-700 refers to all text prepared by EJCDC in the main body of the document. Document covers, logos, footers, instructions, or copyright notices are not Standard EJCDC Text for this purpose.
2. During the drafting or negotiating process for C-700, it is important that the two contracting parties are both aware of any changes that have been made to the Standard EJCDC Text. Thus, if a draft or version of C-700 purports to be or appears to be an EJCDC document, the user must plainly show all changes to the Standard EJCDC Text, using “Track Changes” (redline/strikeout), highlighting, or other means of clearly indicating additions and deletions.
3. If C-700 has been revised or altered and is subsequently presented to third parties (such as potential bidders, grant agencies, lenders, or sureties) as an EJCDC document, then the changes to the Standard EJCDC Text must be shown, or the third parties must receive access to a version that shows the changes.
4. Once the document is ready to be finalized (and if applicable executed by the contracting parties), it is no longer necessary to continue to show changes to the Standard EJCDC Text. The user may produce a final version of the document in a format in which all changes are accepted, and the document at that point does not need to include any “Track Changes,” redline/strikeout, highlighting, or other indication of additions and deletions to the Standard EJCDC Text.

5.0 LICENSE AGREEMENT

This document is subject to the terms and conditions of the **License Agreement, 2018 EJCDC® Construction Series Documents**. A copy of the License Agreement was furnished at the time of purchase of this document, and is available for review at www.ejcdc.org and the websites of EJCDC’s sponsoring organizations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 5. *Bidder*—An individual or entity that submits a Bid to Owner.
 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 10. *Claim*
 - a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

- requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.
- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
 - c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
 - d. A demand for money or services by a third party is not a Claim.
11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
 12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.
 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
 17. *Cost of the Work*—See Paragraph 13.01 for definition.
 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
 20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
 21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

22. *Engineer*—The individual or entity named as such in the Agreement.
23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
 - a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
 - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
 - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.
32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers’ instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion of such Work.

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
46. *Technical Data*
- a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.
 - b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
 - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
48. *Unit Price Work*—Work to be paid for on the basis of unit prices.
49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:* The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:* The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:* The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - 1. does not conform to the Contract Documents;
 - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
- E. *Furnish, Install, Perform, Provide*
 - 1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
- G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.
- C. *Evidence of Owner’s Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.
 - 4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.
- B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.
- G. Nothing in the Contract Documents creates:
 - 1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or
 - 2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer in writing all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work.

- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work may be done at the Site prior to such date.

4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the

established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. Abnormal weather conditions;
 - 3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
 - 4. Acts of war or terrorism.

- D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:
1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.
 2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.
 3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.
- E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:
1. The circumstances that form the basis for the requested adjustment;
 2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;
 3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;
 4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and
 5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.
- Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.
- F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.
- G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.
 - C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;
2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and
3. Technical Data contained in such reports and drawings.

- B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

- C. *Reliance by Contractor on Technical Data:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

- D. *Limitations of Other Data and Documents:* Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
 3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
 4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:
1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
 2. is of such a nature as to require a change in the Drawings or Specifications;
 3. differs materially from that shown or indicated in the Contract Documents; or
 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
 - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions:* Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:
1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 2. complying with applicable state and local utility damage prevention Laws and Regulations;

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
 4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
 2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
 3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
 4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
 - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
 4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures

- of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.
- B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner’s termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Alternative forms of insurance coverage, including but not limited to self-insurance and “Occupational Accident and Excess Employer’s Indemnity Policies,” are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
 - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
 - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.
- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 as supplemented must:
 - 1. include at least the specific coverages required;
 - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
 - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
 - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and
 - 5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds:* The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
 - 1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;
 - 2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
 - 3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and
5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.
- B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.
- C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.
- E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

- A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against

Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
 2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.
1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.06 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.

- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
 - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

- 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) has a proven record of performance and availability of responsive service; and
 - 4) is not objectionable to Owner.
- b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
- 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 Substitutes

- A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
 - a. will certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design;
 - 2) be similar in substance to the item specified; and
 - 3) be suited to the same use as the item specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from the item specified; and
 - 2) available engineering, sales, maintenance, repair, and replacement services.
 - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.
- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.
- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.09 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits, licenses, and certificates of occupancy. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

7.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.11 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.
- C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
- F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
- H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
- J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused by an emergency, or are required as a result of Contractor's response to an emergency. If Engineer determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

- 1. Before submitting a Shop Drawing or Sample, Contractor shall:
 - a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determine and verify:
 - 1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;
 - 2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;
 - c. confirm that the Submittal is complete with respect to all related data included in the Submittal.
- 2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.
1. *Shop Drawings*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.
 2. *Samples*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Engineer's Review of Shop Drawings and Samples*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.
2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

E. Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
 - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
 - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
 - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

- d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
- 2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 Contractor's General Warranty and Guarantee

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
 - 1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and
 - 2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
 - 1. Observations by Engineer;
 - 2. Recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. Use or occupancy of the Work or any part thereof by Owner;
 - 5. Any review and approval of a Shop Drawing or Sample submittal;
 - 6. The issuance of a notice of acceptability by Engineer;
 - 7. The end of the correction period established in Paragraph 15.08;
 - 8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
 - 1. Checking for conformance with the requirements of this Paragraph 7.19;
 - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
 - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.
- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. An itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
 - 1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
 - 2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents will be that of the former Engineer.

9.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.
- B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.

E. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.05 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.06 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.07 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs of which Engineer has been informed.

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

- A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
- B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.
- C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and
 - 4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.
- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

- B. If Owner has issued a Work Change Directive and:
 - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
 - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.
- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.
- B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.
- C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:

1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
1. A mutually acceptable fixed fee; or
 2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;
 - b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;
 - c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;
 - d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and
 - f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.
- B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

- B. *Change Proposal Procedures*

- 1. *Submittal:* Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
- 2. *Supporting Data:* The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
 - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
 - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

- 3. *Engineer's Initial Review:* Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
- 4. *Engineer's Full Review and Action on the Change Proposal:* Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS

12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.
 - 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13—COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included:* Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
 5. Other costs consisting of the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

- 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.
 - 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
 - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded:* The term Cost of the Work does not include any of the following items:
- 1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. The cost of purchasing, renting, or furnishing small tools and hand tools.
 - 3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 6. Expenses incurred in preparing and advancing Claims.
 - 7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*
- 1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
 - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
 - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
 - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
 - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
 - 2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

- E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

13.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances*: Contractor agrees that:
1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.
- C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
 - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.
3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply with such procedures and programs as applicable.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 3. by manufacturers of equipment furnished under the Contract Documents;
 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests will be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work,

or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 Owner May Correct Defective Work

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15—PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
 - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work;
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
 - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

- b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. The Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. The Contract Price has been reduced by Change Orders;
 - i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
 - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
 - l. Other items entitle Owner to a set-off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time

submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without

significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.
2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.
2. The final Application for Payment must be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

- d. a list of all duly pending Change Proposals and Claims; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Final Application and Recommendation of Payment:* If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Notice of Acceptability:* In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.
- D. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.
- E. *Final Payment Becomes Due:* Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim,

appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such adjacent areas;
 - 2. correct such defective Work;
 - 3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.
- B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.
- C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.
- D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

- F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);
 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:
1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and
 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

- A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and
 - 2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
 - 1. in person, by a commercial courier service or otherwise, to the recipient's place of business;
 - 2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
 - 3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination of the Contract or of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party to this Contract of any rights under or interests in the Contract will be binding on the other party without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract.

18.09 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

18.10 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION C: SUPPLEMENTARY CONDITIONS

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SUPPLEMENTARY CONDITIONS

SC-1

The terms used in these Supplementary Conditions, which are defined in the Standard General Conditions of the Construction Contract, have the meanings assigned to them in the General Conditions.

SC-4.02

In the preparation of Drawings and Specifications, ENGINEER has relied upon:

4.02.1 The following reports of explorations and tests of subsurface conditions at the site of the Work.

A site-specific subsurface utility exploration was not completed for this project. CONTRACTOR shall coordinate the field location of existing utilities by Miss Utility. CONTRACTOR shall relocate all utilities prior to beginning any work.

A subsurface soil evaluation was performed for this project by Stable Ground In-Situ entitled “Geotechnical Engineering Study – Berlin Transfer Station” dated September 26, 2024.

SC-5.04

The limits of liability for the insurance required by Article 5 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. and 2. Worker’s Compensation, etc., under Article 5 of the General Conditions:

(1) State:	Statutory
(2) Applicable Federal (e.g., Longshoreman’s):	Statutory
(3) Employers Liability:	<u>\$ 100,000</u>

3., 4., and 5. Comprehensive General Liability (under Article 5 of the General Conditions):

(1) Bodily Injury (including completed operations and products liability):

<u>\$1,000,000</u>	Each Occurrence
\$1,000,000	Annual Aggregate

Property Damage:

<u>\$500,000</u>	Each Occurrence
<u>\$1,000,000</u>	Annual Aggregate

or combined single limit of \$1,000,000

(2) Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.

(3) Personal Injury, with employment exclusion deleted:

\$500,000 Annual Aggregate

6. Comprehensive Automobile Liability:

Bodily Injury:

\$300,000 Each Person
\$500,000 Each Occurrence

Property Damage:

\$100,000 Each Occurrence
or combined single limit of \$1,000,000

SC-5.05 Contractual Endorsement

Article 5 of the General Conditions requires contractual liability coverage with respect to CONTRACTOR'S obligations under Article 6 in respect of indemnification. After the extent of the required coverages has been ascertained, it may be expressed by using the following language:

SC-5.05

The Contractual Liability required by Article 5 of the General Conditions shall provide coverage for not less than the following amounts:

5.05.1 Bodily Injury:

\$300,000 Each Occurrence

5.05.2 Property Damage:

\$300,000 Each Occurrence
\$1,000,000 Annual Aggregate

SC-13.03 Tests and Inspections

The testing laboratories utilized shall be acceptable to the ENGINEER.

SC-13.07 Special Guarantees

SC-13.07.1 Subcontractors shall be required to provide a specific warranty as fully described in the Construction Specifications.

SC-13.07.2 The CONTRACTOR shall warranty all material and workmanship for a period not less than one (2) years.

SC-18 Other Supplemental Conditions

SC-18.01 Night, Saturday, Sunday, and Holiday Work: CONTRACTOR shall perform no work at night, on Saturday, Sunday, or legal holidays, except in the case of emergency and then only upon written authorization of the ENGINEER. Where no emergency exists, but the CONTRACTOR feels it advantageous to work at night, or on Saturdays, the CONTRACTOR shall notify the ENGINEER at least two (2) days in advance, requesting written permission. Legal holidays are as established by the Worcester County Commissioners and as posted on the County website.

SC-18.02 Water: The CONTRACTOR shall be responsible for supplying an adequate supply of water suitable for his use and for construction and drinking. At his own expense, he shall provide and maintain adequate water supplies in such locations and installed in such a manner as may be satisfactory to the ENGINEER.

SC-18.03 Temporary Power Supply: The OWNER shall furnish, at his own expense, all electrical power which may be required for this Contract and it will be the CONTRACTOR'S responsibility to provide all temporary wiring required for use of this power supply.

SC-18.04 If conflicts exist among these Contract Documents. The Documents shall be considered in the following order.

- 1) Change Orders
- 2) Addendum
- 3) Specifications
- 4) Drawings
- 5) Other Documents

SC-18.06 Anticipatable weather delay days:

The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The CONTRACTOR'S progress schedule must reflect these anticipated adverse weather delays in all weather-dependent activities.

**MONTHLY ANTICIPATED ADVERSE WEATHER DELAY
WORK DAYS BASED ON SIX-DAY WORK WEEK**

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
7	6	6	7	7	6	4	5	3	5	4	5

SC-18.07 Worcester County Maryland Standard Terms

The selected contractor shall agree to the "Exhibit A Worcester County Maryland Standard Terms" as provided in the attachment. In the event of discrepancies between the Standard Conditions and "Exhibit A Worcester County Maryland Standard Terms", the latter shall prevail and take precedence.

++ END OF SECTION ++

SECTION D: BONDS AND BID FORMS

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PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, that _____
(CONTRACTOR)
hereinafter called the PRINCIPAL and _____
(SURETY)
hereinafter called the SURETY, are hereby held and firmly bound unto the County Commissioners of Worcester County, Worcester County Government Center, 1 West Market Street, Snow Hill, Maryland 21863 hereinafter called the OWNER, in the penal sum of FIVE-PERCENT-OF-BID Dollars (\$5%-of-bid) for the payment of which sum, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrations, successors, and assigns.

The condition of the above obligation is such that, whereas, the PRINCIPAL has submitted to the OWNER a certain PROPOSAL attached hereto and hereby made a part hereof, to enter into a CONTRACT in writing, for the Construction of the Worcester County Department of Public Works BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR, Worcester County, Maryland.

NOW, THEREFORE,

- a. If said PROPOSAL shall be rejected by the OWNER, or in the alternative,
- b. If within five (5) days of notice from the OWNER or the OWNER'S AGENT of the OWNER'S intention to award a CONTRACT to the PRINCIPAL in accordance with the PROPOSAL, the PRINCIPAL shall duly execute and deliver a PERFORMANCE BOND and PAYMENT BOND in the amounts required and in the forms set forth in the CONTRACT DOCUMENTS under which the PROPOSAL was submitted with a Surety or Sureties as required by said CONTRACT DOCUMENTS and in the event of acceptance of his PROPOSAL by the OWNER shall within the period specified therefor, enter into a written CONTRACT with the OWNER in accordance with the Bid as accepted and furnish to the OWNER proper evidence of insurance coverage as required the CONTRACT DOCUMENTS.

Then this obligation shall be void, otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the SURETY for any and all default of

the PRINCIPAL or claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The SURETY, for value received stipulates and agrees that the obligation of said SURETY and its bond shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such PROPOSAL and said SURETY does hereby waive notice of any such extension.

IN WITNESS THEREOF, the PRINCIPAL and SURETY have executed this instrument under their several seals this ____ day of _____, 2025, the name and corporate seal of each corporate party being hereby affixed and these presents duly signed by its proper officers, pursuant to authority of its governing body.

In presence of

_____	_____ SEAL
	(INDIVIDUAL PRINCIPAL)

_____	_____
(ADDRESS)	(BUSINESS ADDRESS)

_____	_____ SEAL
	(INDIVIDUAL PRINCIPAL)

_____	_____
(ADDRESS)	(BUSINESS ADDRESS)

Attest:

(CORPORATE PRINCIPAL)

(BUSINESS ADDRESS)

BY: _____:

Affix Corporate Seal

Witness:

(CORPORATE SURETY)

(BUSINESS ADDRESS)

BY: _____:

Affix Corporate Seal

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Principal (the “Principal”), and _____, a corporation organized and existing under the laws of the _____ of _____, as Surety (the “Surety”), are held and firmly bound unto the County Commissioners of Worcester County as Obligee (“the Obligee”), as hereinafter set forth, in the full and just sum of (total bid price) Dollars (\$ _____), lawful money of the United States of America, for the payment of which sum we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WITNESS THAT:

WHEREAS, the Principal heretofore has submitted to the Obligee a certain proposal, dated _____, 2025, (the “Proposal”), to perform certain construction work for the Obligee, in connection with Worcester County Department of Public Works BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR, pursuant to plans, specifications, and other related documents constituting the contract documents, which are incorporated into the Proposal by reference (the “Contract Documents”), as prepared by EA Engineering, Science, and Technology, Inc., PBC; and WHEREAS, the Obligee is a “contracting body” under the laws of the State of Maryland,

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee; and

WHEREAS, under the Contract Documents, it is provided, inter alia, that if the Principal shall furnish this Bond to the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Proposal, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the “Agreement”), the form of which Agreement is set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if; (a) the Principal well, truly, and faithfully shall comply with and shall perform the Agreement in accordance with the Contract Documents, at the time and in the manner provided in the Agreement and in the Contract Documents, and if the Principal shall satisfy all claims and demands incurred in or related to the performance of the Agreement by the Principal or growing out of the performance of the Agreement by the Principal, and if the Principal shall indemnify completely and shall save harmless the Obligee and all of its officers, agents, and employees from any and all costs and damages which the Obligee and all its officers, agents, and employees may sustain or suffer reason of the failure of the Principal to do so, and if the Principal shall reimburse completely and shall pay to the Obligee any an all costs and expenses which the Obligee and all of its officers, agents, and employees may incur by reason of any such default or failure of the Principal; and (b) if the Principal shall remedy, without cost to the Obligee, all defects which may develop during the period of one (1) year from the date of completion by the Principal and acceptance of the Obligee of the work to be performed under the Agreement in

accordance with the Contract Documents, which defects, in the sole judgement of the Oblige or its legal successors in interest, shall be caused by or shall result from defective or inferior materials or workmanship, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect.

The Principal and the Surety agree that any alterations, changes, and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Oblige of any extensions of time for the performance of the Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Oblige toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Oblige as permitted by the Contract Documents and by the Agreement, shall not release, in any manner whatsoever, the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors, and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

IN WITNESS THEREOF, the Principal and the Surety cause this Bond to be signed, sealed, and delivered this ___ day of _____, 2025.

(Individual Principal)

_____(SEAL)

WITNESS:

_____ By:

(Partnership Principal)

(Name of Partnership)

WITNESS:

_____ By: _____ (SEAL)

_____ By: _____ (SEAL)

_____ By: _____ (SEAL)

_____ By: _____ (SEAL)
(Corporate Principal)

(Name of Corporation)

ATTEST:

By:

(CORPORATE SEAL)

(Corporate Surety)

(Name of Corporation)

WITNESS:

_____ By:

**Attach an appropriate power of attorney, dated as of the same date as the Bond, evidencing the authority of the Attorney-in-fact to act on behalf of the corporation.

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PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Principal (the “Principal”), and _____, a corporation organized and existing under the laws of the _____ of _____, as Surety (the “Surety”), are held and firmly bound into The County Commissioners of Worcester County, as Obligee (the “Obligee”), as hereinafter set forth, in the full and just sum of _____ Dollars (\$ _____), lawful money of the United States of America, for the payment of which sum we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WITNESS THAT:

WHEREAS, the Principal heretofore has submitted to the Obligee a certain proposal, dated _____, 2025 (the “Proposal”) to perform certain construction work for the Obligee, in connection with the Worcester County Department of Public Works BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR, pursuant to plans, specifications, and other related documents, which are incorporated into the Proposal by reference (the “Contract Documents”), as prepared by EA Engineering, Science, and Technology, Inc., PBC.

WHEREAS, the Obligee is a “Contracting body” under the laws of the State of Maryland; and

WHEREAS, the Obligee requires that, before an award shall be made to the Principal by the Obligee in accordance with the Proposal, the Principal shall furnish this Bond to the Obligee, with this Bond to become binding upon the award of a contract to the Principal by the Obligee in accordance with the Proposal; and

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee; and

WHEREAS, under the Contract Documents, it is provided, inter alia, that if the Principal shall furnish this Bond to the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Proposal, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the “Agreement”), the form of which Agreement is set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if the Principal and any subcontractor of the Principal to whom any portion of the work under the Agreement shall be subcontracted, and if all assignees of the Principal and of any such subcontractor, promptly shall pay or shall cause to be paid, in full, all money which may be due any claimant supplying labor or materials in the prosecution and performance of the work in accordance with that Agreement and in accordance with the Contract Documents, including any amendment, extension, or addition to the Agreement and/or to the Contract Documents, for material furnished or labor supplied or labor performed, then this Bond shall be void; otherwise, this bond shall be and shall remain in force and effect.

The Bond shall be solely for the protection of claimants supplying labor or materials to the Principal or to any subcontractor of the Principal in the prosecution of the work covered by the Agreement, including any amendment, extension, or addition to the Agreement. The term "claimant," when used herein shall mean any individual, firm, partnership, association, or corporation. The phrase "labor or materials," when used herein, shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the site of the work covered by the Agreement. The provisions of this Bond shall be applicable whether or not the material furnished, or labor performed enters into and becomes a component part of the public building, public work, or public improvement contemplated by the Contract Documents and the Agreement.

As provided and required, the Principal and the Surety agree that any claimant, who has performed labor or furnished material in the prosecution of the work in accordance with the Agreement and in accordance with the Contract Documents, including any amendment, extension, or addition to the Agreement and/or to the Contract Documents, and who has not been paid therefor, in full, before the expiration of ninety (90) days after the day on which such claimant performed the last of such labor or furnished the last of such materials for which payment is claimed, may institute an action upon this Bond, in the name of the claimant, to recover any amount due the claimant for such labor or material, and may prosecute such action to final judgement and may have execution upon the judgement; provided, however, that: (a) any claimant who has a direct contractual relationship with any subcontractor of the Principal, but has no contractual relationship, express or implied, with the Principal, may institute an action upon this Bond only if such claimant first shall have given written notice, served in the manner provided in the Act, to the Principal, within ninety (90) days from the date upon which such claimant performed the last of the labor or furnished the last of the materials for which payment is claimed, stating, with substantial accuracy, the amount claimed and the name of the person for whom the work was performed or to whom the material was furnished; and (b) no action upon this Bond shall be commenced after the expiration of one (1) year from the day upon which the last of the labor was performed or material was supplied, for the payment of which such action is instituted by the claimant; and (c) every action upon this Bond shall be instituted either in the appropriate court of the County where the Agreement is to be performed or of such other County as Maryland statutes shall provide, or in the United States district court for the district in which the project, to which the Agreement relates, is situated, and not elsewhere.

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Obligee of any extensions of time for the performance of the Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Obligee toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Obligee as permitted by the Contract Documents and by the Agreement, shall not release, in any manner whatsoever, the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors, and assigns, from liability and obligations under this Bond; any changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

IN WITNESS THEREOF, the Principal and the Surety cause this Bond to be signed, sealed and delivered this ____ day of _____, 2025.

(Individual Principal)

(Signature of Individual) (SEAL)

WITNESS:

_____ By:

(Partnership Principal)

(Name of Partnership)

WITNESS:

_____ By: _____(SEAL)
(Partner)

_____ By: _____(SEAL)
(Partner)

_____ By: _____(SEAL)
(Partner)

_____ By: _____(SEAL)
(Partner)

(Corporation Principal)

(Name of Corporation)

ATTEST:

By:

(Secretary)

(CORPORATE SEAL)

of (if appropriate)

WITNESS:

(Authorized Representative)

*By:

*Attach appropriate proof, dated as of the same date as the Bond, evidencing authority to execute on behalf of the Corporation.

(Corporation Surety)

(Name of Corporation)

WITNESS:

**By:

**Attach an appropriate power of attorney, dated as of the same date as the Bond, evidencing the authority of the Attorney-in-fact to act on behalf of the corporation.

BID FORM

PROJECT IDENTIFICATION: Worcester County Department of Public Works
Berlin Homeowner Convenience Center Bulkhead Repair

CONTRACT IDENTIFICATION: Contract _____

THIS BID IS SUBMITTED TO: County Commissioners of Worcester County—OWNER

SUBMIT BID AT: Worcester County Government Center
1 West Market Street
Room 1103
Snow Hill, Maryland 21863
Attn: Mr. Dallas Baker, P.E., Director of Public Works

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicted in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for sixty (60) days after the day of Bid opening. Bidder will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within fifteen (15) days after the date of OWNER'S Notice of Award.
3. In submitting this Bid, Bidder represents, as more fully set forth in the Agreement, that:
 - a. Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged):

Date(s)

Number(s)

- b. Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.
 - c. Bidder has obtained and carefully studies (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, and studies which pertain to the subsurface or physical

conditions at the site or otherwise may affect the cost, progress, performance, or furnishing of the Work as Bidder considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 4 of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by Bidder for such purposes.

- d. Bidder has reviewed and checked all information and data shown on or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, or similar information or data in respect of said Underground Facilities are or will be required by Bidder in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of Article 4 of the General Conditions.
 - e. Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.
 - f. Bidder has given ENGINEER written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to Bidder.
 - g. This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation: Bidder has not directly or indirectly induced or solicited any other bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.
4. Bidder will substantially complete the Work within ninety (90) calendar days from receipt of Notice to Proceed and final completion within thirty (30) calendar days from the issuance of substantial completion for the following price as indicated on the Bid Form.

BID FORM

WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS BERLIN HOMEOWNER CONVENIENCE CENTER BULKHEAD REPAIR WORCESTER COUNTY, MARYLAND

ITEM NO.	ITEM DESCRIPTION	ESTIMATED QTY	UNIT	COST PER UNIT (\$)	TOTAL ITEM COST (\$)
1	MOBILIZATION AND DEMOBILIZATION	1	LS		
2	DEMOLITION, REMOVAL, AND SITE RESTORATION	1	LS		
3	SITE WORK, BACKFILL, SOIL TESTING, AND TRAFFIC CONTROL.	1	LS		
4	FURNISH AND INSTALL CAST-IN-PLACE CONCRETE, APPURTENANCES, AND CONCRETE TESTING	1	LS		
5	FURNISH AND INSTALL FULL-DEPTH PAVEMENT SECTION	1050	SY		
6	FURNISH AND INSTALL 2" SURFACE ASPHALT OVERLAY	1100	SY		
7	FURNISH AND INSTALL GRAVEL PAVEMENT	750	SY		
8	ELECTRICAL MOUNTING RACK AND ELECTRICAL EQUIPMENT	1	LS		
9	DUCT BANK	260	LF		
10	ELECTRTICAL CONNECTIONS AND MISCELLANEOUS ELECTRICAL WORK	1	LS		
	TOTAL BID				

TOTAL BASE BID PRICE IN WORDS: _____

5. The following documents are attached to and made a condition of this Bid:
- a. Required bid Security in the form of bond or cashier's check.
 - b. A tabulation of Subcontractors, Suppliers, and other persons and organizations required to be identified in this Bid.
 - c. Bidder's Qualification Statement with supporting data.

6. Communications concerning this Bid shall be addressed:

Edward Welch
Procurement Officer
Worcester County Administration
1 West Market Street, Room 1103
Snow Hill, Maryland 21863
ewelch@worcestermd.gov
Phone: (410) 632-1194

7. The terms used in this Bid which are defined in the General Conditions of the Construction Contract included as part of the Contract Documents have the meanings assigned to them in the General Conditions.

SUBMITTED ON _____, 2026.

If Bidder is:

An Individual

By _____ (SEAL)
(Individual's Name)

doing business at

Business Address: _____

Phone Number: _____

A Partnership

By _____ (SEAL)
(Firm Name)

(General Partner)

Business Address: _____

Phone Number: _____

A Corporation

By _____ (SEAL)
(Corporation Name)

(State of Incorporation)

By _____
(Name of Person Authorized to Sign)

(Title)

(Corporate Seal)

Attest _____ (SEAL)
(Secretary)

Business Address: _____

Phone Number: _____

A Joint Venture

By _____
(Name)

(Address)

By _____
(Name)

(Address)

(Each joint venture must sign. The manner of signing for each individual, partnership, and corporation that is a party of the joint venture should be in the manner indicated above.)

**FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR**

THIS AGREEMENT is dated as of the ____ day of _____ in the year 2026 by and between the County Commissioners of Worcester County (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK.

CONTRACTOR shall complete all Work as specified or in the Contract Documents. The Work is generally described as follows:

The Project for which the Work under the Contract Documents is generally described as Berlin Homeowner Convenience Center Bulkhead Repair

Article 2. ENGINEERING.

The Project has been designed by EA Engineering, Science, and Technology, Inc., PBC, who is hereinafter called ENGINEER and who is to act as OWNER'S representative, assume all duties and responsibilities and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 3. CONTRACT TIME.

3.1 The Work will be substantially completed within one hundred fifty (150) calendar days from receipt of Notice to Proceed and completed with final approval by the OWNER within thirty (30) calendar days from the issuance of the substantial completion. For the purpose of calculating contract completion date, calendar days shall include weekdays, Saturdays, Sundays and all legal holidays.

3.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER five hundred dollars (\$500.00) per day of the first thirty (30) days, and thence one thousand dollars (\$1,000.00) per day for each day that expires after the time specified in paragraph 3.1 until the Work is complete.

Article 4. CONTRACT PRICE.

4.1 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents in current funds in accordance with the Bid Form.

Article 5. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

5.1 Progress Payments. OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, on or about the 25th day of each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the schedule of values, following approval by the ENGINEER as established in paragraph 2.7 of the General Conditions.

5.2 Retainage. Retainage in the amount of ten (10) percent of each progress payment will be withheld by the OWNER. The retainage will be paid at the time of completion.

Article 6. INTEREST.

All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the Prime Rate in New York City as published in the *Wall Street Journal*.

Article 7. CONTRACTOR'S REPRESENTATIONS.

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representation:

7.1 CONTRACTOR has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

7.2 CONTRACTOR has studied carefully all reports of explorations and tests of subsurface conditions and drawings of physical conditions which are identified in the Supplementary Conditions, as provided in paragraph 4.02 of the General Conditions, and accepts the determination set forth in paragraph SC-4.02 of the Supplementary Conditions of the extent of the technical data contained in such reports and drawings upon which CONTRACTOR is entitled to reply.

7.3 CONTRACTOR assumes responsibility for obtaining and carefully studying all such examinations, investigations, explorations, tests, reports, and studies which pertain to the subsurface or physical conditions or contiguous to the site or otherwise may affect the cost, progress, performance, or furnishing of the Work as CONTRACTOR considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract

Documents including specifically the provisions of paragraph 4.02 of the General Conditions.

7.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies, or similar information or data in respect of said Underground Facilities are or will be required by CONTRACTOR in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of paragraph 4.03 of the General Conditions.

7.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.

7.6 CONTRACTOR has given ENGINEER written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

Article 8. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the Work consist of the following:

8.1 This Agreement (pages 1 to 5, inclusive).

8.2 Exhibits to this Agreement (the Bid Form inclusive).

8.3 Proposal, Performance, and Payment Bonds, identified herein and consisting of 2, 3, and 4 pages respectively.

8.4 Instruction to Bidders.

8.5 Notice of Award.

8.6 General Conditions (pages 00700-1 to 00700-41, inclusive).

8.7 Supplementary Conditions (pages SC-1 to SC-4, inclusive).

8.8 Specifications bearing the title CONTRACT DOCUMENTS AND CONSTRUCTION SPECIFICATIONS; Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repair, Worcester County, Maryland, and consisting of the items as listed in the table of contents thereof.

8.9 Drawings, consisting of a title sheet and sheets numbered 1 through 11, inclusive with each sheet bearing the following general title.

Worcester County Department of Public Works
Berlin Homeowner Convenience Center Bulkhead Repair
Worcester County, Maryland

8.10. CONTRACTOR'S Bid (pages 1 to 6, inclusive) marked exhibit Bid Form.

8.11 Documentation submitted by CONTRACTOR prior to Notice of Award.

8.12 The following which may be delivered or issued after the Effective Date of the Agreement and are not attached hereto: All Written Amendments and other documents amending, modifying, or supplementing the Contract Documents pursuant to paragraphs 3.04 and 3.05 of the General Conditions.

8.13 The documents listed in paragraph 8.2 at seq. above are attached to this Agreement (except as expressly noted otherwise above).

There are no Contract Documents other than those listed in this Article 8. The Contract Document may only be amended, modified, or supplemented as provided in Article 3 of the General Conditions.

Article 9. MISCELLANEOUS.

9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent, to an assignment no assignments will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.3 OWNER AND CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Document.

9.4 Time for payment: Notwithstanding the special conditions, time for payment by OWNER shall be thirty (30) days after presentation of the Application for Payment with ENGINEER'S recommendations, subject to the provisions of the last sentence of paragraph 14.07.

Article 10. ALTERATION OF CONTRACT.

This Contract may only be altered by written agreement executed by OWNER and CONTRACTOR.

IN WITNESS THEREOF, OWNER and CONTRACTOR have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR, and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This agreement will be effective on _____, 2026

OWNER _____

CONTRACTOR _____

By _____

By _____

[CORPORATE SEAL]

[CORPORATE SEAL]

ATTEST _____

ATTEST _____

Address for giving notices

Address for giving notices

LICENSE NO. _____

Agent for service of process: _____

(If CONTRACTOR is a corporation, attach
evidence of authority to sign.)

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SECTION E: SPECIFICATIONS

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SPECIFICATIONS CONTENTS

SECTION 01 11 00	SUMMARY OF WORK
SECTION 01 20 00	MEASUREMENT AND PAYMENT
SECTION 01 33 00	SUBMITTALS
SECTION 01 70 00	CONTRACT CLOSEOUT
SECTION 02 25 00	EXCAVATION, BACKFILL, AND COMPACTION
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SECTION 26 05 33	CONDUITS AND RACEWAY SYSTEMS
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DIVISION 1

SECTION 01 11 00	SUMMARY OF WORK
SECTION 01 20 00	MEASUREMENT AND PAYMENT
SECTION 01 33 00	SUBMITTALS
SECTION 01 70 00	CONTRACT CLOSEOUT

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SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.1 LOCATION

- A. The work to be performed hereunder for the Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repairs project is located in Worcester County, Maryland, at the following address:

Berlin Homeowner Convenience Center
9696 Mill Haven Road
Berlin, Maryland 21811

1.2 SCOPE

- A. The work to be performed hereunder includes the furnishing of all labor, materials, transportation, tools, supplies, equipment, electrical work, and appurtenances necessary for the complete, and in-place, satisfactory construction, dewatering as needed, and testing of all work shown on the Contract Drawings and required by the Contract for Worcester County Department of Public Works Berlin Homeowner Convenience Center Bulkhead Repairs project.
- B. It is the intent of the Contract Documents to describe a complete project and any work that may be reasonably inferred as being required to produce a finished job for the intended purposes, and this work shall be completed whether or not such incidental or related work is explicitly stated in the Contract Documents.
- C. The project Work generally includes the following:
1. Coordination with Worcester County to maintain operations of the transfer station adjacent to the work areas. Setup of traffic cones to allow public access to half of the work zone during construction. CONTRACTOR shall set up traffic cones in the middle of the drive lane and commence work along the western side of the proposed improvements. The public shall be given access to the eastern side of the work zone to access the trash compactor. When approved, the CONTRACTOR shall switch public access to the western side and commence work on the eastern side of the work zone.
 2. Coordinate with Worcester County for temporary relocation and storage of the western trash compactor while work occurs on the western side of the site.

3. Coordinate with Worcester County for temporary relocation and storage of the bulk containers while work occurs on the eastern side of the site.
4. Demolish and remove existing concrete pads. Dispose of offsite at an approved facility.
5. Full removal of wooden walkways, framing, decking, supports, and piles as well as aggregates and soils for the installation and testing of cast-in-place reinforced concrete walls, slabs, and all associated appurtenances.
6. Demolish existing sheds and dispose of debris in on-site bulk containers.
7. Demolish and remove asphalt to limits indicated. Dispose of offsite at an approved facility.
8. Furnish and install cast-in-place reinforced concrete pads and retaining walls. Including testing, reinforcement, chairs, ties, compounds, form work, and all associated appurtenances.
9. Furnish and install 10-inch compacted graded aggregate base, 2.5-inch 9.5MM Surface Superpave asphalt, and 4-inch 19.5MM Base Superpave asphalt to limits indicated. Work is inclusive of backfill, compaction, and testing of soils, aggregates, and pavement sections.
10. Furnish and install 2-inch overlay of 9.5MM Surface Superpave asphalt to limits indicated.
11. Furnish and install gravel.
12. Furnish and install bollards.
13. Furnish and install light poles.
14. Furnish and install electrical distribution components, such as disconnect, panels, mounting rack, conduits, conductors, ductbank, and shed HVAC, and connection to the proposed electrical loads onsite.
15. Disassemble concrete block wall. Coordinate with County for temporary stockpile location for concrete blocks and assist in loading concrete blocks on County supplied truck to be transported offsite by the County.
16. Coordination with County for placement of County procured attendant hut and storage shed.
17. Coordination with County approved trash compactor installers.

18. Site restoration and repair.
 19. Installation and maintenance of erosion and sediment controls.
 20. Coordination with Worcester County to return operations of the transfer station over to the completed project area.
- D. The CONTRACTOR shall provide and install materials and labor to construct the upgrades and make all connections and install all appurtenant items as shown in or required by the Contract Documents.
- E. All spoil material shall be removed and disposed of by the CONTRACTOR. The OWNER shall have right of salvage for all equipment removed; however, if the OWNER does not claim this equipment, it shall be disposed of at the CONTRACTOR'S expense.
- F. Lump Sum Items
- Measurement for all items listed as Lump Sum will be on a lump sum basis and are reflected as such on the bid form. Payment for each of the items will be as a percent complete in accordance with the schedule of values established prior to initiating construction and in accordance with the work completed each month. Payment is not to exceed each lump sum price from bid.
- G. Measurement and Payment, Unit Price Items
- Measurement for all items listed as Unit Price with quantities identified will be at the unit prices bid, and shall include the furnishing of all labor, tools, equipment and materials and the performance for all work required to complete the project as indicated and specified in accordance with all requirements on the Contract Documents and to the entire satisfaction of the ENGINEER.
- H. Measurement and Payment, General
1. All incidental, minor and miscellaneous items, work and materials for which no specific lump sum or unit price bid item is shown and which are necessary to complete the work and to maintain and/or repair the work, shall be done and furnished by the CONTRACTOR without extra charge.

1.3 BOUNDARIES OF WORK

- A. The OWNER shall provide land for the work specified in these Contract Documents and shall provide suitable provisions for ingress and egress, and the CONTRACTOR shall not enter on or occupy with men, tools, equipment, or material any ground outside the property of the OWNER without the written consent of the OWNER of such ground. Other contractors and employees or agents

of the OWNER may, for all necessary purposes, enter upon the work and premises used by the CONTRACTOR, and the CONTRACTOR shall conduct his work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

- B. Staging Area shall be on the property. Additional storage required shall be obtained by the CONTRACTOR and shall be the CONTRACTOR'S responsibility.

1.4 WATER SUPPLY

- A. The CONTRACTOR is responsible for providing the construction water necessary to perform the work. The CONTRACTOR shall not take water from the OWNER'S system without written approval of the ENGINEER.

1.5 PERMITS, INSPECTIONS, TESTS

- A. The CONTRACTOR will acquire all permits, inspections, and tests necessary for the proper execution of the work in accordance with all federal, state, and local rules, regulations, and codes. Copies of all permits shall be presented to the OWNER upon receipt and shall be posted, as required, at the project site. The CONTRACTOR is required to immediately notify Worcester County and the Maryland Department of the Environment in the event of any spills or discharges.
- B. The CONTRACTOR shall notify the ENGINEER two (2) working days prior to all inspections and tests and shall furnish certificates of test results and approvals to the ENGINEER upon receipt

1.6 CONTINUITY OF SERVICES

- A. Coordination with Worcester County to maintain operations of half of the homeowner dropoff adjacent to the work areas during construction. When half of the project is finished returning operations to the completed side and start work on the remaining half.

1.7 MATERIAL AND WORKMANSHIP WARRANTY

- A. The CONTRACTOR shall warrant that all workmanship, material, and equipment furnished and installed by him shall be free of defects for a period of one (1) year after acceptance of the work. Should such defects appear, the CONTRACTOR shall repair or replace such defects at no cost to the OWNER.

1.8 INSTRUCTION OF OWNER'S REPRESENTATIVES

- A. The CONTRACTOR shall thoroughly and completely instruct the OWNER or his representative in the operation and maintenance of all equipment and systems installed under this Contract to the satisfaction of the ENGINEER.

1.9 COORDINATION WITH OTHER CONTRACTORS, UTILITIES, AND GOVERNMENT AGENCIES

- A. There will be construction activities by other contractors, utilities, and government agencies at the project site. The CONTRACTOR will be required to coordinate and cooperate with others in carrying out his work.

1.10 REFERENCED SPECIFICATIONS

- A. The requirements of the ACI, ASA, API, ASME ASTM, AWS, AWWA, CFR, COMAR, EPA, MDE, MSS, UL and other specifications shall mean the latest edition thereof, and shall apply to all of the latest edition thereof, and shall apply to all of the applicable work to be performed, except as modified or revised by the Contract Documents, which shall govern.
- B. The requirements of referenced specifications shall be as binding upon the performance of the work as if they were fully written out herein.

1.11 FIELD ADJUSTMENTS

- A. The alignment and placement of the work shall be subject to adjustments in the field as directed by the ENGINEER.
- B. Calibration of instruments and sensors shall be subject to adjustments in the field as directed by the ENGINEER. All instruments shall be accurately and completely calibrated by the CONTRACTOR.

**** End of Section ****

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SECTION 01 20 00
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope of Work

1. The items listed in this Section refer to and are the same pay items listed on the Bid Form. They constitute all of the pay items for the completion of the Work. Compensation for all such services and materials shall be included in the prices stipulated for the lump sum and unit price pay items listed herein. Items of Work not specifically included in this Section for measurement and payment as described herein will not be measured for payment but will be considered incidental to the Contract with the associated costs borne solely by the CONTRACTOR.
2. Schedule of Values
 - a. The Schedule of Values is a list of line items, corresponding to each aspect of the Work, establishing in detail the value or cost of each major part of the Work, and is submitted to ENGINEER for acceptance.
 - b. Upon request of ENGINEER, support values with data that substantiate their correctness.
 - c. The preliminary Schedule of Values is submitted to the ENGINEER for initial review. The CONTRACTOR shall incorporate the ENGINEER's comments into the Schedule of Values and provide a re-submittal to the ENGINEER. The ENGINEER may require corrections and re-submittal of the Schedule of Values until it is acceptable.
 - d. The Schedule of Values and the Progress Schedule updates specified in Section 01 33 00, Submittals, shall be used as the basis for preparing each Application for Payment. The Schedule of Values having sufficient breakdown of materials, labor and installation costs may be used as a basis for negotiating the price of changes in the Work.
 - e. Unit price payment items with their associated quantity shall be included in the Schedule of Values. Provide in the Schedule of Values a detailed breakdown of the unit prices when required by the ENGINEER.

1.2 SUBMITTALS

A. Schedule of Values

1. The CONTRACTOR shall submit to the ENGINEER for acceptance a Schedule of Values that allocates cost to each item of the Work.
2. The Schedule of Values shall include an itemized list of Work for each major part of the Contract, for each payment item as listed in the Bid Form.
3. This schedule, when approved by the ENGINEER, shall be used as the basis for the CONTRACTOR's Applications for Progress Payments.
4. Submit the required number of copies of the Schedule of Values to ENGINEER at or before the Pre-construction meeting. The first Application for Payment will not be processed without a Schedule of Values approved by the ENGINEER.
5. When required by the ENGINEER, promptly submit an updated Schedule of Values to include cost breakdowns for changes in the Work, including Change Orders.

1.3 MEASUREMENT

Measurement shall be made in accordance with the Bid Form items and as described in the following sections.

A. Estimate of Quantities

1. The estimated quantities for unit price pay items, as listed in the Bid Form, are approximate only and are included solely for the purpose of comparison of Bids. The ENGINEER does not expressly or by implication agree that the nature of the materials encountered below the surface of the ground or the actual quantities of material encountered or required will correspond therewith, and reserves the right to increase or decrease any quantity or to eliminate any quantity as the ENGINEER may deem necessary in accordance with the Contract Documents. CONTRACTOR shall not be entitled to any adjustment in a unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid unit bid prices as complete and total compensation for any additions or deductions caused by changes or alterations in the Work directed by the COUNTY. Increased or decreased Work involving change orders will be paid for as stipulated in the Contract Documents.

1.4 PAYMENT

- A. Payments to the CONTRACTOR shall be in accordance with Paragraph GC.14 of the General Conditions and the Agreement.
- B. Lump sum price items shall be paid for the actual percentage of Work completed as identified in the approved Schedule of Values as required in Paragraph 1.5.
- C. Unit price items shall be paid in accordance of Paragraph GC.14.c of the General Conditions and the Agreement.
- D. Payment for the Work shall be made in accordance with the Bid Form items as described in the following sections.
- E. Payment Items: The items listed in the Contract Documents refer to the pay items listed on the Bid Form. They constitute all of the pay items for the completion of the Work. Compensation for all such services and materials shall be included in the prices stipulated for the unit price and lump sum pay items listed on the Bid Form.
 - 1. Each lump sum and unit bid price will be deemed to include an amount considered by the CONTRACTOR to be adequate to cover the CONTRACTOR's overhead and profit for each separately identified item.
 - 2. No progress payments will be made by the ENGINEER until the Construction Schedule and the Schedule of Values have been submitted to and approved by the ENGINEER.
 - 3. The CONTRACTOR shall accept in compensation, as herein provided, full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed Work and for performing all Work contemplated and embraced by the Contract, also for all loss or damage arising from weather or other unforeseen conditions which may be encountered during the execution of the Work and until its final acceptance by the ENGINEER, and for all risks of every description connected with the prosecution of the Work, except as provided herein, also for all expenses incurred as a result of the suspension of the Work as herein authorized.
 - 4. The payment of any partial estimate or of any retained percentage, except by and under the approved final invoice, in no way shall affect the obligation of the CONTRACTOR to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.
- F. Eliminated Items: Should any items contained in the Schedule of Values be found unnecessary for the proper completion of the Work contracted, the ENGINEER may

eliminate such items from the Contract, and such action shall in no way invalidate the Contract. No allowance will be made for payment of items so eliminated.

G. Progress Payments:

1. Percentage of Work Complete – At the end of each pay period, the CONTRACTOR's Superintendent or other authorized representative of the CONTRACTOR shall meet with the ENGINEER and determine and agree upon the percentage of the project completed during the pay period.
2. Application for Payment – The CONTRACTOR will then prepare and submit an Application for Payment to the ENGINEER. The ENGINEER will evaluate the Application for Payment, determine the amounts owed, and issue a Recommendation of Payment in such amounts as provided in the Contract Documents. Progress payments shall be made monthly as the Work progresses. All progress invoices and payments shall be subject to correction in the final invoice and payment. The progress payment will be based on invoices prepared by the CONTRACTOR and approved by the ENGINEER for the value of the Work performed, and materials complete in place in accordance with the Contract. Retainage shall be as specified in the Contract Documents. The payment schedule shall be in accordance with the Contract Documents.

H. Final Payment: The CONTRACTOR shall make and the ENGINEER shall approve, as soon as practicable after the completion of the project, a final invoice for the amount of Work performed under the Contract and establish the value of such Work. Final payment shall be made in accordance with the Contract Documents.

1.5 MEASUREMENT AND PAYMENT OF BASE BID ITEMS

Bid Item No. 1 – Mobilization and Demobilization

This item shall include all items necessary to prepare CONTRACTOR onsite for project commencement as well as all items necessary for disassembly at project completion, required bonds, survey stakeout work, and any other work not specifically mentioned to start or finish the project. Measurement and Payment for Bid Item No. 1 will not be measured and shall be paid by lump sum at the Contract price.

Bid Item No. 2 – Demolition, Removal, and Site Restoration

This item includes all materials, labor, equipment, and incidentals required to complete demolition, removal, disposal, and site-restoration activities, including but not limited to the demolition and removal of existing concrete pads, wooden walkways, framing, decking, supports, piles, existing sheds (with debris placed in designated on-site containers), asphalt pavement to the limits indicated, excess or unsuitable soils, and aggregate materials. It also includes the disassembly of the

concrete block wall and loading of blocks onto County-supplied trucks, in coordination with Worcester County.

Furthermore, this item requires coordination with Worcester County for the temporary relocation of bulk containers and the existing compactor equipment on the west side of the site as well as the demolition and removal of the existing compactor equipment on the east side of the site. The Contractor will disconnect and load compactor #1 onto a County-supplied vehicle for reuse. The Contractor will disconnect, move, and temporarily store compactor #2. The Contractor shall ensure safe and timely access for this activity. The Contractor must also perform site restoration and stabilization, including excavation, fine grading, seeding, and installing any necessary erosion and sediment controls. These controls may include temporary swales, geotextiles, pumps, dewatering systems, filtering bags, and road cleaning measures as needed to manage runoff effectively.

All demolition debris must be disposed of at approved offsite facilities, unless otherwise directed (e.g., shed debris disposed of in designated on-site containers, and concrete blocks handled per County instructions). Measurement and payment for Bid Item No. 2 will be made on a lump-sum basis, with no separate measurement. The lump-sum price must include all costs for labor, equipment, materials, removal, disposal, coordination, and incidentals necessary to complete the Work as described above.

Bid Item No. 3 – Site Work, Excavation, Backfill, Soil Testing, and Traffic Control

This item consists of all materials, labor, and equipment to complete Work activities that include but are not limited to, preparation of a traffic control plan, setup and management of traffic control devices along with maintaining access to the public and County personnel, excavation, backfill, compaction, and testing associated with the placement of concrete, forms, aggregates, asphalt, and all other work not specified required to complete the concrete pads and walls specifically covered under Bid Item No. 3. Measurement and Payment for Bid Item No. 3 will not be measured and shall be paid by lump sum at the Contract price.

Bid Item No. 4 – Furnish and Install Cast-in-Place concrete, Appurtenances, and Concrete Testing

This item consists of all materials, labor, and equipment to complete Work activities relating to the furnishing, installation of, and testing associated with the placement of concrete, forms, aggregates, metal fascia, and all other work not specified required to complete the concrete pads and concrete retaining walls as detailed on the contract documents. The Contractor shall coordinate with Worcester County for the installation of the new Marathon trash compactor on the east side of the site as well as the re-installation of the existing Marathon trash compactor on the west side of the site. Worcester County or their representative will furnish and install the new compactor.

Measurement and Payment for Bid Item No. 4 will not be measured and shall be paid by lump sum at the Contract price.

Bid Item No. 5 – Furnish and Install Full-Depth Pavement Section

This item consists of all materials, labor, and equipment to complete Work activities relating to the furnishing and installation of and testing associated with 10” compacted graded aggregate base, 4” 19.0mm base Superpave Asphalt, and 2.5” 9.5mm surface Superpave asphalt, tack coat, compaction, joint milling and all work not specified within Bid Item No. 5 and as detailed on the contract documents. Measurement and Payment for Bid Item No. 5 will be field measured by the inspector and shall be paid by the Square Yard at the Contract price.

Bid Item No. 6 – Furnish and Install 2” Surface Asphalt Mill and Overlay

This item consists of all materials, labor, and equipment to complete Work activities relating to the furnishing and installation of and testing associated with milling 2” of existing asphalt and the placement of 2” of compacted 9.5mm of Superpave surface asphalt, tack coat, joint milling and all work not specified required to complete the mill and overlay as detailed on the contract documents. Measurement and Payment for Bid Item No. 6 will be field measured by the inspector and shall be paid by the Square Yard at the Contract price.

Bid Item No. 7 – Furnish and Install Gravel Pavement

This item consists of all materials, labor, and equipment to complete Work activities relating to the furnishing and installation of and testing associated the placement of gravel pavement and all work not specified required to complete the placement of gravel as detailed on the contract documents. Measurement and Payment for Bid Item No. 7 will be field measured by the inspector and shall be paid by the Square Yard at the Contract price.

Bid Item No. 8 – Electrical Mounting Rack and Electrical Equipment

This item consists of all materials, labor, and equipment to complete Work activities relating to the furnishing, installation, and testing of the equipment mounting rack, electrical equipment, including but not limited to, electrical utility meter, service disconnect switch, and panelboard. Measurement and Payment for Bid Item No. 8 will not be measured and shall be paid by lump sum at the Contract price.

Bid Item No. 9 – Duct Bank

This item consists of all materials, labor, and equipment to complete Work activities relating to the furnishing and installation of the duct banks identified in the Contract Documents including but not limited to spacers, conduits, conductors, warning tape, concrete or sand, backfill, and duct bank markers. Measurement and Payment for Bid

Item No. 9 will be field measured by the inspector and shall be paid by the linear foot at the Contract Price.

Bid Item No. 10 - Electrical Connection and Miscellaneous Electrical Work

This item consists of all materials, labor, and equipment to complete Work activities relating the electrical connections to the shed, compactor #1, compactor #2, and site lighting. This item will also include furnishing and installation of site lighting as identified in the Contract Documents in addition to all other electrical work not explicitly identified in other bid line items. Measurement and Payment for Bid Item No. 10 will not be measured and shall be paid by lump sum at the Contract Price.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

**** End of Section ****

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SECTION 01 33 00 SUBMITTALS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section includes general requirements and procedures related to the CONTRACTOR'S responsibilities for preparing and transmitting submittals to the ENGINEER to demonstrate that the performance of the work will be in accordance with the Contract documents and requirements. Submittals include, but are not limited to, schedules, concrete mix design, erosion and sediment controls, lighting, security camera system, fencing materials, and test results, CONTRACTOR'S Drawings, samples, manuals, methods of construction, and Record Drawings. Other requirements for submittals are specified under applicable sections of the Specifications.

1.2 SUBMITTAL REQUIREMENTS

- A. CONTRACTOR shall submit a written list of materials and equipment that will be purchased giving name, address, and telephone number of supplier, manufacturer, or processor within ten (10) calendar days after the receipt of Notice to Proceed. No material shall be incorporated into the Work until approval of the source has been given by the ENGINEER. Delivery of materials to the contract site prior to approval is made at the CONTRACTOR'S risk and is subject to immediate removal at no cost to the OWNER should it be determined that the source is not acceptable.
- B. Submittals shall be scheduled and coordinated with the ENGINEER and CONTRACTOR'S construction schedule.
- C. A complete submittal schedule and list of required submittals shall be submitted with the first submittal, but not later than 10 calendar days after receipt of the Notice to Proceed. The schedule for submission of submittals shall be arranged so that related equipment items are submitted concurrently. The ENGINEER may require changes to the submittal schedule to permit concurrent review of related equipment. Submittals for each Specification Section shall be submitted in their entirety; partial submittals are not acceptable unless specifically requested by the CONTRACTOR with the ENGINEER'S approval of this partial submittal.
- D. Within ten (10) calendar days after the date set forth in the Notice to Proceed for the construction to start, the CONTRACTOR shall prepare and submit for review to the ENGINEER a construction schedule showing the order in which the CONTRACTOR proposes to execute the Work and the dates upon which he proposes to start and complete each major work item. The schedule shall show each major work item with usage of the entire contract time provided in the

Contract, and shall include the dates for submittals, sample testing, approval of materials and CONTRACTOR'S Shop Drawings, and the procurement of materials and equipment. The schedule shall detail the sequence of construction required to maintain continuous operation of the existing transfer station. The construction schedule shall be in chart form showing contemplated completion percentages and arranged to record actual completion percentages at stated intervals. The schedule will outline in detail the proposed equipment, manpower, and production rates necessary to achieve the schedule. The CONTRACTOR shall update the schedule every week with any and all changes, including but not limited to changes in equipment, manpower, and completion dates being annotated.

- E. The ENGINEER may require that the CONTRACTOR furnish additional information and data as required to justify the basis of the schedule.
- F. The accepted construction schedule shall be kept up-to-date as work progresses, including work added by change order, and shall be submitted to the ENGINEER every week and with the request for payment. If the CONTRACTOR fails to submit the required updated schedule within the time prescribed, the ENGINEER may withhold approval of progress payment estimates until such time as the CONTRACTOR submits the required current updated schedule.
- G. The construction schedule shall generally determine the order in which the work is to proceed. However, the ENGINEER may request and authorize minor changes to this schedule whenever such changes are of definite advantage to or necessary for the operations of the OWNER.

1.3 CONTRACTOR'S SHOP DRAWINGS

- A. The CONTRACTOR'S Shop Drawings shall be neat in appearance, legible, and explicit to enable proper review and to ensure compliance with the Contract Documents. They shall be complete and detailed to show fabrication methods and shall include, but not be limited to, assembly and installation details, wiring and control diagrams, catalog data, pamphlets and descriptive literature, and performance and test data. They shall be accompanied by calculations, reports, or other sufficient information to provide a comprehensive description of the structure, machine, or system provided and its intended manner of use. If the CONTRACTOR'S Shop Drawings deviate from the Contract Documents, the CONTRACTOR shall advise the ENGINEER in writing with the submittal and state deviations and the reasons for the deviations with the Contract Documents.
- B. No portion of the work requiring a CONTRACTOR'S Shop Drawing submittal shall be started nor shall any materials be fabricated, delivered to the site, or installed prior to approval by the ENGINEER. Fabrication performed, materials purchased, or onsite construction accomplished that does not conform to approved CONTRACTOR'S Shop Drawings shall be at the CONTRACTOR'S risk. The

OWNER will not be liable for any expense or delay due to corrections or remedies to accomplish conformity.

- C. The review and approval of CONTRACTOR'S Shop Drawings by the ENGINEER shall not relieve the CONTRACTOR from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the CONTRACTOR, and therefore the ENGINEER, will have no responsibility.
- D. Contract work, materials, fabrication, and installation shall conform with approved CONTRACTOR'S Shop Drawings.
- E. Shop Drawings shall show types, sizes, accessories, and layouts, and shall include plans, elevations, sectional views, components, assembly and installation details, and all other information required to illustrate how applicable portions of the Contract requirements will be fabricated and installed. In the case of fixed mechanical and electrical equipment, layout drawings drawn to scale shall be submitted to show required clearances for operation, maintenance, and replacement of parts. This will include manufacturer's catalog data sheets, pamphlets, descriptive literature, installation, and recommended application as required. Shop Drawings for closely related items shall be submitted together. Additional Shop Drawings and information required for electrical equipment shall be listed in appropriate Specification Sections. All equipment in a given Specification Section shall be submitted together.
- F. Manufacturer's catalog, product, and equipment data shall be certified and shall include materials type, performance characteristics, voltage, phase, capacity, and similar information. Wiring diagrams will be provided when applicable. Indicate catalog, model, and serial numbers representing specified equipment. Provide manufacturer's catalog or part number for all equipment. Provide complete component information for all equipment.
- G. When so specified or directed by the ENGINEER, submit proposed method of construction for specific portions of the work for review and approval. This submittal shall include a detailed written description of all phases of the construction operation to fully explain to the ENGINEER the proposed method of construction. If required by the Specifications, submit installation drawings to supplement the description. Review and approval by the ENGINEER will be in accordance with the approval process herein and shall not relieve the CONTRACTOR from his responsibility with regard to fulfillment of the terms of the Contract. All risks associated with the proposed method remain the CONTRACTOR'S responsibility, and therefore the ENGINEER shall have no responsibility. After review and approval, if, in the opinion of the CONTRACTOR, modifications are necessary, submit such modifications in detail, including reasons for the modifications. Modifications shall not be implemented without review and approval by the ENGINEER.

- H. Each CONTRACTOR'S Shop Drawing submitted by the CONTRACTOR shall have affixed to it the following certification statement signed by the CONTRACTOR:

"Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and pertinent data, and I have checked and coordinated each item with other applicable approved drawings and all contract requirements."

- I. With the first submittal, submit a CONTRACTOR'S Shop Drawing submittal schedule listing as nearly as practical, by Specification Section number, all submittals required and the approximate date the submittal will be made. All submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhere thereto:
1. OWNER'S Name
 2. Project name and location
 3. Product identification
 4. Drawing title, drawing number, revision number, and date of drawing revision
 5. Subcontractor's, vendor's, and/or manufacturer's name, address, and telephone number
 6. CONTRACTOR'S certification statement.
- J. For the original submittal and each subsequent resubmittal that may be required, submit six (6) legible prints each of all shop and working drawings, and six copies of catalog data, method of construction, and manufacturer's installation recommendation to the ENGINEER for approval. Three (3) copies of all CONTRACTOR'S Shop Drawings will be returned to the CONTRACTOR.
- K. Each submittal shall be made in accordance with the CONTRACTOR'S Drawings submission schedule. Allow twenty (20) calendar days for checking and appropriate action by the ENGINEER. CONTRACTOR'S Drawings will be returned stamped with one of the following classifications:
1. APPROVED – No corrections, no marks.

2. APPROVED AS NOTED – A few minor corrections. All items may be fabricated as marked without further resubmission. Resubmit a corrected copy to the ENGINEER.
3. REVISE AND RESUBMIT – Minor corrections. Resubmit Drawings as per original submissions with corrections noted. Allow 20 calendar days for checking and appropriate action by the ENGINEER.
4. REJECTED – Requires corrections or is otherwise not in accordance with the Contract Documents. No items shall be fabricated. Allow twenty (20) calendar days for checking and appropriate action by the ENGINEER.

1.4 RECORD DRAWINGS (AS-BUILT DRAWINGS)

- A. The CONTRACTOR shall maintain and keep one record copy of all Contract Documents at the site in good order and annotated to show all revisions made during construction. Such annotations shall be kept current and shall be available to be inspected by the ENGINEER at any time. Failure to maintain current Record Drawings will be cause to delay progress payments. Record Drawings shall be available to the ENGINEER at all times during the life of the Contract. All drawings shall be made a part of the Record Drawings and shall include the following:
 1. Contract Drawings – Annotate or redraft, as required, to show all revisions, substitutions, variations, omissions, and discrepancies made or discovered during construction concerning location and depth of concrete pads, conduits, lighting, and fencing. Revisions shall be made and shown on all drawing views with actual dimensions established to permanent points.
- B. At the completion of the Contract, or at the ENGINEER'S request and before final payment is made, furnish the ENGINEER one set of drawings, of a quality that allows reproductions, of the final Record Drawings (as-builts) reflecting all revisions herein described.
- C. The CONTRACTOR shall be responsible for coordination and cooperation with OWNER'S personnel and shall not permanently seal or bolt any equipment covers or material surfaces until after as-built surveys have been made, and shall assist OWNER'S personnel as required in ascertaining necessary location information.

1.5 HEALTH AND SAFETY PLAN (HASP)

- A. Prepare and submit a site HASP for review and acceptance by the ENGINEER. Acceptance by the ENGINEER is required prior to commencement of onsite activities. The HASP shall comply with appropriate local, state, and federal

requirements. The HASP shall address how the CONTRACTOR will monitor excavation, installation of new electrical systems, and construction of proposed features and determine if additional safety procedures are necessary. The plan shall address how the work will be managed, worker safety, and procedures to notify ENGINEER.

- B. The following is a list of items which, at a minimum, shall be included in the HASP:
1. Key Personnel. Names of key personnel responsible for site health and safety, including a site Superintendent and site Safety Officer. The Safety Officer shall have the authority to stop work if hazardous conditions are encountered. The Safety Officer shall have management and supervisor training as required. The Superintendent may serve as the Safety Officer if he has the required training. The Safety Officer shall be onsite during excavation activities.
 2. Site Assessment. An assessment of the site health and safety hazards as related to all onsite activities. Physical and biological hazards shall be addressed. Potential physical hazards include slips, trips, falls, heavy equipment hazards, excavation hazards, electrical hazards, and heat and cold stress.
 3. Emergency Response Plan. This Plan shall address the action required to safely and effectively deal with emergency situations, which may occur during construction activities. At a minimum, the Emergency Response Plan shall address the following list of items:
 - a. Personnel Roles
 - b. Emergency Recognition and Prevention
 - c. Evacuation Procedures and Routes
 - d. Emergency Equipment
 - e. Emergency Medical Treatment.
 4. Site Monitoring Plan. This Plan shall address air monitoring and personnel monitoring and potential onsite environmental sampling including monitoring equipment maintenance and calibration requirements. A list of hazardous (toxic and flammable) substances that may be encountered onsite and their respective permissible exposure limits shall be included in the site HASP.
 5. Revisions to the HASP. The CONTRACTOR may be required to revise the HASP under certain conditions to meet more or less stringent requirements in the event additional contamination is discovered. Any revisions to the HASP shall be reviewed and accepted by the ENGINEER.

6. CONTRACTOR Responsibilities: The CONTRACTOR shall assume total responsibility for the development, implementation, and enforcement of the Health and Safety Plan and for protection of all onsite personnel's safety, health and welfare and in no way places these responsibilities, partially or in whole, on the ENGINEER, OWNER, or any other onsite personnel.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

**** End of Section ****

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SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section includes requirements for cleanup, restabilization, and restoration, as required to prevent accidents to personnel, and OWNER employees, to protect all work in place, restabilize and restore all disturbed areas, removal of all evidence of construction activities, and to effect completion of the Contract in an orderly manner.

1.2 CLEANUP

- A. Construction cleanup shall proceed as construction progresses and shall consist of the removal of all mud, oil, grease, soil, gravel, trash, scrap, debris, and excess materials that are unsightly or may cause the tripping or sliding of workmen, ladders, or equipment. Remove water from floor areas where electrical power tools are to be used and prevent stains on concrete which will be exposed in the finished work. All cleaning materials and equipment used shall be selected and employed with care to avoid scratching, marring, defacing, staining, or discoloring the surfaces cleaned.
- B. Immediately prior to the CONTRACTOR'S written request for a final inspection of the Contract Work or any portion thereof, perform final cleanup.
- C. In addition to the normal "broom clean" requirements, the exposed surfaces of the following materials shall be cleaned as listed herein:
 - 1. Exposed slabs – Wash, scrape, and scrub, using a detergent, as necessary, to remove bond breaker, dirt, and discolorations.
 - 2. Asphalt paving – Remove mud, dirt, and trash; and hose down as required.
 - 3. Other surfaces – Remove all blemishes, leave clean, uniform, and dust free.
 - 4. Premises and site – Removal all trash, debris, surplus excavated material.
- D. No items shall remain on or be discarded on this site, or any other OWNER'S site. Items and excess materials that are to be discarded shall be removed at the CONTRACTOR'S expense. Leave premises orderly and "broom clean."

1.3 RESTORATION AND RESTABILIZATION

- A. All areas disturbed by the CONTRACTOR'S operation shall be restored and restabilized as specified herein. This shall include, but not be limited to, staging and excavation areas, construction strips, access to roads, and all areas within the limit of work.
- B. Final restoration and restabilization shall proceed in accordance with the construction schedule. This shall include seeding and sodding areas disturbed during the construction of the pumping station, disassembly and removal of all temporary construction facilities constructed by the CONTRACTOR, and the site left in an orderly and restored condition as required by the Contract Documents.
- C. Preserve existing site features, (such as signs, markers, guard rails, and fences), and maintain in their existing locations and condition unless written permission is obtained from the ENGINEER for their removal and restoration or replacement. Remove existing site features that conflict with construction operations and store in a manner to keep them clean and in their existing condition. Restore to their locations and existing conditions before removal, or install to new locations as directed. Repair or replace damaged items when directed, at no cost to the OWNER.
- D. Gravel surfaces and access road shoulders shall be restored as near as practicable to their condition prior to being disturbed. Do not reuse shoulder material if contaminated by foreign material. In such place, replace with new material of same quality and gradation. Materials and methods of construction shall be in accordance with specification requirements and with applicable permits secured for this Contract.

1.4 DISPOSAL OF WASTE AND EXCESS MATERIALS

- A. Construction waste and excess construction materials shall be disposed of at the CONTRACTOR'S expense.
- B. Waste and excess material disposed of in an unauthorized area shall be removed by the CONTRACTOR and the area shall be restored as near as practicable to its condition before disturbance, at no cost to the OWNER.

1.5 REMOVAL OF CONDEMNED MATERIAL

- A. Material delivered to the contract site, which has been determined by the ENGINEER to be unsuitable or not in accordance with the Contract Documents, shall be removed from the work site and disposed of at no cost to the OWNER.

PART 2 PRODUCTS

2.1 MATERIALS FOR RESTORATION

- A. Topsoil: Onsite topsoil or topsoil brought from offsite and which meets the requirements of MSHA Section 920.01.02. Topsoil shall only be provided for the permanent improved areas and shall be placed in six (6) inch (minimum) layers.
- B. Seed for Restoration
 - 1. Unless otherwise specified herein, seed shall be certified by the Maryland Department of Agriculture and shall conform to requirements of Maryland Seed Law and Regulations.
 - 2. Provide seed mix in accordance with the “2011 MD Standards and Specifications for Erosion and Sediment Control.” Sowing of seed shall be conducted during the periods in accordance with the “2011 MD Standards and Specifications for Erosion and Sediment Control.” Seeding shall not be done outside of these dates without prior approval of the ENGINEER.
- C. Fertilizer for Restoration
 - 1. The CONTRACTOR will submit soil samples to an approved soils testing laboratory for fertilizer recommendations. Recommendations shall be submitted to and approved by the ENGINEER before implementation.
 - 2. Fertilizer shall be uniform in composition, free flowing and delivered to the site fully labeled according to applicable State fertilizer laws and shall bear the name, tradename or trademark, and warranty of the producer. Fertilizer shall be in accordance with the “2011 MD Standards and Specifications for Erosion and Sediment Control.”
- D. Lime for Restoration: Lime shall be ground limestone containing at least 50% total oxides, calcium oxide plus magnesium oxide. Limestone shall be ground to fineness such that at least 50% will pass through a 100-mesh sieve and 98% to 100% will pass through a 20-mesh sieve. Lime shall be applied as recommended by soil test results.
- E. Mulch for Restoration: Mulch for protection of seeding in restored areas shall conform to the following requirements:
 - 1. Straw shall be clean, weed free, unrotted, applied at a rate of not less than 70 to 90 pounds per 1,000 ft², 1.5 to 2.0 tons per acre, and shall be anchored with one of the following methods: Mulching anchoring tool for flat slopes, mulch nettings, cut back and emulsified asphalt applied five (5) gallons per 1,000 ft², Curasol AH applied five (5) gallons per 1,000 ft²,

Petroset applied per manufacturer's recommendations, RMH Plus Tackifier applied per manufacturer's recommendations, or other equivalent binding solutions. Increase application rate on slopes eight (8) feet or more high as recommended by the manufacturer.

2. Straw erosion control blanket shall be placed in all channel beds that are to be grass lined. Erosion control blankets shall be Type SC150 as manufactured by North American Green, Evansville, Indiana, or equal. Also, all slopes greater than or equal to 3H:1V shall have type SC150 erosion blanket or equal.
- F. Mulch utilized as temporary protection and stabilization shall conform to the above materials requirements. Rate of application shall be directed by the ENGINEER.

PART 3 EXECUTION

3.1 PERMANENT SEEDING

- A. Place six (6) inches of topsoil on all areas defined as permanent improved areas. Harrow, disc, or otherwise loosen topsoil to a depth of four (4) inches.
- B. Remove objectionable material such as stones (two [2] inches or larger), clods, brush, roots, and trash from the top four (4) inches of soil.
- C. Apply fertilizer and lime at the rates recommended by soil test results and as approved by the ENGINEER. Thoroughly mix into the top four (4) inches. Scarify the area and rake until the surface is leveled to provide a maximum of two (2) inches in variation, and the soil is friable and a uniform fine texture.
- D. Apply seed mixture uniformly with mechanical power driven seeders, mechanical cyclone hand seeders, or hydroseeding equipment. Slurry for hydroseeder may contain seed and fertilizer only. Disc seed one (1) inch into soil in drainage ditch areas. Do not rake, roll, or drag the seedbed in all other areas if hydroseeder is used.
- E. Apply mulch at the rates specified herein, to all other areas.

3.2 TIME RESTRICTIONS

- A. When permanent seeding is specified or directed and seeding is not allowed because of time restrictions specified, utilize one or more of the following methods to prevent erosion and sedimentation until such time as permanent seeding or sodding is allowed:
 1. Place and anchor straw mulch.

2. Apply temporary seeding.
 3. Prepare soil as for permanent seeding and then mulch as specified; overseed during next seasonal seeding period.
 4. Provide other erosion control measures acceptable to the ENGINEER.
- B. Remove straw or wood chips used as temporary mulch or work into subsoil at a minimum depth of six (6) inches prior to initiation of permanent seeding application.

3.3 MAINTENANCE OF SEEDED AREAS

- A. Maintain seeded areas until accepted in writing by the ENGINEER.
- B. Water seeded areas as necessary to maintain adequate moisture in the upper four (4) inches of soil and keep mowed to a height of two (2) to three (3) inches. Do not remove more than one-third (1/3) of the grass leaf during initial mowing.
- C. Inspect seeded areas for failures due to poor vegetative growth, traffic, or equipment damage, weather damage, or erosion. Make necessary repairs promptly.
- D. Provide replacements during the specified planting seasons for areas where repairs are deemed to be necessary by the Inspector at no cost to the OWNER. This shall include repairs and replacements due to erosional or weather-related damage.
- E. If stand of turf is inadequate as determined by the ENGINEER, overseed and fertilize using half of the rates originally applied, or reseed. If stand is over 60% damaged, as determined by the ENGINEER, reestablish following original fertilizer, seed bed preparation, and seeding recommendations.

3.4 FINAL WALK THROUGH

- A. Upon receiving the CONTRACTOR'S written request for substantial completion inspection, the ENGINEER will perform a walk through of the site area with the CONTRACTOR'S and the OWNER'S representative(s). All punchlist items identified by the walk through shall be repaired, replaced, as required to the satisfaction of the ENGINEER. Final payment will not be made until all of the punchlist items are resolved to the satisfaction of the ENGINEER.

**** End of Section ****

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DIVISION 2

SECTION 02 25 00 EXCAVATION, BACKFILL, AND COMPACTION
SECTION 02 74 10 ASPHALT PAVING

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SECTION 02 25 00
EXCAVATION, BACKFILL, AND COMPACTION

PART 1 GENERAL

1.1 DESCRIPTION

- A. Excavation, backfill, and compaction shall include, but not necessarily be limited to, the excavation, backfill, for aggregate placement, compaction for electrical conduits, concrete pads, and other concrete structures in accordance with the Contract Documents.

1.2 QUALITY ASSURANCE

- A. All materials removed from trench excavations and used for backfill will be subject to testing by an approved geotechnical engineer to determine the material's suitability for use as backfill. Additional density testing may be required by the ENGINEER. All materials testing shall be provided at no cost to the OWNER.

1.3 SUBMITTALS

- A. CONTRACTOR shall provide aggregate and soil gradations, Atterberg Limits, grain size, optimum compaction, moisture content, and classifications as required to verify conformance to Unified Soil Classification System (USCS). Provide 20-pound bag sample to ENGINEER for approval.

PART 2 PRODUCTS

2.1 MATERIALS FURNISHED BY THE OWNER

- A. The OWNER will not furnish any materials for trench backfill other than those materials which are available from the trench excavation limits as shown on the Standard Details and the Contract Documents.

2.2 DETAILED MATERIAL REQUIREMENTS

- A. Material for backfills may be from onsite excavations (if of proper quality) or from borrow sources. The material shall be free from organic material, sludge, grit, trash, muck, roots, logs, stumps, excess moisture or frozen material and other deleterious substances. Except as otherwise specified for pipe backfill below or approved by County and ENGINEER, the material shall not contain rocks or lumps larger than four (4) inches in greatest dimension. The material shall not contain mica in quantities, which in the judgment of the OWNER are sufficient to affect compaction characteristics. Materials having a maximum dry density of less than one hundred (100) pounds per cubic foot (AASHTO T 180) shall not be used

unless specifically approved in writing by the OWNER. Cinders, ashes, rubble, and construction debris shall not be used in the work. The use of any soil additive that in the judgment of the OWNER may adversely affect the proposed utility is strictly prohibited.

1. Use and Ownership of Excavated Material

- a. All suitable material excavated from utility trenches shall be used, as far as practicable, for backfill in trenches if meeting classification defined in these specifications.
 - b. The CONTRACTOR shall properly store, stockpile, and protect all materials that are to be reused in the work. The CONTRACTOR shall replace, at his own expense, material that was suitable when excavated, which has subsequently become unsuitable because of careless, neglectful, wasteful, or unprotected storage. The CONTRACTOR shall have no property right in any material taken from any excavation and no excavated material shall be wasted or otherwise removed from the project site without permission of the OWNER. All unsuitable and surplus suitable material, as determined by the OWNER, shall be removed from the site and disposed of off-site by and at the expense of the CONTRACTOR in accordance with all applicable Federal, State, and local regulations.
2. If insufficient suitable soils are available from excavation on the contract project, the CONTRACTOR shall submit for approval by the OWNER, borrow excavation sites from which such soils as may be required to complete the construction of excavation backfill on the contract project. CONTRACTOR shall make suitability tests as directed by the OWNER. Borrow material shall be supplied and placed at the contract unit price.
3. Excavation Backfills on rights-of-way, improved easements or supporting pavements or surface loads shall be constructed of material classified by the Unified Soil Classification System as GW, GP, GM, SW, or SP. Soils containing more than twenty (20) percent round rock (Pea Gravel) shall not be acceptable.
4. Excavation Backfills not supporting surface loads or pavements and in unimproved easements shall be constructed of materials listed above or GC, SM, SC, ML, or CL.
5. Backfill for pipe, electrical conduit, and structure installation, bedding and trench backfill shall be existing excavated material if meeting above classification, or other as approved by the OWNER. Backfill around

pipings shall not contain any stones greater than – three-quarter (3/4) inch in any dimension.

PART 3 EXECUTION

3.1 SEDIMENT CONTROL

- A. The CONTRACTOR shall install all required sediment control devices in accordance with the drawings, permits and all applicable Federal, State and local regulations.

3.2 TRAFFIC CONTROL

- A. The CONTRACTOR shall furnish all labor, tools, equipment, and materials required for the maintenance of traffic during construction.

3.3 EXCAVATION

A. General

1. Excavation for the installation of utilities shall be unclassified and shall consist of the excavation removal and/or disposition of all material encountered to the lines, grades, and sections shown on the Plans and/or the Standard Details, as specified, or as directed by the OWNER.
2. Unless otherwise indicated, excavation shall be by open cut, except that short sections of a trench may be tunneled, or the pipeline jacked, if, in the opinion of the OWNER, the pipe can be safely and properly installed.
3. Trenches may be excavated and backfilled either by hand or by machinery. The CONTRACTOR shall have no claims, nor will extra compensation be allowed, for hand excavation or backfill, which may be required by these Specifications or by the OWNER for protection of existing utilities or structures.

B. Protection of Property and Structures

1. The CONTRACTOR shall, at his own expense, sustain in place and protect from direct or indirect injury all existing facilities in the vicinity of the excavation, whether above or below the ground, or that may appear in the excavation. The CONTRACTOR shall be responsible for the implementation of protective measures associated with the presence or proximity of pipes, poles, tracks, walls, buildings, property markers, and other structures and property of every kind and description in or over his trenches or in the vicinity of his work whether above or below the surface

of the ground. The CONTRACTOR shall repair or replace damaged facilities at his expense.

C. Utility Adjustments

1. All adjustments to utilities other than those owned by the OWNER shall be performed by the utility owner.

D. Obstructions

1. It shall be the responsibility of the CONTRACTOR to notify "MISS UTILITY," all municipal and County utilities, all utility line owners, and any other parties affected prior to the beginning of work. It is the CONTRACTOR'S responsibility to reference and maintain the location markings during the construction of the project. In the event that a utility location needs to be re-established by Worcester County, the cost to provide this shall be borne by the CONTRACTOR.

E. Removing Obstruction

1. Should the unforeseen position of any pipe, conduit, or other structure above or below ground be such as, in the opinion of the OWNER, to require its removal, realignment, or change due to the work to be done under the Contract, the work of removal, realignment, or change will be done as a change in the work, or will be done by the owner of the obstructions without cost to the CONTRACTOR; but the CONTRACTOR shall uncover and support the structures in the limits of his trench at his own expense before such removal, and before and after such realignment or change. Whether the obstruction is shown on the Plans or not, the CONTRACTOR shall not be entitled to any claim for damage or extra compensation on account of the presence of said structure or on account of any delay in the removal or rearrangement of the same; however, if said structure is not shown on the Plans, time extension will be allowed if deemed to be warranted by the OWNER.
2. In the event that obstructions would delay the work of pipe installation, the CONTRACTOR may, with OWNER approval, be permitted to leave a gap in the work and return to fill the gap after the obstructions have been removed. The installation shall be completed by laying full pipe lengths and appropriate closure pieces.
3. The CONTRACTOR shall not interfere with any persons, firms, or corporations or with the OWNER in protecting, removing, changing or replacing pipes, conduits, poles, or other structures.

4. In the event that the OWNER has entered into any agreement with an affected utility owner or owners which will have an effect on the operations or financial responsibilities of the CONTRACTOR, the requirements of these agreements will be included in the Special Provisions of the Contract.

F. Change of Excavation Location

1. In the event the OWNER directs that the location of an excavation to a reasonable extent from that proposed on the drawing on account of the presence of an obstruction, or from other cause, or if a changed location shall be paid as allowed in the General Conditions upon the CONTRACTOR'S request as approved, the CONTRACTOR shall not be entitled to extra compensation or to a claim for damages, provided that the change is made before the excavation is begun.
2. If, however, such change, made at the direction of the OWNER involves the abandonment of excavation already made, such abandoned excavation together with the necessary backfill, will be considered extra work and the CONTRACTOR shall be compensated accordingly. In the event that the trench is abandoned in favor of a new location, at the CONTRACTOR'S request, the abandoned excavation and backfill shall be at the CONTRACTOR'S expense.
3. If an obstruction shall lie within the trench in such manner that the trench has to be excavated to extra width in order that sheeting or bracing may be properly placed, or in order that a structure to be placed in the trench may be properly built, such extra width of trench shall be classed as miscellaneous excavation. No sloping of sides of excavation, however, for the purpose of avoiding the necessity of placing sheeting or bracing, either in the presence or absence of obstructions, will be considered as excavation beyond pay limits.

G. Trench Width and Depth

1. Trenches shall be excavated to the necessary width and depth as may be shown on the Plans or Standard Details, as specified in the Special Conditions, or as directed. The trench subgrade shall be such as to provide a uniform and continuous bearing and support for foundations, or conduits solid undisturbed earth for the full length of excavation. Any part of the bottom of the trench excavated below subgrade shall be backfilled with approved material and compacted in accordance with Contract Documents, at no expense to the OWNER.
2. The sides of the trenches shall be practically plumb and under no circumstances will they be permitted to be sloped except with the written

approval of the OWNER. Should the CONTRACTOR elect to slope or cut-back the sides of the trench, no additional payment will be made for extra excavation, backfill, restoration, or contingent items beyond the limits indicated on the Standard Details.

H. Length of Open Trench

1. The CONTRACTOR shall limit trench excavation to what can be opened, constructed, and backfilled in a single working day.
2. All trenches shall be closed at the end of each work day.

I. Responsibility for Condition of Excavation

1. The CONTRACTOR shall be responsible for the condition of all excavations made by him.

J. Excavation Support

1. The support of the excavation and all structures shall be the sole responsibility of the CONTRACTOR.
2. The CONTRACTOR shall support the sides and ends of all excavations wherever necessary with braces, sheeting, shoring or stringers, trench boxes, or other acceptable excavation support systems. All trench support systems shall be installed by men skilled in such work and shall be so arranged that it may be withdrawn as backfilling proceeds, without injury to the utility or structure constructed or to any roadbed, adjacent structure or property. Supporting methods shall be included in CONTRACTOR'S Excavation Plan.
3. Wherever necessary, in running sand, or soft ground, or for the protection of any structure or property, sheeting shall be driven without extra compensation to such a depth below the bottom of the trench as may be required or directed. Where directed by the OWNER to leave sheeting in place, payment will be made under the appropriate contingent item.
4. All work shall be performed in accordance with the latest applicable Federal, State, and local safety and health regulations.

K. Drainage and Dewatering

1. The CONTRACTOR shall grade the site as necessary to prevent surface water ponding or from flowing into the trench or other utility excavations and shall provide all necessary temporary surface drainage and keep the same operating to the satisfaction of the OWNER until permanent

drainage or finished grading and permanent surface stabilization has been completed.

2. It shall be the CONTRACTOR'S responsibility to adequately control water that may be present in the excavation. A National Pollutant Discharge Elimination System (NPDES) permit shall be obtained by the CONTRACTOR to dewater excavations from the Maryland Department of the Environment for the anticipated dewatering period. If flow is more than 10,000 gallons per day or longer than 30 days, an NPDES permit is required. Fees shall be paid by the OWNER.
3. CONTRACTOR shall provide for the disposal of water removed from excavations in such a manner not to cause damage to public or private property or to any portion of the work completed or in progress or cause any impediment to the use of any area by the public; nor shall the CONTRACTOR discharge any flushing or groundwater or any material of any nature into existing sanitary sewer system during the construction of the facilities. All water shall be discharged through an approved sediment control device and under the threshold as required by the Maryland Department of the Environment requiring a groundwater discharge permit.

L. Excavation Below Subgrade

1. The CONTRACTOR shall, without additional compensation, before any pipe or appurtenance is installed, fill all unauthorized depressions or irregularities in the bottom of excavations with aggregate fill.
2. Where the bottom of the excavations, at subgrade, is in unstable or unsuitable material, excavation shall be carried to such depth as ordered by the OWNER. The trench bottom shall be restored to subgrade with aggregate fill.

3.4 BACKFILL

- A. The CONTRACTOR shall backfill as rapidly as practicable after the installation of the utility therein, or after the excavation has served its purpose. No more than one hundred (100) feet of trench may be open at any time except as approved by the OWNER.
- B. Backfill to twelve (12) inches above top of pipe: Suitable material shall be carefully placed around and to a depth of twelve (12) inches over the pipe. These initial lifts shall be carefully placed and hand-tamped in four (4) inch layers. Care should be exercised in this operation to insure that the alignment of the utility is not disturbed.

- C. From twelve (12) inches above top of pipe to top of trench: The remainder of the trench may be backfilled in layers not exceeding the specified compaction lift depths. However, if lift thickness is followed and the specified compaction is not obtained based on the testing during backfilling, the CONTRACTOR shall, at his own expense, remove, replace, and retest as many times as is required to obtain the specified compactions. In backfilling the remainder of the trench, stones of not more than four (4) inches in largest dimension which have been taken out in excavating may be mixed with earth in an amount not exceeding twenty-five (25) percent of the backfill volume. Stones of larger size or in greater quantities shall not be used, unless directed by the OWNER. The CONTRACTOR shall not permit excavations to be used for the disposal of refuse.
- D. In paved areas, the CONTRACTOR shall furnish and backfill the trench as per the requirements of the governing regulatory agency, and/or Contract Documents.
- E. Should additional material be required or deemed unsuitable by the geotechnical engineer for backfilling, the CONTRACTOR shall obtain Borrow material from offsite sources, to complete the trench backfill. If soil removed from the trench is determined to be suitable but too wet for immediate reuse as determined by the geotechnical engineer, the CONTRACTOR may be allowed to replace with approved material at their own expense.
- F. No layer of soil shall be placed on a frozen surface of a preceding layer or on a frozen subgrade.

3.5 COMPACTION

- A. The CONTRACTOR shall, in unimproved areas outside the public rights-of way, compact each backfill layer in such a manner as to obtain a dense backfill free of voids and not susceptible to undue settlement or depression. Backfilled lifts extending to not less than one (1) foot in depth or as approved by the OWNER shall be compacted to at least ninety (90) percent of maximum density at a moisture content within five (5) percent of the optimum in accordance with ASTM D 1556. Perform density testing per ASTM D 6938 Nuclear Density for soils and aggregate. ASTM D 2950 for Bituminous pavement.
- B. Backfill for any improved area beneath aggregates, paving, or concrete specified hereinafter shall be backfilled with suitable material and compacted in lifts not to exceed eight (8) inches in thickness to at least ninety-five (95) percent of maximum density at a moisture content within five (5) percent of the optimum in accordance with ASTM D 1556. All compaction must comply with the aforementioned or the latest edition of the governing applicable road code or permit whichever is most stringent. CONTRACTOR shall hire an independent testing agency to provide suitable Proctor curves for each type of backfill material used in the project. CONTRACTOR'S testing agency shall perform density tests at a rate of one (1) test per every one hundred (100) feet, for each eight (8) inch

lift of material placed. The CONTRACTOR'S independent testing agency shall be subject to approval by the OWNER. Perform density testing per ASTM D 6938 Nuclear Density, ASTM D 2950 for Bituminous pavement.

- C. Insofar as the specifications for mechanical tamping equipment or methods are concerned, no specific requirements are included in these Specifications other than that the use of any particular type of equipment is subject to the approval of the OWNER and that the OWNER has sole right to judge what equipment is suitable for the uses intended.

3.6 MAINTENANCE OF BACKFILLED TRENCH

- A. All backfilled trenches shall be maintained in an acceptable condition by and at the expense of the CONTRACTOR for a period of four months following the date of conditional acceptance of the work. Retainage may be held until the end of this period.
- B. If the CONTRACTOR fails to fill depressions in the backfilled trench within twenty-four (24) hours after the receipt of notice from the OWNER, the OWNER may refill said depressions and the cost thereof shall be retained from any monies due the CONTRACTOR, under the Contract. In case of emergency, the OWNER may refill any dangerous depression or protect with lights wherever necessary without giving previous notice to the CONTRACTOR; and the cost of so doing shall be retained from any monies due to become due the CONTRACTOR under the contract.
- B. The CONTRACTOR shall be responsible for any injury or damage that may result from lack of maintenance of any refilled excavation at any time prior to final acceptance of the Project.

**** End of Section ****

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SECTION 02 74 10

ASPHALT PAVING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Provide Super-pave asphalt pavement according to the materials, workmanship, and other applicable requirements of the Maryland State Highway Administration Standard Specifications for Constructions and Materials. This Section includes the following:
 - 1. Cold milling of existing hot-mix asphalt pavement
 - 2. Hot-mix asphalt patching
 - 3. Hot-mix asphalt paving
 - 4. Pavement-marking paint.

1.2 DEFINITIONS

- A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.
- B. MDOT SHA: Maryland Department of Transportation State Highway Administration.

1.3 SUBMITTALS

1.3.1 Product Data

- A. For each type of product indicated, include technical data and tested physical and performance properties.
 - 1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work
 - 2. Material Certificates: For each paving material, signed by manufacturers
 - 3. Density test results
 - 4. Lab testing results from field sampling
 - 5. Plant print out during production of all types of mixes.

1.4 PROJECT CONDITIONS

1.4.1 Environmental Limitations

- A. Do not apply asphalt materials if subgrade is wet or excessively damp, or if the following conditions are not met:
 - 1. Prime Coat: Minimum surface temperature of 60 degrees Fahrenheit
 - 2. Tack Coats: Minimum surface temperature of 60 degrees Fahrenheit
 - 3. Slurry Coat: Comply with weather limitations of ASTM D3910
 - 4. 19.0 MM Asphalt Base Course: Minimum surface temperature of 40 degrees Fahrenheit and rising at time of placement
 - 5. 9.5 MM Asphalt Surface Course: Minimum surface temperature of 60 degrees Fahrenheit at time of placement
 - 6. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 degrees Fahrenheit for water-based materials, and not exceeding 95 degrees Fahrenheit.

PART 2 – MATERIALS

2.1 AGGREGATES

2.1.1 General

- A. Use materials and gradations that have performed satisfactorily in previous installations.

2.1.2 Coarse Aggregate

- A. See MDOT SHA Specifications.

2.1.3 Fine Aggregate

- A. See MDOT SHA Specifications.

2.2 ASPHALT MATERIALS

2.2.1 Asphalt Binder

- A. See MDOT SHA Specifications.

2.2.2 Asphalt Cement

- A. See MDOT SHA Specifications.

2.2.3 Tack Coat

- A. See MDOT SHA Specifications.

2.3 AUXILIARY MATERIALS

2.3.1 Pavement-Marking Paint

- A. Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 3 minutes.

1. Color: White, Yellow, as indicated.

2.4 MIXES

The Contractor shall provide 12.5 MM Super-pave base course, and 9.5 MM Super-pave surface course in accordance with MDSHA Specification.

PART 3 – EXECUTION

3.1 COLD MILLING

- A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross-sections indicated.
 1. Mill to a depth of 2 inches.
 2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
 3. Control rate of milling to prevent tearing of existing asphalt course.
 4. Repair or replace curbs, manholes, and other construction damaged during cold milling.
 5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
 6. Transport milled hot-mix asphalt to asphalt recycling facility.
 7. Keep milled pavement surface free of loose material and dust.

3.2 PATCHING

3.2.1 Hot-Mix Asphalt Pavement

- A. Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

3.2.2 Portland Cement Concrete Pavement

- A. Break cracked slabs and roll as required to reseal concrete pieces firmly.
 - 1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseal pieces firmly.
 - 2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

3.2.3 Tack Coat

- A. Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gallon per square yard.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.2.4 Patching

- A. Fill excavated pavements with 12.5 MM Super-pave base course in required maximum lifts for full thickness of patch and, while still hot, compact flush with adjacent surface. Follow with 9.5 MM Super-pave surface course per plan detail, finished flush with existing pavement.

3.3 HOT-MIX ASPHALT PLACEMENT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross-section, and thickness when compacted.

1. Place 19.0 MM Super-pave base course in number of lifts and thicknesses indicated in plan detail for type of mix.
 2. Place 9.5 MM Super-pave base course in single lift per plan detail.
 3. Spread mix at minimum temperature of 275 degrees Fahrenheit.
 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
1. Clean contact surfaces and apply tack coat to joints.
 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for "Resumption of Paving Operations."
 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

3.5.1 General

- A. Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

- 1. Complete compaction before mix temperature cools to 185 degrees Fahrenheit.

3.5.2 Breakdown Rolling

- A. Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

3.5.3 Intermediate Rolling

- A. Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

- 1. Average Density: 96 percent of reference laboratory density according to ASTM D6927, but not less than 94 percent nor greater than 100 percent.
 - 2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D2041, but not less than 90 percent nor greater than 96 percent.

3.5.4 Finish Rolling

- A. Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

3.5.5 Edge Shaping

- A. While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

3.5.6 Repairs

- A. Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

3.5.7 Protection

- A. After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- B. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

3.6.1 Pavement Thickness

- A. Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Base Course: Plus or minus $\frac{1}{2}$ inch
 - 2. Surface Course: Plus $\frac{1}{4}$ inch, no minus.

3.6.2 Pavement Surface Smoothness

- A. Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: one-quarter $\frac{1}{4}$ inch
 - 2. Surface Course: $\frac{1}{8}$ inch
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is $\frac{1}{4}$ inch.

3.6.3 Traffic-Calming Devices

- A. Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus $\frac{1}{8}$ inch of height indicated above pavement surface.

3.7 PAVEMENT MARKING

Do not apply pavement-marking paint until layout, colors, and placement have been verified with the ENGINEER. Allow paving to age for thirty (30) days before starting pavement marking. Sweep and clean surface to eliminate loose material and dust. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mil. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 pounds per gallon.

3.8 DISPOSAL

Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill. Do not allow milled materials to accumulate onsite.

+ + END OF SECTION + +

DIVISION 3

SECTION 03 10 00	CONCRETE FORMING AND ACCESSORIES
SECTION 03 20 00	CONCRETE REINFORCING
SECTION 03 30 00	CAST-IN-PLACE CONCRETE

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SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work to be furnished under this Section includes, but is not limited to the designing, furnishing, fabricating, erecting, and bracing required for the various concrete work on the site.

1.2 SUBMITTALS

- A. The CONTRACTOR shall prepare and submit for approval complete detailed plans of all formwork to be constructed. Submittals shall be in accordance with Section 01 33 00 of these Specifications. He shall not proceed with formwork construction until his plans have been approved. This requirement may be waived for minor foundations (less than one [1.0] cubic yard) only upon receipt of written approval from the ENGINEER. However, approval of these plans or lack thereof shall not relieve the CONTRACTOR of complete responsibility for the safety and adequacy of all formwork.

1.3 DESIGN CRITERIA

- A. Forms shall be designed in accordance with American Concrete Institute (ACI) 347 and such that the forms can be removed without injuring the concrete. The design and engineering of the formwork shall be the responsibility of the CONTRACTOR.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Forms for concrete work shall conform to ACI Standard 318 and shall be constructed of wood, steel, or other approved materials. Surfaces of forms shall be free from irregularities, dents and sags. Lumber used in forms shall be dressed to a uniform thickness, evenly matched and free from loose knots and other imperfections that would produce defects in the finished concrete surfaces. The CONTRACTOR may elect to employ prefabricated forms, upon prior approval as to both type and material, for concrete walls and structures. In either case a plain smooth surface of the desired contour must be obtained. For surfaces to be given a rubbed finish the material shall be heavy plywood unless otherwise specifically approved. For curved or special surfaces the above requirements may be modified.

- B. Form surfaces in contact with concrete shall be treated with an effective bond-breaking form coating, in accordance with Section 3.4 of ACI 347. Forms shall be designed to permit easy removal. Prying against the face of the concrete will not be allowed. Only wooden wedges shall be used.
- C. Plywood forming shall be B-B Plyform Class 1 Exterior, as manufactured and specified by the American Plywood Association.
- D. Form ties, spreaders, and other form accessories shall be commercial brands of standard manufacture. Form ties and accessories shall be of such design that upon removal of forms, no metal shall be less than one and a half (1-1/2) inch from the surface of concrete. All tie holes shall be filled entirely.

PART 3 EXECUTION

3.1 FABRICATION AND ERECTION

- A. The form material shall be placed so a smooth surface free from irregularities is obtained. Sheets of material shall be placed so that joints are in regular and true horizontal and vertical lines. Full sized plywood sheets shall be used except where a single smaller piece will cover an entire area. Where form lining is used it will be used in pieces as large as possible. All joints shall be solidly backed, butted tight together and sealed with white lead paste or other approved crack fillers. All holes shall be filled as well as depressions or hammer marks so that the completed surface is as smooth as possible. When steel forms are used the panels shall be as large as practical and of sufficient gage to prevent surface irregularities. Panels shall be assembled in uniform patterns and firmly locked and braced together to form a smooth surface. Bent or irregular panels will not be used. Round fiber column forms shall be furnished full height and shall be fitted with circular wooden templates at top and bottom and with wooden collars at intermediate points. Fiber forms shall be removed no later than ten (10) days after pouring.
- B. All lumber shall be free from knotholes, loose knots, cracks, splits, warps, or other defects impairing the strength or the appearance of the finished structure.
- C. The forms shall be built true to line and braced in a substantial and unyielding manner. They shall be mortar tight and shall be thoroughly soaked with water to close cracks due to shrinkage.
- D. Dimensions affecting the construction of subsequent portions of the work shall be carefully checked after the forms are erected and before any concrete is placed. The interior surfaces of the forms shall be adequately oiled, greased, or soaped to ensure nonadhesion of mortar. Form plywood and/or lumber which is used a second time shall be free from bulge, warp or damage and shall be thoroughly cleaned. The forms shall be inspected immediately preceding the placing of

concrete and any defects shall be remedied and all dirt, sawdust, shavings, or other debris within the forms shall be removed.

- E. Blocks and bracing shall be removed with the forms and in no case shall any portion of the wood forms be left in the concrete. Special attention shall be paid to the ties and bracing and when forms appear to be insufficiently braced or unsatisfactorily built, before or during construction, the work will be ordered stopped until the defects have been corrected. The forms shall be so constructed that the finished concrete shall be of the form and dimensions shown on the plans and true to line and grade.
- F. Securely install in the formwork required inserts, anchors, sleeves, and other items specified under other sections or as shown on the Contract Drawings. Wherever practicable, securely fasten embedded items to reinforcing steel.
- G. Set edge forms and screed to produce the indicated elevations and contours, and secure to prevent displacement during placing and consolidation of concrete.
- H. Construct formwork so as to result in concrete surfaces conforming to the tolerances specified herein.
- I. Concrete Tolerances
 - 1. Variations from the plumb:
 - In any 10 ft of length.....1/4 in.
 - Maximum for entire length 1 in.
 - 2. Variation from the level or from the grades indicated on the drawings.
 - In any 10 ft of length.....1/4 in.
 - In any bay or in any 20 ft of length....3/8 in.
 - Maximum for entire length 3/4 in.
 - 3. Variation of linear building lines from
 - Established position in plan 1/2in.
 - 4. Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls.
 - Minus 1/4 in.
 - Plus.....1/4 in.

5. Footings:

- a. Variation in dimensions in plan, when formed.

Minus 1/2 in.

Plus.....2 in.

- b. Variation in dimensions in plan against unformed excavation.

Minus 1/2 in.

Plus.....3 in.

3.2 REMOVAL OF FORMS, FALSEWORK, AND CENTERING

- A. Unless earlier removal is approved by the ENGINEER, maintain forms, falsework and centering in place until the concrete has attained the minimum of forty (40) percent of specified design strength.
- B. Do not disturb or remove forms until the concrete has hardened sufficiently to permit form removal with complete safety.
- C. Do not remove shoring until the member has acquired sufficient strength to support its own weight, the load upon it, and the added load of construction.
- D. Do not strip floor slabs in less than two (2) days.
- E. Do not strip vertical concrete in less than seven (7) days.

** End of Section **

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work to be performed under this Section includes, but is not limited to the furnishing, fabricating, bending and placing of all steel reinforcement as shown on the Contract Drawings and as specified herein.
- B. Details of concrete reinforcement and accessories not included in this Section shall be in accordance with American Concrete Institute (ACI) 315-80.

1.2 RELATED WORK SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS

- A. Section 03 10 00, Concrete Forming and Accessories.

1.3 SUBMITTALS

- A. Shop drawings are required for all reinforcement and shall be in accordance with Section 01 33 00, as well as ACI 315-80, manual of standard practice for detailing concrete structures.
- B. Furnish certified copy of mill tests on each heat, showing chemical and physical analysis.

PART 2 PRODUCTS

- A. Reinforcing bars shall be new, intermediate grade billet steel, deformed, of domestic manufacture and in accordance with ASTM Designation A 615, Grade 60. Bars shall be of the sizes, shapes, laps, spacings, and clearances as shown on the Contract Drawings and detailed in accordance with the latest applicable provisions of ACI 318 and ACI 315.
- B. Metal accessories shall be in accordance with ACI 315 and shall include spacers, bolsters, chairs, tie bars, support bars, and all other items necessary for the proper support and location of the reinforcement and forms. All metal accessories shall be employed. No metal accessories shall be exposed on the surface of the finished concrete.

PART 3 EXECUTION

3.1 BONDING AGENT

- A. A bonding agent shall be used for:
 - 1. Vertical surfaces of concrete against which new concrete is to be placed.
 - 2. A thin uniform coating of bonding agent shall be brushed onto the prepared surface immediately before placing fresh concrete. Bonding agents shall be mixed by means of a mixer. Any bonding agent not used within thirty (30) minutes of mixing shall be discarded. Bonding agent that has dried shall be removed and replaced prior to placing concrete against it.

3.2 ADHESIVE DOWELS

- A. The CONTRACTOR shall drill holes to the required dimensions, clean holes, place dowel adhesive, and properly position the dowels as specified in the Contract Documents. Core drilling of the dowel holes shall not be permitted.
- B. Steel reinforcement and other existing embedments shall not be cut or damaged by the drilling process. Prior to drilling holes, the CONTRACTOR shall locate existing steel reinforcement using a cover meter, utility ducts, post tensioning hardware, and any unsound concrete in the vicinity of the dowel locations. If any of the above is encountered during drilling operations, the ENGINEER shall be notified immediately.
- C. The CONTRACTOR'S operations shall not cause spalling, cracking, or other damage to the surrounding concrete. Concrete spalled or otherwise damaged by the CONTRACTOR'S operations shall be repaired in a manner acceptable to the ENGINEER. The CONTRACTOR shall clean the holes using compressed air to remove all deleterious material, including dust and debris, and shall dry them prior to placing the dowel adhesive. Holes that are started but not completed shall be cleaned and filled with a proprietary patching material.
- D. The handling and placement of the dowel adhesive shall conform to the manufacturer's written instructions. All excess dowel adhesive shall be struck-off flush with the concrete surface and removed from the surrounding concrete surface area.
- E. Dowels shall be clean and free of deleterious material.
- F. The CONTRACTOR shall maintain dowels in the proper position during the setting of the dowel adhesive and shall prevent the loss of dowel adhesive from the holes.

3.3 FABRICATION

- A. Detailing and fabrication of reinforcement shall be in accordance with the latest editions of ACI 315 and ACI 301.

3.4 DELIVERY, STORAGE, AND HANDLING

- A. Immediately after delivery, reinforcing steel shall be sorted for size, shape, and length or by final usage. Steel shall be handled utilizing equipment and procedures to prevent bending, kinking, or damaging the steel. Reinforcing steel shall be stored on racks clear of the ground to protect it at all times from the weather. Sufficient supports shall be used to prevent damage to the steel.

3.5 PLACING

- A. Only material free from loose rust, scale, grease, or other adhering substances shall be placed in the forms. It shall be placed in exact positions and spacing shown. Spacing between forms and bars shown shall be maintained. Securely fasten in position so materials do not become displaced during placing of concrete. Cleaning, bending, placing, and splicing of reinforcement shall be done in accordance with requirements of the Contract Drawings and approved shop drawings. Mesh reinforcement in slabs shall have sides and ends lapped not less than one mesh. All mesh in slabs on grade shall be placed in top half of slabs.

3.6 CLEAR COVER

- A. All reinforcement shall have a clear cover measured from the outside of the bar to the concrete surface as listed below, unless otherwise noted on Contract Drawings.
 - 1. Concrete deposited against the ground shall be three (3) inches.
 - 2. Formed surfaces exposed to weather or in contact with the ground or process liquid shall be two (2) inches.
 - 3. Tops of Slabs
 - a. #6 through #18 bars shall be two (2) inches
 - b. #5 Bar, W31 or D31 wire and smaller one and one-half (1-1/2) inches.

3.7 SPLICING

- A. Where single lengths of bars are not available, shorter bars may be used. Splices shall overlap as shown on drawings or as specified in ACI 318 and ACI 315. Locations of splices are to be approved by ENGINEER.

3.8 INSERTS AND FASTENING DEVICES FOR OTHER WORK

- A. The CONTRACTOR shall provide for installation of inserts, conduit, pipe sleeves, drains, hangers, metal ties, anchors, bolts, angle guards, and other fastening devices required for attachment of other work. Reinforcing shall be properly located in cooperation with other trades and secured in position before concrete is poured.
- B. Sufficient time between erection of forms and placing of concrete shall be given to various trades to permit proper installation of their work. See Contract Drawings and other sections of these Specifications for extent, location, and details of items to be embedded or placed in concrete.
- C. All sleeves, chases, inserts, hangers, etc., which are provided and placed in forms by various trades shall be maintained in position and protected until concreting is completed.

3.9 INSPECTION

- A. All reinforcement shall be subject to inspection by the ENGINEER after placement in the forms. Approval of ENGINEER shall be obtained prior to pouring concrete.

**** End of Section ****

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified and required to furnish and install cast-in-place concrete curbing and concrete associated with bollards.
2. Work associated with the installation of the cast-in-place reinforced concrete wall and pads are to meet the specifications found on the Contract Drawings.

B. Coordination

1. Review installation procedures under other sections and coordinate the installation of items that must be installed in the concrete.

1.2 QUALITY ASSURANCE

A. Reference Standards

1. Comply with the applicable provisions and recommendations of the following, except as otherwise shown or specified.
 - a. American Concrete Institute (ACI) 301, Specifications for Structural Concrete for Building (includes ASTM Standards referred to herein except ASTM A 36).
 - b. ACI 347, Recommended Practice for Concrete Formwork.
 - c. ACI 304, Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
 - d. ASTM A 36, Structural Steel.
 - e. Maryland Department of Transportation Specification Section 918, Cement Concrete Mixture.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All materials used for concrete must be kept clean and free from all foreign matter during transportation and handling and kept separate until measured and placed in the mixer. Bins or platforms having hard clean surface shall be provided for storage. Suitable means shall be taken during hauling, piling and handling to ensure that segregation of the coarse and fine aggregate particles does not occur and the grading is not affected.
- B. Deliver concrete reinforcement materials to the site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement
 - 1. ASTM C 150, Type II.
- B. Aggregates
 - 1. ASTM C 33.
 - a. Fine Aggregate: Clean, sharp, natural sand free from loam, clay, lumps or other deleterious substances. Dune sand, bank run sand and manufactured sand are not acceptable.
 - b. Coarse Aggregate: ASTM C 33 Clean, uncoated, processed aggregate containing no clay, mud, loam, or foreign matter, as follows:
 - i. Crushed stone, process from natural rock or stone,
 - ii. Washed gravel, either natural or crushed. Use of slag and pit or bank run gravel is not permitted.
 - c. Coarse Aggregate Size: Size to be ASTM C 33, Nos. 57 or 67, unless permitted otherwise by ENGINEER.
 - d. Water: Clean, potable.
 - e. Air-Entraining Admixture: ASTM C 260.

- f. Water-Reducing Admixture: ASTM C 494, Type A. Only use admixtures which have been tested and accepted in mix designs.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60.

PART 3 EXECUTION

3.1 INSPECTION

- A. CONTRACTOR shall examine the conditions under which concrete is to be placed, and notify ENGINEER in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.2 FORMWORK

- A. Construction so that concrete members and structures are correct size, shape, alignment, elevation and position, complying with ACI 347.
- B. Clean and adjust forms prior to concrete placement. Apply form release agents or wet forms, as required. Retighten forms during and after concrete placement if required to eliminate leaks.

3.3 REINFORCEMENT, JOINTS, AND EMBEDDED ITEMS

- A. Comply with the applicable recommendations of specified codes and standards, and Concrete Reinforcing Steel Institute (CRSI), Manual of Standard Practice, for details and methods of reinforcement placement and supports.
- B. Clean reinforcement to remove loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.
- C. Position, support, and secure reinforcement against displacement during formwork construction or concrete placement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 1. Place reinforcement to obtain the minimum concrete coverages as shown and as specified in ACI 318. Arrange, space, and securely tie bars and bar supports together with sixteen (16) gage wire to hold reinforcement accurately in position during concrete placement operations. Set with ties so that twisted ends are directed away from exposed concrete surfaces.

2. Reinforcing steel shall not be secured to forms with wire, nails or other ferrous metal. Metal supports subject to corrosion shall not touch formed or exposed concrete surfaces.
- D. Concrete shall not be placed until the reinforcing steel is inspected and permission for placing concrete is granted by ENGINEER. All concrete placed in violation of this provision will be rejected.
- E. Installation of Embedded Items: Set and building into the Work anchorage devices and embedded items required for other Work that is attached to, or supported by cast-in-place concrete.

3.4 CONCRETE AND PLACEMENT

- A. Concrete Curbing: Proportioning and Design of Mix – MDOT SHA Mix No. 3:
 1. Minimum compressive strength at 28 days: 3,500 psi.
 2. Maximum water cement ratio by weight: 0.50.
 3. Minimum cement content: 580 pounds per cubic yard.
 4. Use air-entraining admixture in all concrete: provide a minimum of five (5) percent, and up to a maximum of 8 percent air for concrete exposed to freezing and thawing.
 5. Calcium Chloride: Do not use calcium chloride in concrete, unless otherwise authorized in writing by ENGINEER. Do not use admixtures containing calcium chloride.
 6. Slump Limits: At point of placement, not less than two (2) inches and not more than five (5) inches.
- B. Bollard Concrete: Proportioning and Design of Mix – MDOT SHA Mix No. 13.
 1. Minimum compressive strength at 28 days: 4,000 psi.
 2. Maximum water cement ratio by weight: 0.45.
 3. Minimum cement content: 615 pounds per cubic yard.
 4. Use air-entraining admixture in all concrete: provide five (5) percent plus or minus 1 percent entrained air for concrete exposed to freezing and thawing, and from two (2) percent to four (4) percent for other concrete.

5. Calcium Chloride: Do not use calcium chloride in concrete, unless otherwise authorized in writing by ENGINEER. Do not use admixtures containing calcium chloride.
 6. Slump Limits: At point of placement, not less than two (2) inches and not more than five (5) inches.
- C. Job-Site Mixing: Use drum type batch machine mixer, mixing not less than one and a half (1-1/2) minutes for one (1) cubic yard or smaller capacity. Increase mixing time at least fifteen (15) seconds for each additional cubic yard or fraction thereof.
 - D. Ready-Mixed Concrete: ASTM C 94.
 - E. Concrete Placement: Comply with ACI 304, placing concrete in a continuous operation within planned joints or sections. Do not begin placement until work of other trades affecting concrete is completed.
 - F. Consolidate placed concrete using mechanical vibrating equipment with hand rodding and tamping, so that concrete is worked around reinforcement and other embedded items and into all parts of forms.
 - G. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placement, and curing.
 1. In cold weather comply with ACI 306.
 2. In hot weather comply with ACI 305.

3.5 QUALITY OF CONCRETE WORK

- A. Make all concrete solid, compact and smooth, and free of laitance, cracks and cold joints.
- B. Cut out and properly replace to the extent ordered by ENGINEER, or repair to the satisfaction of ENGINEER, surfaces which contain cracks or voids, are unduly rough, or are in any way defective. Patches or plastering will not be acceptable.
- C. Repair, removal, and replacement of defective concrete as ordered by ENGINEER shall be at no additional cost to OWNER.

3.6 CURING

- A. Curing: Begin initial curing as soon as free water has disappeared from exposed surfaces. Keep continuously moist for not less than seventy-two (72) hours. Continue curing use of moisture-retaining cover or membrane-forming curing

compound. Cure formed surfaces by moist curing until forms are removed.
Provide protections as required to prevent damage to exposed concrete surfaces.

3.7 FINISHES

- A. Exposed to View Surfaces: Provide a smooth finish for exposed. Remove fins and projections, patch defective areas with cement grout, and rub smooth.

**** End of Section ****

DIVISION 26

SECTION 26 00 00	ELECTRICAL GENERAL
SECTION 26 05 01	CONDUCTORS AND CABLES
SECTION 26 05 26	ELECTRICAL GROUNDING
SECTION 26 05 33	CONDUITS AND RACEWAY SYSTEMS
SECTION 26 05 53	IDENTIFICATION FOR ELECTRICAL SYSTEMS
SECTION 26 28 00	PANELBOARDS AND CIRCUIT PROTECTION DEVICES
SECTION 26 29 13	MOTOR CONTROLLERS
SECTION 26 50 00	LIGHTING

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SECTION 26 00 00
ELECTRICAL GENERAL

PART 1 GENERAL

1.1 SUMMARY

This Section includes general requirements for all electrical work. The Contractor shall furnish and install all materials, equipment, and appurtenances necessary for a complete and satisfactory installation of the electrical systems. The Contractor shall coordinate all electrical work required for the project. The Contractor shall provide the correct electrical feeder or branch circuit to each piece of electrical equipment whether or not shown on the drawings and check and coordinate feeder, branch circuit, and controls required with equipment provided under other specification sections.

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers (IEEE)
- B. National Fire Protection Association (NFPA)
- C. Underwriters Laboratories, Inc. (UL)
- D. National Electrical Manufacturers Association (NEMA)
- E. American Society of Testing Materials (ASTM)
- F. Association of Illuminating companies (AEIC)
- G. Insulated Cable Engineers Association (ICEA)

1.3 SUBMITTALS

- A. Submittals shall include the following information: manufacturer's name, trade name, place of manufacture, catalog model number, complete part number, nameplate data, size, layout dimensions, capacity, project specification, and paragraph reference.
- B. Shop Drawings: Submit shop drawings in accordance with the General Conditions, the Supplementary Conditions, Section 01 33 00 Submittals, and Section 26 00 00 Electrical General. Organize similar items into a single submittal that includes wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Shop drawings shall be specific for this project. Shop drawings which provide only generic information or are of a generic nature are not sufficient. Information within the shop drawings shall be clearly marked to identify components applicable for this project. Non-applicable information shall be noted, or neatly crossed out.
- C. Manufacturer's Catalog Data: Shop drawings shall include manufacturer's published literature and catalog data for each manufactured item. Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog data sheets. Submittal shall include ratings, circuit diagrams, and dimensional data as a minimum.
- D. Materials List: The Contractor shall submit, along with Shop Drawings, a materials list which shall include full information, including manufacturer's complete part number, regarding all

components of the equipment. Materials of construction shall be presented in the listing by ASTM reference and grade.

- E. Nameplate Information. Submit complete nameplate information for all industrial machinery. The nameplate shall include the following information:
1. Supply voltage, number of phases, frequency, and full-load current.
 2. Maximum ampere rating of the short-circuit and ground-fault protective device
 3. Ampere rating of largest motor, from the motor nameplate, or load
 4. Short-circuit current rating of the machine industrial control panel. Short-circuit current rating shall be based on the short-circuit current rating of a listed and labeled machine control enclosure or assembly. Or the short-circuit current rating shall be as established utilizing an approved method.
 5. Electrical diagram number, or the number of the index to the manufacturer's electrical drawings.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Manual. Prepare operation and maintenance manuals. Submit one manual for review; then submit the remainder (quantity to be agreed between owner and contractor in advance). Include one copy of the following:
1. Copy of all relevant, and previously reviewed shop drawings, with all comments addressed.
 2. Record (as-built) drawings, incorporating all field changes and Engineer's comments.
 3. Wiring diagrams incorporating all field changes and Engineer's comments.
 4. Manufacturer's instructions on care, operation, and maintenance of equipment.
 5. Narrative describing the procedures for equipment startup and operation.
 6. Warranty certificates.
 7. Spare parts list.
 8. Complete type written operating instructions, covering all systems descriptions and operation, emergency operating instructions, and precautions.
 9. Copies and originals of all applicable software certificates showing proof of ownership by the Owner's Representative.
 10. Name, address, and telephone number of supplier or representative of manufacturer for each item of equipment in Contract.

Bind all items (all unused, clean and legible) in common folder or heavy notebook covers and submit to Engineer before request for final acceptance. Provide electronic copy in a format agreed to in advance.

- B. Affidavit of Compliance. The manufacturer shall provide an affidavit stating compliance of their equipment with all applicable provisions of this specification.

1.5 QUALITY ASSURANCE

- A. Experience: All equipment furnished under Division 26 shall be furnished by manufacturers who have at least three years' experience in the design, production, assembly, and field service of equipment of like type and size. Products shall have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year period shall include applications of

equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the two-year period. Products having less than a two-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6,000 hours, exclusive of the manufacturer's factory or laboratory tests, is furnished.

- B. Uniformity: Unless otherwise specified, equipment or material of the same type of classification, used for the same purpose shall be the product of the same manufacturer. All material shall be new and of the current design of the manufacturer providing equipment or material.
- C. Design: Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with NEMA, IEEE, or other applicable technical standards and shall have a neat and finished appearance.
- D. Installation: Erect equipment in a neat and workmanlike manner; align, level, and adjust for satisfactory operation. Install equipment so that parts are easily accessible for inspection, operation, maintenance, and repair. Minor deviations from the indicated arrangements may be made, but only after obtaining approval from the Engineer.
- E. Electrical work shall meet or exceed the latest revisions for the following standards and codes except where more stringent requirements have been specified:
 - 1. Local Building Codes
 - 2. National Fire Protection Associations – NFPA
 - 3. National Electrical Code – NEC
 - 4. Underwriters Laboratories, Inc. – UL
 - 5. National Electrical Manufacturers Association – NEMA
 - 6. Institute of Electrical and Electronic Engineers – IEEE
 - 7. American Society of Testing Materials – ASTM
 - 8. Association of Edison Illuminating Companies – AEIC
 - 9. American National Standard Institute - ANSI
- F. In general, all electrical equipment furnished shall be listed and labeled by Underwriters Laboratories, Inc. (UL), Factory Mutual (FM), Edison Testing Laboratories (ETL), or another nationally recognized testing laboratory acceptable to the County and the Engineer. Submit name of organization that will label the equipment, product, or component. Organization shall certify that the equipment meets applicable UL, ANSI, and NEMA standards.

1.6 INSPECTIONS

- A. The Contractor shall have all electrical work inspected by the following agency and this work shall pass such inspection: Independent electrical inspection agency approved by the Engineer.
- B. The Contractor shall furnish to the Engineer a certificate of compliance stating that the completed installation complies with the requirements of the National Electrical Code. This certificate shall be completed by the approved independent electrical inspection agency.

1.7 CONTRACT DRAWINGS

- A. Locations Approximate. The locations of equipment shown on the Contract Drawings are approximate only. The Contractor shall determine the exact locations of the equipment, box-

outs, sleeves, and of similar items required for the coordination of electrical work with the mechanical and other work.

- B. Plan Drawings Diagrammatic. Power and Control Plans, and Lighting, Receptacle Circuit & Grounding Plans shown are diagrammatic and functional only and are not intended to show exact conduit layouts, number of fittings, or other installation details. The final determination as to routing, location, and termination shall be governed by structural conditions, obstructions, job conditions, and best industry practices. This shall not be construed to mean that the design of the system may be changed without written approval. The Contractor shall obtain shop drawings affecting all conduit locations before installation. The Contractor shall consult all drawings and specifications which may affect location of any outlet, piece of equipment, or conduit run to avoid interference with other trades. The Contractor shall furnish all labor and materials necessary to install and place in satisfactory operation all power, control, and other electrical systems shown.
- C. Elementary Circuit Drawings and Control Panel Drawings Diagrammatic. Circuit diagrams and elementaries shown are diagrammatic and functional only and are not intended to show exact wiring, circuitry, or to be considered a substitute for wiring diagrams. Control Panel drawings, including sub-panel layout drawings, are diagrammatic and functional only and are not intended to show exact parts and locations, or to be considered a substitute for assembly drawings. The Contractor shall submit shop drawings detailing exact part selection, placement, and wiring connections.
- D. Parts lists and part numbers are included to convey design intent using actual manufactured parts. Every attempt has been made to provide a part number that may be used to order and purchase parts; but the Contractor shall be responsible for checking all part numbers to verify that all parts will perform the intended function correctly as part of an integrated system, and fit in the designated space.

1.8 CONTINUITY OF SERVICES

- A. When existing buildings are in use during construction operations, keep all existing electrical systems in operation within all rooms of buildings at all times.
- B. Provide necessary and temporary connections and relocations as required to maintain existing systems in operation.

1.9 INSTRUCTION OF OWNER'S REPRESENTATIVES

Before request for final acceptance of Work, furnish necessary skilled personnel to operate all systems. Instruct designated Owner's representative in proper operation and care of systems and equipment. Repeat instructions as required.

1.10 PROTECTED WORK

- A. Dry Locations. Dry locations are not normally subject to dampness or wetness. An area classified as dry may be temporarily subject to dampness or wetness.
- B. Wet Locations. Wet locations are areas outside, underground, in concrete slabs or masonry in direct contact with the earth, and areas subject to saturation with water or other liquids, such as a vehicle washing area and unprotected areas exposed to weather.

1.11 REMOVALS AND REPLACEMENT OF WORK

- A. All equipment and materials shown to be removed on the Contract Drawings shall become property of the Contractor and shall be removed off-site unless otherwise noted.
- B. Open conduits not used shall be capped. Spare and unused conductors shall be taped and identified at both ends.
- C. It shall be the responsibility of the Contractor to perform field verification of the existing wiring associated with the Work prior to removal of existing work and installation of new work at the existing facilities. The Contractor shall notify the Engineer prior to conducting field investigation. If discrepancies arise between the power distribution wiring connections indicated on the Contract Drawings and what is field verified, the Contractor shall immediately bring this to the attention of the Engineer.
- D. Where electrical equipment is removed or relocated, also remove all wiring back to source panelboard, MCC, switch or to last remaining device on the same circuit. Associated conduits, hangers, supports, etc. shall be removed unless otherwise noted or required to maintain the support and operation of remaining equipment.
- E. Remove all extraneous wires and exposed conduits for all mechanical, and electrical devices to be removed or abandoned.
- F. Wires shown for removal which are in underground duct banks, or embedded conduit shall be removed unless otherwise noted.
- G. Contractor shall disconnect and remove related equipment and conduit mounting hardware, equipment mounting racks, and equipment associated with materials to be removed unless otherwise required to maintain the support and operation of remaining equipment.
- H. Any conduit abandoned in concrete slabs, walls, or other inaccessible locations shall be left empty except for a nylon pull wire. Ends shall be capped with push plugs for future use.
- I. If cables cannot be removed due to a collapsed or deformed duct, or other similar reason, cut cable at duct entrance at each end and tag cable as "Abandoned Cable", "collapsed duct" or similar text. Notify the Owner of these conditions.
- J. Deliver on the premises where directed, existing material and equipment which is removed and desired by the Owner or is indicated to remain on the property of the Owner.
- K. Equipment and materials not indicated for relocation, reuse, or salvage shall become the property of the Contractor and shall be removed by the Contractor from the premises and disposed of.

1.12 EQUIPMENT RELOCATIONS AND MODIFICATIONS

- A. Relocate equipment and conduits as shown on the Contract Drawings. Provide materials and hardware for patching, plugging, and refurbishing equipment intended for reuse. Provide new

nameplates for reused electrical work. Perform all work and make necessary modifications to existing work as required to leave completed system in a finished and workmanlike condition.

- B. Ensure that all hardware items and replacement equipment are on hand prior to performing any demolition, modification, or remedial work.
- C. It shall be the responsibility of the Contractor to perform field verification of the existing conditions associated with the Work prior to removal of existing work and installation of new work. If discrepancies arise between the Contract Drawings and conditions verified in the field, the Contractor shall immediately bring this to the attention of the Engineer.
- D. Equipment, conduits, cables, and materials that are abandoned in place shall be provided with tags, labels, and nameplates indicating "Spare Equipment" or similar text.
- E. Contractor shall take necessary precautions to insure against damage to existing materials or equipment to remain in place, to be reused or to remain the property of the Owner. Repair or replace damaged materials and equipment at no additional cost to the Owner.
- F. Provide materials, and hardware for patching, plugging, and refurbishing equipment intended for reuse. Provide new nameplates for reused electrical work.
- G. Where the work specified herein or under other divisions necessitates relocation of existing equipment, foundations, conduits, wiring, etc., perform all work and make necessary modifications to existing work as required to leave the completed system in a finished and workmanlike condition.
- H. Modify existing motor control centers as required to install new motor starter and feeder circuit breaker equipment as shown on the Contract Drawings.
- I. Rehabilitate and relocate items of equipment as required and as indicated on the Contract Drawings or specified.
- J. Fill and patch penetrations, holes, damaged surfaces, and similar areas to restore a smooth finish to floors, ceilings and walls. Finish shall match existing, pre-project conditions.
- K. Keep existing electrical system in operation during the progress of work. Provide temporary electrical connections to systems or equipment where necessary to maintain continuous operation until the new systems and equipment are ready for operation.
- L. Contractor shall develop a schedule for power outages that are necessary to execute the work. Schedules shall be reviewed by Engineer and Owner and subject to change based on limitations required to maintain equipment essential to the plant operation and to minimize the effect of the outages on plant operation. This may require working outside normal working hours when removing or installing equipment which will cause a partial or complete shutdown.
- M. When the work specified connects new equipment to any existing equipment, conduit, wiring, or similar object, perform necessary alterations, cuttings, fittings, etc. of the existing equipment as required to make connections between the new and existing equipment or material. The work to the existing and new equipment shall be performed in a workmanlike manner and shall be provided in a finished condition.

1.13 GROUNDING

- A. Equipment and systems shall be bonded and grounded in accordance with Article 250 of the National Electrical Code, applicable local codes, the electrical utility provider, and the manufacturer's recommendations.
- B. Ground raceways and noncurrent carrying parts of electrical equipment in accordance with NEC Article 250. Use the metallic conduit system for equipment and enclosure grounding. Grounding through the conduit system shall be in excess of any equipment grounding conductors shown on the Contract Drawings.
- C. Circuits in nonmetallic conduit shall carry one equipment grounding conductor for equipment grounding.

PART 2 PRODUCTS

2.1 CONCRETE EQUIPMENT PADS (CEP)

Provide concrete equipment pads where shown on the Contract Drawings for setting any floor and ground mounted equipment, as well as equipment mounting racks. Concrete shall be 4500 PSI, 28 day minimum. Refer to details on electrical drawings for outdoor and indoor concrete equipment pads.

2.2 EQUIPMENT MOUNTING RACKS (EMR)

- A. Equipment mounting racks shall be provided as required to mount and support equipment and where specifically shown on the Contract Drawing details.
- B. The details shown on the Contract Drawings provide minimum requirements for the equipment mounting racks. Equipment mounting racks shall be designed to support the required equipment. Equipment mounting racks shall be constructed to maintain a rigid installation minimizing movement and racking.
- C. Materials
 - 1. Tubing: 2" x 2" x 1/4" Aluminum Alloy (6063-T52)
 - 2. Backplate: 1/4" thick aluminum plate (up to 24" x 24" maximum)
3/8" thick aluminum plate (for sizes larger than 24"x 24")
 - 3. Bottom Plate: 6" x 6" x 1/2" Aluminum Alloy
 - 4. Hardware: 3/8" stainless steel locknuts, bolts, and washers.
 - 5. Alternatively, Thomas & Betts Kindorf channel system, with stainless steel hardware, and non-corrosive parts.
- D. Assembly
 - 1. Corners and angles shall be ground smooth and shall be free of burrs.
 - 2. Equipment mounting racks shall be constructed as required to accommodate field conditions such as handrails, mounting against walls, or other structures.
 - 3. Equipment mounting racks installed on unpaved surfaces or grass areas shall be provided with a concrete equipment pad. The concrete equipment pad shall extend a minimum of

6" around the perimeter of the equipment and an additional 30" (minimum) in front of the equipment to provide an area for operators to stand.

4. Equipment mounting racks shall be sized to facilitate access to the equipment controls. Controls shall be accessible in an area between 42" and 60" above finished grade.
5. Utilize 3/8" full welds as appropriate for the connection of the components.

2.4 OUTDOOR EQUIPMENT PROTECTION (BOLLARDS)

Steel bollards shall be installed to protect outdoor transformers, emergency generators, fuel tanks, and other equipment from damage by vehicles. Bollard locations shall be as indicated on the Contract Drawings, and are approximate. Placement of bollards around equipment shall be well planned so that bollards are positioned to maximize the protection to the equipment, but are not placed over ground rods, ground wires, and duct banks. Bollard locations shall also be coordinated with door swings of all enclosures. Allow all required clearances.

PART 3 EXECUTION

3.1 PAINTING OF EQUIPMENT

- A. Factory Applied. Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test.
- B. Field Applied. Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

3.2 NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two stainless steel sheet-metal screws or two stainless steel rivets.

3.3 COORDINATION

The Contractor shall coordinate all electrical work involving existing circuits and operations with the Owner for required shutdowns, conversions, and tie-ins.

** End of Section **

SECTION 26 05 01
CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section includes wires, cables, and accessories as shown, specified, or required for the complete power, lighting, control, and other systems in the Contract.

1.2 REFERENCES

- A. NFPA 70 - National Electrical Code (NEC)
- B. NFPA 262 – Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces
- C. Insulated Cable Engineers Association (ICEA)
- D. Underwriters Laboratories, Inc. (UL)
- E. National Electrical Manufacturers Association (NEMA)
- F. American Society of Testing Materials (ASTM)
- G. Association of Edison Illuminating Companies (AEIC)

1.3 SYSTEM DESCRIPTION

- A. Product Requirements. Provide products as follows:
- 1. Conductors for feeders and branch circuits 6 AWG and smaller shall be stranded.
 - 2. Control circuits shall utilize stranded conductors.
 - 3. Conductors for power and lighting circuits shall not be smaller than 12 AWG.
 - 4. Conductors for control circuits shall not be less than 16 AWG.
 - 5. Increase wire size in branch circuits to limit voltage drop to a maximum of 2.5%.
- B. Wiring Methods. Provide the following wiring methods:
- 1. Concealed Dry Interior Locations: Use only building wire, type THHN/THWN, or XHHW insulation in raceway (rigid metal conduit, intermediate metal conduit, or electrical metallic tubing), or nonmetallic-sheathed cable or armored cable.
 - 2. Exposed Dry Interior Locations: Use only building wire, type THHN/THWN, or XHHW insulation in rigid metal conduit.
 - 3. Wet or Damp Interior Locations: Use only building wire, type THHN/THWN, XHHW, or RHW-2 insulation using raceway (PVC coated rigid metal conduit or rigid metal conduit), direct burial cable, armored cable, or metal clad cable.
 - 4. Exterior Locations: Use only building wire, type THHN/THWN, XHHW, or RHW-2 insulation using raceway (PVC coated rigid metal conduit or rigid metal conduit), direct burial cable, service-entrance cable, armored cable, or metal clad cable.
 - 5. Underground Locations: Use only building wire, type THHN/THWN, XHHW, or RHW-2 insulation using raceway (PVC coated rigid metal conduit or rigid metal conduit), direct burial cable, armored cable, or metal clad cable.
 - 6. Conductors for electrical services shall be in accordance with the National Electrical Safety Code and recommended practices of the electrical utility provider.

1.4 SUBMITTALS

- A. Prior to obtaining any material in connection with this Section, detailed shop drawings on all material shall be submitted. Submittals shall conform to the requirements of Section 01 33 00 Submittals.
- B. Submittals shall contain a material list with manufacturer data describing the material and showing its compliance with the specification, associated standards, and test requirements.
- C. Other Submittals
 - 1. Samples of any material shall be submitted upon the Engineer's request.
 - 2. A list of all test equipment shall be submitted to the Engineer for review.
 - 3. Cable testing results.

1.5 CLOSEOUT SUBMITTALS

Provide project record documents which record actual locations of components and circuits.

1.6 QUALITY ASSURANCE

- A. Material and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Safety Code (NESC)
 - 3. Insulated Cable Engineers Association (ICEA)
 - 4. Underwriters Laboratories, Inc. (UL)
 - 5. National Electrical Manufacturers Association (NEMA)
 - 6. American Society of Testing Materials (ASTM)
 - 7. Association of Edison Illuminating Companies (AEIC)
- B. Conductor Manufacturers. All wires and cables of like type shall be the product of one manufacturer.
- C. Manufacturer Test Requirements. Certified test reports showing compliance with applicable ICEA and UL Standards for each type of conductor shall be provided upon request.
- D. In general, all electrical equipment furnished shall be listed and labeled by Underwriters Laboratories, Inc. (UL) or another acceptable organization to the County and the Engineer. Submit name of organization that will label equipment if other than Underwriters Laboratories. Organization shall certify that the equipment meets applicable UL, ANSI, and NEMA standards.
- E. Verify that field measurements are as indicated on the drawings.
- F. Coordination. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

PART 2 PRODUCT

2.1 GENERAL

- A. Unless otherwise shown or specified, all conductors shall be stranded copper.
- B. Material construction of copper conductor strands shall be coated or uncoated soft drawn or annealed copper.

2.2 LOW VOLTAGE CONDUCTORS

- A. Low voltage conductors for 600 VAC service and below shall be rated a minimum of 600 volts. Conductors shall be constructed of uncoated Class B copper concentric-lay- stranded wires, rated for 90 degrees C (dry), 75 degrees C (wet), machine tool wire with thermoplastic (PVC) insulation and nylon jacket. Conductors shall be oil and gasoline resistant II. Conductors stranded in other than Class B may be used provided that all terminals, lugs, and connectors are listed and marked for use with that conductor stranding.
- B. Conductors shall be of the following type, temperature rating, insulation, and/or jacket:
 - 1. THHN/THWN/MTW: 600 Volt, 90°C (dry), 75°C (wet)
 - 2. MTW/AWM: 600 Volt, 90°C (dry) with PVC insulation
- B. Control conductors shall be type MTW/ATM, 14, 16 or 18 AWG. Control conductors for AC circuits within MCC or control panels shall be red. Control conductors energized from a source external to the control panel source shall be yellow.
 - 1. Control conductors may be 16 AWG copper provided all of the following conditions are met:
 - a. Continuous load does not exceed 8 amperes.
 - b. Overcurrent protection is provided by one of the following:
 - i) Branch-circuit-rated circuit breakers listed and marked for use with 16 AWG copper wire
 - ii) Branch-circuit-rated fuses listed and marked for use with 16 AWG copper wire.
 - iii) Class CC, Class J, or Class T fuses.
 - 2. Control conductors may be 18 AWG copper provided all of the following conditions are met:
 - a. Continuous load does not exceed 5.6 amperes.
 - b. Overcurrent protection is provided by one of the following:
 - i) Branch-circuit-rated circuit breakers listed and marked for use with 18 AWG copper wire
 - ii) Branch-circuit-rated fuses listed and marked for use with 18 AWG copper wire.
 - iii) Class CC, Class J, or Class T fuses.
- C. Acceptable manufacturers: Royal, Deceron, Rome, GE, General Cable, Essex, or equal.

2.3 INSTRUMENTATION CABLES

- A. Multi-conductor control cable shall consist of 600 volt, individual conductors, each constructed of a minimum of seven strands of No. 14 AWG (or as shown on the Contract Drawings) uncoated Class B copper concentric-lay-stranded wires. Each conductor shall have HMW-PE insulation and color coded PVC outer jacket. Additional overall PVC jacket shall be provided around individual conductors. Cables shall be Type 20-10 as manufactured by Anaconda, Type CT-B manufactured by Rome Cable Co. or equal.
- B. Twisted Shielded Pair (TSP) Instrumentation conductors shall consist of two twisted strands of No. 16 AWG (or as shown on the Contract Drawings) tinned coated Class C copper concentric-lay-stranded wires with a braid or foil shield. Each conductor shall have polyethylene insulation and color coded (black/white) PVC outer jacket. With multi-conductor twisted pair assemblies, each pair shall include individual shield and an overall shield shall be applied over the cable assembly with an additional overall PVC jacket around the conductors.
- C. Acceptable manufacturers: Rome, Deceron, Belden, or equal.

2.4 GROUNDING SYSTEM CONDUCTORS

Grounding grid system conductors shall be constructed of tin coated copper concentrically lay-stranded wires in accordance Section 26 05 26 Electrical Grounding.

2.5 NETWORKING CABLES

- A. Category 5e Cables (CAT 5 enhanced)
 - 1. The cable and patch cords shall consist of four (4) unshielded twisted pair of 24 AWG stranded or solid copper conductors and shall be FEP Teflon insulated. The conductor shall be color coded and the cable plenum jacketed.
 - 2. The Unshielded Twisted Pair (UTP) wiring shall be able to accommodate data transmission speeds up to 1000 Mbps (gigabit Ethernet) at 100 MHz.
 - 3. Manufacturer: Belden or equal.
- B. Category 6 Cables
 - 1. The cable and patch cords shall consist of four (4) unshielded twisted pair of 24 AWG solid bare copper conductors and shall be FEP Teflon insulated. The conductor shall be color coded and the cable plenum jacketed.
 - 2. The Unshielded Twisted Pair (UTP) wiring shall be able to accommodate data transmission speeds up to 10 gigabits at 250 MHz.
 - 3. Manufacturer: Belden or equal.
- B. Coaxial Cable
 - 1. Cable shall be #20 AWG tinned stranded copper with tinned copper braid shielding, and a foam FEP Teflon insulation. Cable shall be rated for 120V, 75°C. Cable shall support Ethernet and shall be plenum jacketed.

2. Video Cable (RG6)
 - a. The conductor shall be #18AWG, 0.037" diameter solid bare copper. The insulation shall be made of foam polyethylene and the core shall have a nominal outside diameter of 0.180 inches.
 - b. There shall be two (2) bare copper braids 98% shield coverage and the cable jacket shall be made of black PVC.
3. Manufacturer: Belden or equal.

2.6 TELEPHONE CABLES

- A. Telephone cable shall be twisted shielded pairs, #24 AWG, and shall be solid copper. Cable shall consist of 4 pairs or 25 pairs as shown on the Contract Drawings. Cable shall be suitable for installation in cable tray, conduit, access floors, and above suspended ceilings.
- B. The cable shall be provided with a FEP Teflon insulation and shall be plenum jacketed.
- C. Manufacturer: Belden or equal.

2.7 FLEXIBLE CORD

Flexible cord for conductors 600 VAC and below shall be rated a minimum of 600 volts. Conductors shall be constructed of Class K flexible stranded conductors for sizes 18 AWG through 10 AWG, and soft-drawn rope lay conductors for sizes 8 AWG through 2 AWG, and heat and moisture resistant thermoplastic-elastomer (TPE) insulation, type SEOW.

2.8 COLOR CODING OF CONDUCTORS

- A. Power conductors on systems 600 volts and less shall be color coded in accordance with the following:
 1. 480/277 VAC, three phase, 4 wire, 60 Hz.

Phase A	Brown
Phase B	Orange
Phase C	Yellow
Neutral	White
Ground	Green
 2. 240/120 VAC, single phase, 3 wire, 60 Hz.

Conductor 1	Black
Conductor 2	Red
Neutral	White
Ground	Green
 4. 208/120 VAC, three phase, 4 wire, 60 Hz.

Phase A	Black
Phase B	Red
Phase C	Blue
Neutral	White
Ground	Green

- B. For conductors larger than No. 6 AWG, colored tape may be used to color code the conductors at all terminations, splices or other places where they are visible.
- C. Multi-conductor Instrumentation cables shall be color-coded according to ICEA/NEMA, latest edition, Method 1.

2.9 CONNECTORS AND TERMINALS

A. Connectors (for #10 AWG and smaller)

- 1. Solderless pressure connectors (wirenuts) for pigtail splicing all power conductors and cables #10 AWG and smaller shall be "Wing-nut" type made by Ideal.

<u>Model No.</u>	<u>Wire Size</u>
451	2 #18 min.; 3 #12 max.
452	2 #14 min.; 4 #12 max.
453	1 #10, and 1 #12 min.; 2 #8 and 1 #16 max.
455	3 #12 min.; 4 #10 max.

- 2. Connectors for (straight) splicing signal and control wires #10 AWG and smaller shall be solderless and compression type. Connectors shall be Burndy Hydent, Thomas and Betts Stakon, or equal.

B. Connectors (for #8 AWG and larger)

- 1. Connections of conductors to terminal posts or other conductors shall be made with UL approved compression type connectors. Wire nuts shall not be permitted.
- 2. Connections shall insure a thorough connection without damaging the conductor.
- 3. Connections shall be suitable for the conductor size used.
- 4. Typical compression type fittings shall be as specified below:
 - a. Two way splices for large conductors size 1/0 and larger shall be uninsulated indenture type similar to Burndy "Hy-Link", Thomas and Betts Sta-kon, Burndy, or equal.
 - b. Two way splices for small conductors, size 1 AWG and smaller shall be uninsulated indenture type similar to Burndy "Hy-Dent", Thomas and Betts "Sta-Kon" or equal.
 - c. Fixture connections shall be two piece indenture type similar to Thomas and Betts "Sta-Kon" Series PT-66M, Ideal - Crimp Connector Sleeve No. 410 with wire cap insulated or equal.

C. Terminals

1. Terminals shall be 600 volt, indenture type, two or one hole lugs similar to Thomas and Betts "Sta-Kon", Burndy "Hylug" or equal.
2. Spade terminals shall be locking, vinyl self insulated similar to Thomas and Betts "Sta-Kon", Burndy or equal.
3. All accessories that use special tools for proper application as recommended by the manufacturer shall be installed only with those tools and in accordance with the established practices and recommendations of the manufacturers.

D. Terminal Blocks

1. Terminal blocks shall be suitable for a continuous rating of 600 VAC shall be manufactured in accordance with UL and NEMA standards for clearance between adjacent terminals.
2. Terminal blocks shall be sectional units of molded thermoplastic polyester and suitable for channel mounting.
 - a. Sections shall have built in marking areas
 - b. Center post in each section shall prevent over insertion of wires.
 - c. Sections shall not be interlocked so that one section may be removed without disturbing the remainder of the assembly.
 - d. Terminals shall be tin plated, box lugs, having hardware recessed into the molding, or flat terminal connectors.

E. Power Distribution Terminal Blocks

1. Power distribution blocks shall be constructed of copper. Blocks shall have a minimum of two line connections and one load connection per pole with lug wire range suitable for conductor size as indicated on the Contract Drawings.
2. Power terminal blocks shall be furnished with removable clear lexan cover plates to prevent accidental contact with live parts.
3. Power distribution blocks shall be as manufactured by Allen-Bradley, Gould-Shawmut, or equal.

2.10 MISCELLANEOUS ACCESSORIES

- A. Wire pulling lubricant shall be non-toxic and contain no solvents that degrades wire insulation, plastic tape, or conduits. Lubricant shall not leave residual material in conduit, shall be rust inhibited, and be non-combustible. Lubricant shall be as manufactured by Ideal, Tomic Electric, or equal.
- B. Cable and wire supports shall be Kellem grips or cable supports wedges as manufactured by O. Z. Gedney, or equal.
- C. Cable tags for coding of individual conductors shall be in accordance with Section 26 05 53 Identification for Electrical Systems.

- D. Plastic tape shall be all weather vinyl electrical tape having a high dielectric strength and resistant to sun, water, oil, acids and corrosive chemicals. Tape shall be 3M Type 88 or similar item as manufactured by Bishop Electric, General Electric, Okonite, or equal.
- E. Electrical insulation putty shall be rubber based elastic putty in tape form. Putty shall be 3M Scotchfill, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Unless otherwise shown or specified, all power, lighting, and control circuits shall be enclosed in conduit wireways.
- B. All individual conductors shall be identified at all termination and splice points. Wire numbers or letter coding shall be by means of printed plastic tape, and shall be as scheduled on the Contract Drawings.
- C. Each conductor's insulation shall be a single color throughout its entire length.
- D. Splices and connections shall be made with solderless pressure type connectors, and shall be taped and covered to provide an insulating value of the connection equal to the adjacent wire insulation.
- E. Conductors installed in wireways shall be grouped and bundled as they exit each conduit run. In open areas, such as wireways, manholes, or other similar areas, wires and cables shall be tied every twelve (12) inches.
- F. All conductors shall be carefully handled to avoid kinks or damage to its insulation.
 - 1. Lubricant may be used to assist in pulling conductors through conduits.
 - 2. Pulling strain shall not exceed the value recommended by the cable manufacturer.
- G. Spare conductors shall be of sufficient length for future connections where spare terminals are provided; proper terminals shall be installed and connected.
- H. Conductors shall be installed in junction boxes and pull boxes that are sized to meet the requirements of the National Electrical Code for wire bending and minimum radius.

3.2 SPLICES AND JOINTING

- A. Cables and conductors installed in the underground distribution system and duct banks shall be routed continuously from termination point to termination point. No splices shall be made in underground manholes or handholes without written approval by the Engineer. Where underground or outdoor splices of 600 volt conductors are approved by the Engineer, they shall be installed utilizing an epoxy based cast splice kit. Splice kit shall be as manufactured by 3M or equal.

- B. Splices shall be made in junction boxes and shall be taped to an insulating value at least equal to the insulating value of the conductors.
- C. Application of taped joints shall be as follows:
 - 1. For 480/277 VAC power circuits, connection shall be wrapped with plastic tape.
 - 2. For lighting circuits, splice connections shall be wrapped with plastic electrical tape.
 - 3. For motor circuit terminations, splice connections shall be wrapped with 3M Scotchfill tape and finished with plastic tape.
- D. Copper to aluminum connections shall be made with UL approved aluminum-to-copper connectors and compound.
- E. Solder joints, hinged connectors, and bolted terminal lugs will not be permitted. The exception of multi-bolted directed compression connectors in large wire and cable sizes will be permitted, if compression type fittings are not available.
- F. Splices, taps, or terminations shall not be made when conductor ends have missing strands or when the ends are mutilated in any way.
- G. Pump power and control cables shall be connected to conductors using power terminal blocks which shall be mounted inside local junction boxes as shown on the Contract Drawings. Terminal blocks shall be provided with insulation barriers so that there are no exposed live parts inside the junction box.

3.3 MULTI-CONDUCTOR CONTROL CABLE

- A. Multi-conductor cable shall be provided where shown on the Contract Drawings. Multi-conductor control cable may be used where separate control circuits having a number of conductors greater than three are shown on the Contract Drawings. The Contractor shall be responsible for sizing the conduit required at no cost to the Owner.
- B. Termination of cable shall be as specified.

3.4 LOW VOLTAGE AND CONTROL CONDUCTORS

All power, control, and lighting conductors shall be type THHN-90C, THWN-75C/MTW unless otherwise noted.

3.5 CONNECTIONS TO EQUIPMENT

- A. Connections and interconnections shall be made to all equipment in accordance with the Contract Drawings, and wiring diagrams furnished by manufacturers, and as specified by the Engineer.
- B. The Contractor shall be responsible for the accuracy of the connected work made under this contract. Any damage resulting from erroneous connections shall be corrected by the Contractor at his own expense.

3.6 TESTING

A. General

1. When all wires and cables are in place but before the final connections have been made, they shall be tested.
2. Manufacturer's data on testing resistance shall be submitted with tabulated test results.
3. Contractor shall furnish all necessary test equipment instruments.
4. All tests shall be performed in the presence of the Engineer, unless waived by the Engineer.
5. Contractor shall notify the Engineer three (3) working days in advance of any testing.
6. If damage is indicated during testing or upon review of the tabulated data, Contractor shall replace defective wires and cables and retest at no cost to the Owner.

B. Direct Current High Potential Test

1. A direct current high potential test (Hi Pot Test) shall be performed as described below for the following conductors:
 - a. All conductors operating over 600 volts.
 - b. Any conductor, not otherwise required to be tested, but in the opinion of the Engineer has been subjected to possible damage.
2. The direct current high potential test shall be recorded at one minute intervals over a ten minute period for each conductor, and between each conductor and ground.
3. The ten minute period shall commence when the charging/leakage current stabilizes.
4. If leakage current stabilizes and decreases with time, the conductor being tested is acceptable.
5. Voltage levels for high potential test shall be as scheduled below.

<u>Rated cable voltage</u>	<u>D.C. high potential test voltage</u>
600	2000
Up to 5 kV	25 kV
Up to 8 kV	35 kV
Up to 15 kV	55 kV
Up to 25 kV	80 kV

Up to 28 kV	85 kV
Up to 35 kV	100 kV

6. The data recorded during high potential testing shall be tabulated by the Contractor and submitted to the Engineer in the typewritten form as indicated below:

High Potential Test Data

Circuit No.	Minute	Test Voltage		
		MF – 1/25 kV	P – 1/2 kV	P – 3/2 kV
PH A, B, C to Grd.	Init.			
	1			
	2			
	...			
	10			
PH A to B, C	Init.			
	1			
	2			
	...			
	10			
PH C to A, B	Init.			
	1			
	2			
	...			
	10			

C. Megohm Test

1. For all wires and cable #8 AWG and larger, a 1500 volt insulation resistance (Megohm) test shall be performed.
 2. The Megohm test shall be performed on the following combination of conductors:
 - a. Between all conductors in the same enclosure
 - b. Between each conductor and ground.
 - c. The resistance test shall be recorded at the end of one minute of sustained voltage.
- D. Acceptance. After all final connections have been made, the equipment and controls shall be tested, by operation, to demonstrate performance.

** End of Section **

SECTION 26 05 26
ELECTRICAL GROUNDING

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes rod electrodes, active electrodes, equipment grounding conductors, grounding well components, mechanical connectors, exothermic connections, the grounding system, and the grounding grid where shown on the Contract Drawings.
- B. Related Sections
 - 1. Section 03 20 00 – Concrete Reinforcing: Bonding or welding bars when reinforcing steel is used for electrodes.

1.2 REFERENCES

- A. Institute of Electrical and Electronics Engineers
 - 1. IEEE 142 – Recommended Practice for Grounding of Industrial and Commercial Power Systems
 - 2. IEEE 1100 – Recommended Practice for Powering and Grounding Electronic Equipment
- B. International Electrical Testing Association
 - 1. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems
- C. National Fire Protection Association
 - 1. NFPA 70 – National Electrical Code
 - 2. NFPA 99 – Standard for Health Care Facilities

1.3 SYSTEM DESCRIPTION

- A. The Grounding systems shall use the following elements as grounding electrodes:
 - 1. Existing or new metal underground water pipe
 - 2. Metal building frame
 - 3. Concrete-encased electrode
 - 4. Ground ring
 - 5. Rod electrode
 - 6. Plate electrode

All of these metal underground systems and structures shall be bonded together to form the grounding electrode system. Piping systems and underground tanks shall be included when present.

1.4 SUBMITTALS

- A. Prior to obtaining any material in connection with this Section, detailed shop drawings on all material shall be submitted including but not limited to:
 - 1. Ground Grid Conductors
 - 2. Grid Connecting Conductors
 - 3. Grid Compression Connectors (each type)
 - 4. Compression Tools
 - 5. Grounding Electrodes
 - 6. Ground Bushings
 - 7. Water Pipe Ground Connectors
- B. Test Reports: Indicate overall resistance to ground and the resistance to ground at each electrode.
- C. Submittals shall conform to the requirements of Section 01 33 00 Submittals.
- D. Submittals shall contain a material list with manufacturer data describing the material and showing its compliance with specifications, associated standards, and test requirements.
- E. Prior to installation of any material, a detailed plan layout of the entire grounding system, including location and quantity of electrodes, connections, and cables shall be submitted to the Engineer for review.
- F. Samples of any material shall be submitted upon Engineer's request.

1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of components and grounding electrodes.

1.6 QUALITY ASSURANCE

- A. Materials and installation shall be in accordance with latest revisions of the following codes, standard, and specifications, except where more stringent requirements have been specified herein:
 - 1. National Electrical Code (NEC)
 - 2. Underwriters Laboratories, Inc. (UL)
- B. These Specifications require that all grounding and grounding circuitry equal or exceed the requirements of the National Electrical Code Article 250, and in the event of a conflict or discrepancy between these Specifications, the Contract Documents, and NEC Article 250, the more stringent requirements shall apply.

1.7 COORDINATION

- A. Complete grounding and bonding of building reinforcing steel prior to concrete placement.

PART 2 PRODUCT

2.1 GROUNDING GRID SYSTEM CONDUCTORS

- A. Grid connecting conductors shall be minimum size 4/0 AWG bare stranded copper conductors in accordance with NEC Article 250.

2.2 GROUNDING ELECTRODES

- A. Rods shall be 5/8 inch in diameter, minimum 8 feet long unless otherwise shown, steel core with copper molten welded or electrolytically bonded to exterior. Two section ground rods are acceptable. Rods shall be manufactured by Copperweld Steel Co., Thompson Lightning Protection, Inc. or equal.
- B. Grounding plates shall be 24 inch by 24 inch, 1/4 inch thick solid copper.

2.3 GRID CONDUCTOR CONNECTORS

Connections shall be made with compression type connectors specially made for buried grounding systems as manufactured by Thomas & Betts Co., Burndy Corp. or equal.

Connections shall be made using an exothermic welding process or irreversible compression connectors.

2.4 EQUIPMENT GROUND CONDUCTORS

- A. Equipment ground conductors shall be in accordance with Section 26 05 01 Conductors and Cables for low voltage conductors.
 - 1. Ground conductor #8 and smaller shall be green in color.
 - 2. For #6 and larger ground conductors, black wire may be used and identified where exposed in all junction boxes, disconnect switches, panels, etc. with green tape wrapped over its entire exposed length.
- B. All exposed grounding conductors such as bars, straps, cables, flexible jumpers, braids, shunts, etc., shall be bare copper.

PART 3 EXECUTION

3.1 GENERAL

- A. All grounding and bonding of electrical installations shall be in accordance with, or shall exceed the requirements of Article 250 of the National Electrical Code. In the event of a conflict or a discrepancy between these Specifications, the Contract Document Drawings, and the National Electrical Code, the more stringent requirement shall apply.

- B. All metallic equipment, such as tanks, machinery, and piping where the potential exists for an ignitable mixture to be present shall be bonded and grounded.

3.2 INSTALLATION

- A. Install in accordance with IEEE 142 or IEEE 1100 as applicable.
- B. Install grounding rod electrodes at locations as indicated on the drawings. Install additional rod electrodes to achieve specified resistance to ground.
- C. Install grounding and bonding conductors concealed from view.
- D. Equipment Grounding Conductor. Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- E. Permanently ground entire light and power system in accordance with the National Electrical Code, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, ground terminals, and ground bus at service panel.
- F. Bare copper bars, cables, fittings, etc. shall not be installed in cinder fill nor shall be covered with soil containing cinders or other corrosive material.
- G. Cables shall be installed with enough slack to prevent breaking stresses.
- H. All grounding conductors subject to mechanical damage shall be protected by rigid steel conduit or other suitable guards and in all cases where so protected shall be permanently and effectively grounded to said enclosure at each end of its lengths with approved grounding connector and conduit fittings.
- I. Where grounding conductors pass through floor slabs, walls, etc., and are not encased in metal conduit, they shall be sleeved in transite, fiber, or approved nonmetallic conduit.
- J. Connections to water pipes, including water meter or other similar device bypass connections, shall be made only after the surface of the pipe at the point of connection has been thoroughly cleaned and brightened and immediately prior to actually making the connection the contact surfaces are to be coated with Vaseline or Oxidation Preventive Compound.
- W. All equipment ground bus, ground pads, frames, enclosures, etc., shall have all surfaces at the point of connection thoroughly cleaned and brightened, to remove paint or non-conducting material, just prior to actually making the connection. Touch-up damaged pointed surfaces to match existing conditions.
- X. Splices in wire or cable grounding conductors are prohibited.

3.3 GROUNDING GRID SYSTEM

- A. Grounding Grid

1. Where shown on the Contract Drawings, a system of grounding conductors and driven electrodes, known as the grounding grid shall be installed. The grounding grid shall interconnect all the various grounding systems.
2. The grounding grid conductors shall be embedded in a minimum of 36 inches below the finished grade and 36 inches from the foundation walls or footings in the backfill material around the structure(s).
3. All underground conductors shall be laid slack.
4. Where shown on the Contract Drawings the Contractor shall locate the existing ground grid and make connections thereto.
5. Locations shown for the existing ground grid are approximate only and the exact location shall be determined in the field.
7. Care shall be taken in locating the existing grid to avoid damage to existing power and control conduits.

B. Grounding Electrodes

1. The grounding electrodes shall be driven as located on the Contract Drawings.
2. In areas where rock is encountered or hard ground makes the driving of grounding electrodes impractical, copper plates shall be installed in lieu of the grounding electrodes. The Contractor shall notify the Engineer in writing of his intention to substitute the copper plate in lieu of the electrodes.
3. Installation shall be a minimum of 36 inches below grade and 36 inches from footings.

C. Grid Connecting Conductors

1. In addition to the grounding requirements of the National Electrical Code, a grid connecting conductor shall be provided for, but not limited to, the following equipment:
 - a. All transformer frames
 - b. Neutral transformer taps
 - c. Frames of electric motors 10 HP and larger
 - d. Exposed structural steel
 - e. Grounding of the conduit system
 - f. Service entrance disconnects
 - g. Motor control centers, including enclosure and ground bus
 - h. Switchgear and switchboard including enclosures and ground bus
 - i. Plant water system point of connection to each building or structure, if provided
 - j. Engine generator sets
2. Where any equipment is shown or specified as "future," sufficient lengths of the grounding conductor, connected to the ground grid, shall be installed for future connections.

3. The ground grid connecting conductors shall be connected to the grounding grid, and all shall be buried in or below the floor slab with no conduit enclosures, unless exposed to mechanical injury.

3.4 GROUNDING SYSTEM CONNECTIONS

- A. Exposed connections shall be made with pressure clamps. Connections between different metals shall be protected against corrosion and moisture with an insulating epoxy resin.
- B. Buried connections shall be made with exothermic weld type connections. Exothermic welding equipment shall be selected and used in accordance with the equipment manufacturer's instructions. Equipment and molds shall be used to accommodate the wire size, the metallic structure's shape, the wire position of attachment, vertical or horizontal, and other criteria that may be specified. Before a mold is used, remove and clean slag, dirt, and other foreign matter from the mold. Use cartridge and charge size based on the manufacturer's recommendations for the specific application. Different charges are required for steel and ductile iron pipe.

1. Surface preparation

- a. Surfaces with little or no coating shall be cleaned to bare metal by grinding or filing an area approximately three inches square to produce a bright metal surface. Weld area shall be free of coating, dirt, mill scale, oxide, grease, moisture, and other foreign matter.
 - b. Surfaces with a thick coating shall have a four inch square window cut through the coating and three inches square of surface cleaned to bright metal. Avoid damaging the surrounding coating.
2. Prior to welding, remove the wire insulation as required to fit the mold. Avoid damaging the exposed copper wire. If the wire is cut or nicked over half way through its diameter, cut off and strip a new end. If the manufacturer requires the use of a copper sleeve, the sleeve shall be crimped securely to the wire and excess wire protruding from the end of the sleeve removed.
 3. After the charge is set, remove the mold and slag from the weld area with a welder's hammer. Strike the top and sides of the weld with the hammer to test the secureness of the connection. If the weld does not hold, remove the scrap weld material clean and begin the weld process again.
 4. After the weld is completed and prior to coating the clean and weld area, the Engineer may test the joint bond wire for electrical continuity.

5. Weld Caps

- a. After the weld passes the test for soundness, and electrical continuity, repair coating in the weld area with a cold-applied bituminous or coal-tar mastic and a weld cap placed over the weld. Mastic shall be applied to fill the weld cap and cove the exposed metal of the structure and the wire to a minimum thickness of 1/4 inch. Damage to the coating around the weld area shall be repaired according to the coating manufacturer's recommendations.

- b. If weld cap will not fit due to physical space limitations, coat bare metal and wire in weld area with a minimum 1/4 inch thickness of bituminous mastic.
- C. In fixtures, enclosures, equipment, etc., ground terminals or lugs shall be provided.
 - 1. Ground clips may be installed within device or switchboxes where terminals are not provided or are impracticable if used with solid ground wire.
 - 2. Each panel, switchboard, or motor control center shall be provided with a ground bar of sufficient size for all ground conductors to be connected.

3.5 CONDUIT SYSTEM

A. Ground Conductor

- 1. All power and 120-volt control system conduits (feeders, branch circuits, lighting circuits, etc.) shall have an internal grounding conductor, which shall be sized in accordance with the requirements of the National Electrical Code. This grounding conductor shall be installed although it may not be shown or scheduled on the Contract Drawings.
- 2. The internal grounding conductor shall be bonded to each device box, pull-box, junction box, or wiring trough it passes through.
- 3. All conduits one inch and larger shall be provided with grounding bushings on each end and at all cabinets and pull, junction, or outlet boxes.
- 4. The Contractor shall exercise care to ensure good ground continuity, in particular, between the conduit system and equipment frames and enclosures.
- 5. Circuits in conduit shall carry one equipment grounding conductor for bonding equipment to the grounding system.
- 6. Ground raceways and noncurrent carrying parts of electrical equipment in accordance with NEC Article 250. Use the metallic conduit system for equipment and enclosure grounding. Grounding through the conduit system shall be in excess of any ground conductors shown on the Contract Drawings.

3.6 TESTING

A. Acceptance

- 1. Unless otherwise specified, the installed grounding grid shall have a resistance to ground of 5 ohms or less.
- 2. The Contractor shall test all grounding conductors and grounding systems for continuity. Where continuity does not exist, jumpers shall be installed at no cost to the Owner and the system retested.
- 3. All testing shall be performed in the presence of the Engineer.

B. Grounding Resistance

Grounding resistance of the existing facility ground grid shall be tested using the ratio method, or other similar method that is acceptable to the Engineer. Contractor shall submit test procedure and equipment to be used in the testing. If the grounding resistance of the existing facility ground grid is in excess of 5 ohms, additional grounding shall be provided. After installation of additional grounding, ground resistance shall be retested to verify that the value does not exceed 5 ohms.

End of Section

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SECTION 26 05 33
CONDUITS AND RACEWAY SYSTEMS

PART 1 GENERAL

1.1 DESCRIPTION

This Section includes the conduit system required, specified, or shown on Contract Drawings including conduits, fittings, boxes, hangers, and accessories.

1.2 REFERENCES

- A. American National Standards Institute
 - 1. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.
 - 2. ANSI C80.3 – Specification for Electrical Metallic Tubing, Zinc Coated.
 - 3. ANSI C80.5 – Aluminum Rigid Conduit – (ARC).
- B. Underwriters Laboratories
 - 1. ANSI/UL 6 – Electrical Rigid Metal Conduit – Steel ([edition 14, November 30, 2007](#))
 - 2. UL651A – High Density Polyethylene (HDPE) Condit ([edition 4, January 3, 2024](#))
 - 3. UL 1990 – Nonmetallic Underground HDPE Conduit with Conductors ([edition 4, January 3, 2024](#))
- C. National Electrical Manufacturers Association
 - 1. NEMA 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
 - 2. NEMA FN 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
 - 3. NEMA OS 1 – Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 4. NEMA OS 2- Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
 - 5. NEMA RN 1 – Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
 - 6. NEMA TC 2 – Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
 - 7. NEMA TC 3 – PVC fittings for Use with Rigid PVC Conduit and Tubing.

1.3 SYSTEM DESCRIPTION

- A. Raceways and boxes located as indicated on the drawings, and other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.
- B. Underground More Than 5 Feet Outside Foundation Wall: Provide rigid metal conduit, PVC coated rigid metal conduit, or concrete encased PVC conduit. Provide cast metal boxes or nonmetallic handhole.
- C. Underground Within 5 Feet from Foundation Wall: Provide rigid metal conduit, PVC coated rigid metal conduit, or concrete encased PVC conduit. Provide cast metal or nonmetallic boxes.
- D. In or Under Slab or Grade: Provide rigid metal conduit, PVC coated rigid metal conduit, or concrete encased PVC conduit. Provide cast metal or nonmetallic boxes.

- E. Outdoor Locations, Above Grade: Provide rigid metal conduit or PVC coated rigid metal conduit. Provide cast metal or nonmetallic outlet, pull, and junction boxes.
- F. In Slab Above Grade: Provide rigid metal conduit or PVC coated rigid metal conduit. Provide cast metal boxes.
- G. Below Grade: Provide Schedule 40 or Schedule 80 PVC conduit in concrete encased duct bank where indicated on the drawings.
- H. Wet and Damp Locations: Provide rigid metal conduit or PVC coated rigid metal conduit. Provide cast metal or nonmetallic outlet, junction, and pull boxes. Provide flush mounted outlet boxes in finished areas.
- I. Concealed Dry Locations: Provide rigid metal conduit, PVC coated rigid metal conduit, or PVC conduit. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.
- J. Exposed Dry Locations: Provide rigid metal conduit, PVC coated rigid metal conduit, or PVC conduit. Provide sheet-metal boxes. Provide flush mounting outlet box in finished areas. Provide hinged enclosure for large pull boxes.

1.4 SUBMITTALS

- A. Prior to obtaining any material in connection with this Section, detailed shop drawings on all material shall be submitted. Submittals shall conform to the requirements of section 01 33 00 Submittals.
- B. Submittals shall contain a material list with manufacturer's name and data describing the material and showing its compliance with specifications and associated standards.
- C. Samples of any material shall be submitted upon Engineer's request.
- D. Prior to installation of any material in a specific area, a detailed plan layout of the conduit system, including the routing of conduits, support systems, junction boxes, conduit fittings and condulets, and coordination of other work, shall be submitted to the Engineer for review. Existing conduits and enclosures to be reused shall be shown and indicated on the submittal.

1.5 CLOSEOUT SUBMITTALS

Provide project record documents which record actual locations of components and circuits.

1.6 QUALITY ASSURANCE

- A. Material and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:
 - 1. American National Standard Institute (ANSI)
 - 2. National Electrical Code (NEC)
 - 3. National Electrical Manufacturers Association (NEMA)

4. Underwriters Laboratories (UL)

- B. Equipment furnished under this section shall be furnished by manufacturers who meet the industry standards for quality, workmanship, and experience.

PART 2 PRODUCT

2.1 CONDUIT

A. Rigid Metal Conduit (Type RMC)

1. Rigid metal conduit shall be galvanized steel, hot-dipped with zinc over the entire length, both exterior and interior including threads. Conduits shall have a coat of lacquer for sealing.
2. Each conduit shall have a coupling on one end and a thread protector on the other. Conduit shall be UL Listed and threaded in accordance with ANSI/ASME B.1.20.1-1983 Pipe Threads, General Purpose (inch) (3/4-inch taper per foot).
3. Conduit shall meet ANSI Standards C80.1 and C80.4 latest revisions, and ANSI/UL6. The conduit shall be manufactured by Allies Tube & Conduit Corporation, Pittsburgh Standard Conduit Company, Triangle PWC Co., or equal.

B. Non-Metallic Conduits (PVC)

1. Non-Metallic conduits and fittings shall be Schedule 40 or schedule 80, polyvinyl chloride. Materials shall be corrosion and fire retardant, and sunlight resistant.
2. Conduit and fittings shall be in accordance with the NEMA Standard TC-2 and TC-3, latest revisions, and UL-651 Schedule 40 and 80 PVC Conduit.
3. The conduit and fittings shall be manufactured by Carlon Electric Conduit Co., Triangle PWC Co., or equal.

C. Flexible Conduit

1. Flexible metallic conduit (Greenfield). Shall be hot dipped galvanized flexible steel or aluminum and shall comply with UL Standard No. 1, latest revisions. Conduit shall be manufactured by Anaconda Metal Hose Company, Triangle PWC Co., or equal. Fittings shall be PVC coated at each end of the liquid-tight conduit.
2. Liquid-tight flexible metal conduit (Seal-tight). Shall be constructed of flexible corrosion resistant zinc galvanized steel conduit with an extruded plastic jacket and built-in continuous copper ground strap under the jacket. Conduit shall be type UA manufactured by Anaconda Metal Hose Company, Type LA manufactured by Electri-Flex Co., or equal. Fittings shall be PVC coated at each end of the liquid tight conduit.
3. Liquid-tight Flexible Non-metallic Conduit. Shall be constructed of corrugated flexible PVC. Fittings shall be identified for use with flexible non-metallic conduit. Flexible non-metallic conduit shall be Carflex as manufactured by Carlon, or equal.
4. Hazardous Area Flexible Metal Conduits. Flexible metal conduits installed in areas classified as Hazardous shall be Crouse-Hinds Series EC, Killark Series EK, or equal.

2.2 JUNCTION, DEVICE AND PULL BOXES

A. Junction Boxes.

1. Junction boxes and pull-boxes shall be sized as required for the quantity and size of conductors to be installed within the box. Sizes shall comply with the requirements of the National Electrical Code for wire bending space radius.
2. Cast Junction Boxes. Junction boxes for use with RMC shall be constructed of hot-dipped galvanized cast iron or copper free aluminum and shall be sized per NEC requirements. Boxes shall be manufactured by Crouse-Hinds Co., Killark Co., or equal.

B. Device Boxes for Outlets and Switches

1. Cast Device Boxes. Cast device boxes shall be constructed of hot-dipped galvanized cast iron or copper free aluminum and sized in accordance with the requirements of the National Electrical Code. Boxes shall be Series FD manufactured by Crouse-Hinds Co., Series FD manufactured by Killark Co., or equal.
2. Flush Device Boxes. Device boxes installed within concrete masonry units shall be constructed of code-gage galvanized steel and shall be of the type specifically approved for masonry use. Boxes shall be installed flush with finished surface and the mounting height shall be adjusted for masonry joints.

C. Pull Boxes:

Pull boxes shall be used in dry locations only for pulling. No splicing of conductors shall be allowed. The boxes shall be constructed of galvanized steel, 12-gauge sheet metal, angle and frame members with welded joints. The pull box cover shall be gasketed and attached with stainless steel screws. A ground lug shall be provided, sized in accordance with the National Electrical Code.

2.3 CONDUIT OUTLET BODIES, FITTINGS, COUPLINGS, EXPANSION COUPLINGS, CONDUIT SLEEVES, AND SUPPORTS

A. Conduit Outlet Bodies

1. Conduit outlet bodies shall be used where required to permit ready fishing and withdrawing of wires. Conduit bodies not located in areas classified as Hazardous shall be gasketed. Bodies shall be of cast iron or copper-free aluminum type. Bodies shall be Condulet series manufactured by Crouse-Hinds Co., Electrolet series manufactured by Killark Co., or equal.
2. Conduit outlet bodies used with rigid PVC conduit shall be of the same material and schedule as rigid PVC conduit.

B. Fittings and Couplings

1. PVC Coated Rigid Metal Conduit - All couplings and fittings for PVC coated rigid metal conduits shall have factory coating similar to above PVC coated conduit bodies.
2. PVC - All couplings and fittings for PVC rigid conduit shall be of the same material and schedule as PVC rigid conduit.

C. Expansion Couplings

1. Expansion couplings shall be a watertight, corrosion retardant coupling with flexible neoprene outer jacket, stainless steel jacket clamp, flexible copper ground strap, and internal hub bushing.
2. Coupling shall compensate for the following movements:
 - a. Axial expansion or contraction
 - b. Angular misalignment
 - c. Parallel misalignment
3. Coupling shall be Type XD as manufactured by Crouse-Hinds Company, Type DX as manufactured by O.Z. Gedney Co., or equal.

D. Conduit Sleeves

Where conduits pass through the walls or floors of structures, they shall be installed in suitable sleeves. Sleeves, installed in the outside walls of structures or elsewhere where watertightness is required, shall be cast iron and shall be equal to thru-wall and floor seal manufactured by O.Z. Gedney Manufacturing Company, Inc. Types No. FSK, WSK, FSC, or WSC as required, or Link-Seal as manufactured by Thunderline Corp. When Link-Seal is used, a wall sleeve, with water-stop, shall be installed. All other sleeves shall be galvanized steel pipe.

E. Conduit Hangers and Supports

1. Hangers and supports for conduits shall be adequate to support conduit systems with a minimum safety factor of 10.
2. All steel parts of the conduit support systems shall be galvanized, cadmium plated or PVC coated.
3. Perforated strap hangars shall not be used.
4. Conduit supports shall be as manufactured by Steel Coty Co. (Kindorf), Unistrut Corp., Allied Tube & Conduit Corporation (Power-Strut) or equal.
5. One hole, malleable iron pipe clamps shall be hot-dipped galvanized. Pipe spacers shall be of malleable iron and have a hot-dip galvanized finish.
6. Hanger rods shall be continuous thread and galvanized not less than 3/8" inch in diameter.
7. All fasteners shall be stainless or silicon bronze.
8. All expansion anchors shall be self-drilling type.

F. Cable Terminator Fitting

1. Cable terminating fittings shall be provided complete with gland nut and neoprene bushing properly sized to provide a tight seal.

2. Cable terminator fittings shall be CGB or CGF series as manufactured by Crouse-Hinds, or equal.

2.4 MISCELLANEOUS ACCESSORIES

A. Warning Tape

1. Tape shall be red and have imprinted a minimum of 1-inch high letters "CAUTION BURIED ELECTRIC LINE BELOW" or appropriate warning approved by the Engineer.
2. Tape shall be 6 inches wide, 4.5 mils thick, and made of low-density polyethylene.
3. Warning tape shall be as manufactured by Allen Systems (Houston, Texas), Panduit, or equal.

B. Duct-bank Conduit Spacers

1. Underground Duct-bank conduit spacers shall provide stability and consistent separation on duct-banks. Spacers shall be sized for the conduits with which they are used. They shall provide both vertical and horizontal spacing with interlocking intermediate and base spacers.
2. Duct-bank conduit spacers shall be as manufactured by Carlon, or equal

2.5 SUPPORT GRIPS

Provide a flexible wire mesh holding device to fit around an electrical cable for support of motor cable as shown on the Contract Drawings. The support grip shall support vertical runs of up to 99 feet with loads up to 600 pounds. Provide a single eye for attaching support grip to steel rod. Support grips shall be Hubbel Kellems, or equal.

PART 3 EXECUTION

2.1 INSTALLATION

A. General

1. All interior conduit work shall be installed exposed except areas in which there is a finished ceiling, or as indicated on the Contract Drawings, "Room Finish Schedule," a finished ceiling will be installed. These areas shall have all conduit work concealed.
2. No exterior conduits shall be run exposed on outside walls of buildings, or structures.
3. Minimum size shall be $\frac{3}{4}$ inch unless specifically shown otherwise.
4. Sufficient expansion fittings for the application shall be installed.

5. Conduit shall not be used to support enclosures except as permitted by the National Electrical Code.
6. Splices or taps shall not be made inside conduits.
7. All conductors and neutrals of the same circuit and all equipment grounding conductors shall be contained within the same conduit.
8. The conduit system shall be installed complete, including tightening of joints, from termination point to termination point, prior to installation of conductors.
9. Conduit shall be installed with a minimum number of joints. Conduits shall be continuous and shall be secured in such a manner that each system shall be electrically continuous. Terminations of conduits shall be furnished with locknuts at each fabricated panel using watertight conduit hubs. (Use PVC coated hubs in corrosive or chemical environments).
10. Terminations of metallic conduits shall be furnished with grounding bushings in accordance with Section 26 05 26 Electrical Grounding.
11. Where exposed conduit requires clamping to the building structure, clamps shall consist of galvanized iron or stainless steel one-hole pipe straps and expansion shields.
12. All conduit fittings, connectors and couplings shall be properly tightened in such a manner so as not to be easily “backed off” in order that proper ground continuity is established.
13. The use of lubricating materials to aid in the installation of conductors is allowed. Where necessary, a powdered soapstone and “Y-ER-EAS” are acceptable.
14. Support outlets, pull-boxes, and junction boxes separately from building construction, not from conduit.
15. Where exposed conduit is permitted, install conduit parallel to or perpendicular to walls, ceilings, and lines of building, in neat and organized configurations.
16. Coordinate all conduit installations with other trades in advance of installation.
17. Ream conduit ends before installation
18. Plug conduit openings until wires are installed.
19. Where spare conduits are shown to be installed, the conduit shall be capped at each end as provided with a nylon fish-wire.
20. Expansion couplings shall be installed in conduits crossing building expansion joints.
21. Plug conduit openings until wires are installed
22. Do not install conduit or boxes in structural columns unless detailed on Contract Documents.

23. Do not install adjacent to or on hot surfaces.
24. Do not install conduit in water or in areas saturated with moisture.
25. All conduit threads shall be given a coat of zinc dust in oil or other approved compound and shall be made watertight.
26. All conduits routed next to walls, columns, or ceilings shall have minimum ¼" separation between conduit and walls or ceiling.
27. Conduit reducers shall not be allowed unless otherwise specified, or approved by the Engineer.
28. Conduits entering enclosures shall be provided with Myers hubs.

B. PVC Coated Rigid Metal Conduit Requirements

1. PVC coated rigid metal conduits shall be installed using proper tools for threading and tightening conduit fittings.
2. Cutting back of coating for threading will not be allowed.
3. Minor touch up of coating shall be with manufacturer's recommended touch-up compound of applicable color.
4. Contractor must be trained and certified by the factory before installation of PVC coated products can begin.
5. Any coating and conduit considered by the Engineer damaged excessively shall be replaced at Contractor's expense.
6. Conduits shall be installed with a minimum number of joints. Conduits shall be continuous and shall be secured in such a manner that each system shall be electrically continuous. Terminations of conduits shall be furnished with locknuts at each fabricated panel or pull box using PVC coated hubs. Hubs shall be as manufactured by Myers.
7. Conduits entering enclosures shall be provided with PVC coated Myers hubs.

C. PVC Rigid Conduit Requirements

1. PVC rigid conduit shall be installed per manufacturer's recommendations.
2. Use proper tools for installing PVC conduits.
3. Fittings, boxes, and other accessories shall be PVC of the same schedule with all joints being the solvent cement type.

D. Conduit Supports and Hangers

1. Conduit supports shall be spaced at intervals of 8 feet or less as required to obtain rigid construction.

2. Single conduits shall be supported by pipe clamps with clamp backs to raise conduits at least 1 inch from the surface.
3. Multiple runs of conduits shall be supported on trapeze hangers with steel horizontal members and threaded hanger rods. Trapeze hangers shall be crossed braced to prevent spreading.
4. Conduit hangers shall be attached to structural steel by means of beam or channel clamps.
5. Supports located in corrosive areas and/or where shown shall be PVC coated.

E. Conduit Routing

1. The number of bends, offsets and crossovers shall be kept to a minimum.
2. The Contractor shall exercise the necessary precautions to prevent the lodging of dirt, plaster, or foreign matter, in conduits, boxes and fittings during installations.
3. Runs shall be parallel to walls, beams, columns and horizontal planes and shall be neatly aligned.
 - a. For bends made in the field, an approved conduit bending machine shall be used.
 - b. Field bends shall be symmetrical and carefully made so as to prevent damage or deformation of conduit.
4. Conduit runs shall be slightly pitched to facilitate draining condensation or shall be otherwise installed to prevent trapping of condensation.

F. Underground Conduits

1. Conduits shall be buried to a minimum of 24 inches unless otherwise shown or specified.
2. All buried metallic conduits shall be individually tied to plant grounding grid at each electric manhole or handhole.
3. All buried conduits or groups on conduits 2 feet in width or less shall have an identifying tape buried 12 inches under finish grade and located directly over the centerline of the conduits. Groups of conduits over 2 feet wide shall have additional identifying tape per 2 feet or less of additional width. Where shown on the Contract Drawings, additional tapes shall be provided for duct banks wider than thirty inches.
4. Underground conduit not encased in concrete shall be PVC coated rigid steel
5. Underground conduit exiting and entering structures shall have expansion couplings as specified.
6. Where conduit is buried below structures, footing, slabs, etc., the electrical Subcontractor shall excavate, install, backfill, and compact buried conduit prior to final compaction by General Contractor.

7. Any Earthwork shall be in accordance with section 02200 Earthwork.
8. The transition from the underground conduit system to the building interior conduit system shall occur at the first junction box, device, or equipment enclosure within the building. Conduit seals shall be provided at this location. Such seals shall minimize the circulation of air between the underground conduit system and the indoor enclosures. Seals shall be composed of Duct Seal sealing compound or similar non-hardening removable sealant.
9. Conduit bends in underground conduits shall have a minimum centerline radius as follows:

<u>Conduit Size</u>	<u>Radius (inches)</u>
3 inch	36
4 inch	42
5 inch	48

10. Conduits terminating at manholes shall have endbells or insulated bushings.
11. Conduit spacers shall be used when installing two or more underground conduits. Conduit spacers shall be located at intervals of 8 ft or less.

D. Conduits in Concrete

1. All electrical conduit placed in concrete slabs shall be installed after and above the bottom reinforcing bars, but before and under the top reinforcing bars.
 - a. Where conduit crossovers are necessary, they shall be located so that the reinforcing bars are not displaced from their positions.
 - b. The minimum clearance between conduits shall be 2 times the diameter of the conduit.
 - c. No conduit greater than $t/4$ in diameter, where "t" is the thickness of the concrete slab, shall be placed in any structural slab.
 - d. If these conditions cannot be satisfied, the conduit shall be placed below the slabs.
2. Where electrical conduits in slabs cross a building expansion joint, an expansion coupling for each conduit shall be installed at the joint.
3. Conduits encased in concrete shall be type 40 heavy - wall polyvinyl chloride per NEMA standards and UL listed.
4. Where concrete encased conduits enter manholes, #4 dowels shall be installed between the duct bank and manhole, on 8 inch centers around the perimeter of the duct bank, to minimize the potential for conduit shearing at the ductbank/manhole interface.
5. Concrete encased conduits (underground ductbanks) where shown or scheduled shall be schedule 40 PVC. Where these conduits enter buildings or equipment, concrete encasement shall stop approximately 5 ft from the building or equipment. There shall be

a transition from schedule 40 PVC to RMC or IMC approximately 10 ft. from the building or equipment, so that the transition occurs within the concrete encasement.

2.2 CONDUIT TYPES

- A. Conduit types shall be in accordance with the following schedule unless specifically noted otherwise on the Contract Documents:

Area/Use Description	RMC	PVC	Reference Notes:
Underground Ductbanks	x		
Conduit Encased in Concrete		x	
Exposed Conduit	x		

- B. Only rigid metal conduit (RMC) or Intermediate metal conduit (IMC), shall be provided, unless specifically noted otherwise on the Contract Drawings.

** End of Section **

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SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 DESCRIPTION

This Section includes materials, procedures, practices, and requirements that shall be provided for identification of raceways, conductors, instruments, equipment, and devices.

1.2 QUALITY ASSURANCE

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein:

1. National Electrical Code (NEC)
2. Underwriters Laboratories, Inc. (UL)

1.3 SUBMITTALS

- A. Prior to obtaining any materials in conjunction with this Section, detailed shop drawings on all material shall be submitted. Submittals shall conform to the requirements of Section 01 33 00 Submittals.
- B. Submittals include:
1. Complete list of all engraved nameplates. Failure to indicate all nameplates on this list shall not relieve the contractor of the requirement for their installation.
 2. Sample of engraved nameplate, punch type label, marking tags, laminated instrument tags.
 3. Catalog data sheets for engraved nameplates, marking tags, or other item used to identify equipment.
 4. Duplicate set of all engraved nameplates.

PART 2 PRODUCTS

2.1 NAMEPLATES

- A. Nameplates shall be engraved lamicoid.
- B. All lettering shall be uppercase (condensed block type), unless otherwise noted.
- C. Nameplate colors shall be black with white letters unless otherwise shown.
- D. Nameplate numbering system, lettering style, and letter size shall be as shown on Contract Drawings, schedules, etc.

- E. Plaques for building disconnecting means shall be provided on disconnecting means enclosures for each disconnecting means. For building with multiple power sources, each power source disconnecting means shall be provided with a plaque identifying it as a building disconnecting means, and the total quantity of building disconnecting means within the building. Plaques shall be of the same construction as the service entrance plaques specified in section entitled “Incoming Services”.

2.2 MARKING TAGS (WIRE AND CABLE IDENTIFICATION)

Marking Tags shall be by means of preprinted plastic tape. Manufacturer: Brady, O.Z. Gedney, equal.

2.3 INSTRUMENT TAGS

- A. Instrument tags shall be laminated vinyl tape, minimum 3 inches by 5 inches with preprinted insert and “write on” type laminate to provide calibration and servicing information. Each tag shall include a pre-punched hole for fastening to instrument with ty-raps.
- B. Tags shall be Panduit No. PST-2 or equal with a preprinted (not handwritten) insert.
- C. Each instrument tag shall include the following as appropriate:

SIDE 1

FIT – 5021(*instrument tag number*)

FLOW INDICATIONG TRANSMITTER (*instrument type*)

Manufacturer: xxxxx
Model No.: xxxxx
Serial No.: xxxxx
Calibrated Range: xxxxx
Power: 0-24 VDC (*if applicable*)
Installed by: xxxxx, Inc.
Any town, Any state, USA

SIDE 2 (*write-on laminate side*)

FIT – 5021 (*instrument tag number*)

FLOW INDICATING TRANSMITTER (*instrument type*)

Calibrated Range: xxxx-xxxx GPM
Output: 4-20 mA
Alarms Set @ High: xxxxx
 Low: xxxxx
Recommended Service Interval: xxx months
Last Serviced on: xxxxx
Last Serviced by: xxxxx

PART 3 EXECUTION

3.1 INSTALLATION

- A. Follow the numbering systems specified, scheduled and/or shown on the Contract Documents.
- B. Provide identification noted on panel schedules, one-line diagrams, etc. for all instruments, panelboards, contactors, transformers, disconnect switches, bus-ways, motor starters, devices, controllers, motor control centers, unit substation, fire alarm systems, sound systems, and all other electrical devices and enclosures. Indicate with engraved lamicoid nameplate, on cover of equipment and label with numbers and letters as shown.

3.2 FASTENING

- A. Nameplates: Clean equipment surface and securely fasten each label with silicone adhesive.
- B. Instrument Tags: Laminated instrument tags shall be fastened to instruments with cable ties.

3.3 DEVICES (RECEPTACLES AND LIGHT SWITCHES)

Label all receptacles and light switches on faceplate with 3/4-inch clear punched (Dymo) tape.

- A. Provide the following information:
 - 1. Panel Designations (per panelboard schedules)
 - 2. Branch Breaker Number

3.4 WIRE CABLES

- A. Tag all feeders, sub-feeders, special system wiring, and control wiring in each panelboard, pull-box and gutter space, denoting points of origin and termination of the wires.
- B. Provide the following information:
 - 1. Panel or source where the conductors originate
 - 2. Circuit Number
 - 3. Circuit Designation

3.5 EMERGENCY LIGHTING

All lighting fixtures powered from an emergency source of power shall be identified by 1/2-inch diameter red dots.

3.6 SPECIAL PANELBOARD REQUIREMENTS

- A. Nameplates: Identify in accordance with Panel Schedule
- B. Directory:
 - 1. Provide complete type written directory for each panel, with all room numbers, functions, etc., clearly identified for each individual branch circuit.
 - 2. Handwritten directory shall be provided until all circuits are connected and balanced. Then, install permanent directory. Do not mark circuit identification on the front of enclosure of panels or on other electrical equipment.
 - 3. Lighting panel locations shall be identified in the panel directory according to location.

4. Electrical sub-feed circuits from panels shall also be identified in the panel directories.
5. When branch circuits are relocated, the panel directory shall be updated to indicate new functions, and locations.
6. When branch circuits are removed, the panel directory shall be updated to indicate a spare.

**** End of Section ****

SECTION 26 28 00
PANELBOARDS AND CIRCUIT PROTECTIVE DEVICES

PART 1 GENERAL

1.1 DESCRIPTION

This section includes low voltage panelboards, circuit breakers, disconnect switches, fuses, and other circuit protective devices for service at 600 VAC or less.

1.2 QUALITY ASSURANCE

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. Underwriters Laboratories, Inc. (UL) 1449
 - 4. American National Standards Institute (ANSI)
- B. Qualifications of manufacturer. Provide materials and equipment that are the products of manufacturers regularly engaged in the production of such products which are of equal material, design, and workmanship. Products shall have been in satisfactory commercial or industrial use for two (2) years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer.
- C. Uniformity. Unless otherwise specified, equipment or material of the same type of classification, used for the same purpose shall be the product of the same manufacturer. All material shall be new and of the current design of the manufacturer providing equipment or material.

1.3 SUBMITTALS

- A. Submittals shall conform to the requirements of Section 01 33 00 Submittals, and to the requirements given in Section 26 00 00 Electrical General. In addition, submittals shall include the manufacturer's name, trade name, place of manufacturer, catalog model, layout dimensions, project specification, and technical paragraph reference.
- B. Submittals shall contain a material list with manufacturer's name and data describing the material and showing its compliance with specifications, associated standards and test requirements.
- C. Prior to obtaining any material in connection with this section, detailed shop drawings on all material shall be submitted. Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog data sheets. Submittal shall include ratings, circuit diagrams, and dimensional data, as a minimum. Drawings shall include elementary and interconnection diagrams showing connections to internal components, and indicate field termination points for power and

control interface. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted.

- D. Submittals shall contain complete part numbers for all materials, including the panelboard enclosure, the neutral bar, the ground bar, the lugs, and the circuit breakers. And the submittal shall include an explanation of each part number, and the options and alternatives available
- E. Submittals shall also contain descriptive data and time-current characteristic trip curves for each type of circuit breaker or fuse. These curves shall be submitted on full size manufacturer's drawings.
- F. Samples of any material shall be submitted upon Engineer's request.

1.4 CLOSEOUT SUBMITTALS

Provide project record documents which record actual circuit directories, as well as actual locations of components and circuits.

PART 2 PRODUCT

2.1 PANELBOARDS

A. Panelboards

1. Panelboards shall meet Federal Specification W-P-115B, Type 1, Class 1, and shall conform to UL50 UL67, and NEMA PB-1.
2. Loadcenters (Federal Specification W-P115C Type 1 Class 2) shall not be substituted for panelboards unless specifically indicated.
3. Panelboards shall be circuit breaker type as shown on the drawings with neutral bar, ground bar, and main and branch circuit breakers as scheduled.
 - a. Unless otherwise shown, scheduled or specified, bus bars, ground bar, and neutral bar shall be copper or tin plated aluminum.
 - b. Panelboards shall be furnished and installed in accordance with the panelboard schedules as shown.
 - c. Subject to Engineer's review, such schedules may be revised to obtain more convenient grouping and better balance of the actual connected load.
4. Panelboards shall be provided with ample wiring gutters and shall have a single door with spring door hinges, lock, keys, and cardholder on the side of the door. Circuit identification cards shall be typewritten with circuits identified as actually installed.
5. Panelboards shall have single, double, or triple pole bolt-on branch circuit breakers as scheduled.
 - a. Branch circuit breakers shall be in accordance with subsection headed "Molded Case Circuit Breakers".
 - b. Unless otherwise shown, circuit breakers shall be rated at 20 amperes.
 - c. Circuit breakers shall be provided for all spares shown on the schedule.

6. Short circuit current requirements shall be obtained only from the schedules, specifications, or the Contract Drawings.
 - a. If this information is not shown, the Engineer shall be consulted.
 - b. Under no circumstances shall any short circuit requirements be assumed by the Contractor.
 - c. Integrally rated panelboards utilizing branch breakers with reduced short circuit ratings are acceptable.
7. Panelboards with main circuit breakers serving as building disconnecting means shall be service entrance rated, and shall be provided with a plaque designating the circuit breaker as a building disconnecting means.
8. Provide surge suppression for panelboards in accordance with Section 26 43 13 Transient Voltage Surge Suppression. Devices for surge suppression may be an integral part of the panelboard.
9. Panelboard enclosures shall be provided with key-locked doors. Provide a minimum of two keys for each lock.
10. Manufacturers
 - a. 120/208 VAC and 120/240 VAC, 3 Phase Panelboards. Unless otherwise indicated, four wire 120/208 VAC and 120/240 VAC panelboards shall be: bolt-on AQ Series manufactured by General Electric Co., Type NQOD manufactured by Square D Company, or equal.
 - b. 277/480 VAC, 3 Phase Panelboards. Unless otherwise indicated, four wire 277/480 VAC panelboards shall be: bolt-on AE Series manufactured by General Electric Co., Type NF as manufactured by Square D Company, or equal.

B. Panelboard Circuit Breakers

1. Circuit breakers, where included as part of panelboards, shall be mechanically and electrically similar to molded case circuit breakers.
2. Single pole breakers shall have a minimum interrupting rating of 10,000 amperes RMS symmetrical at 240 VAC or 14,000 amperes at 480 VAC unless otherwise shown or specified.
3. Except where otherwise shown, trip ratings shall be 20 amperes.
4. 120/208 VAC circuit breakers shall be Q Line manufactured by General Electric Co., Type QOB manufactured by Square D Company, or equal.
5. 277/480 VAC circuit breakers shall be TEY Line manufactured by General Electric Company, Type ED/EG/EJ manufactured by Square D Company or equal.
6. GFCI circuit breakers shall be provided where scheduled on the Contract

2.2 CIRCUIT BREAKERS

A. Molded Case Circuit Breakers

1. Except as modified below, the material and construction of molded case circuit breakers shall be in accordance with NEMA AB-1 and UL 489 standards for breakers.

2. Circuit breakers shall be of the air-break type.
3. Circuit breaker mechanisms shall be so designed that an overload or a fault on any one pole shall trip all poles simultaneously.
4. All poles shall be effectively barriered from one another.
5. Circuit breaker handles shall be trip-free. Circuit breakers in motor control centers or individual enclosures shall be interlocked with the door latching mechanism so that the door of the circuit breaker enclosure or motor control center compartment cannot be opened unless the circuit breaker contained is in the open position.
6. Number of poles and trip ratings of circuit breakers shall be as shown, specified, or required.
7. Motor control center main and tie circuit breakers shall be provided with auxiliary contacts for remote monitoring of the circuit breaker status.

B. Individual Circuit Breakers

1. Circuit breakers shall have a minimum of 14,000 amperes RMS symmetrical interrupting rating at 480 VAC or 10,000 amperes at 240 VAC except where different ratings are shown on the Contract Drawings, or unless otherwise specified.
2. Circuit breakers, 225 ampere frame and above, shall have interchangeable thermal and adjustable magnetic tripping elements.
3. Circuit breaker enclosures of the type shown on the drawings shall be provided.

C. Motor Circuit Protectors

1. Motor Circuit Protectors (MCP) shall have a quick make, quick break, switching mechanism, mechanically trip free from the handle, enclosed in a molded case.
2. The Contractor shall field verify actual motor starting and running currents in sizing the MCPs. Any replacement of MCPs due to this verification not being performed shall be done at no additional cost to the Contract.
3. MCPs shall have provisions for adjusting the instantaneous magnetic trip element.
4. Each pole shall provide instantaneous short circuit protection and all poles shall be constructed to open, close, and trip simultaneously.
5. Where higher short circuit protection is required, MCPs shall be provided with current limiters with trip indicators that are fully coordinated with the motor circuit protector so all three phases open if the current limiter is operated. Current limiters shall be constructed so replacement can only be made with an identical limiter having the same interrupting capacity. The minimum interrupting short circuit ratings of the MCP shall be known as shown on the Contract Drawings (integral rating).

6. MCPs shall be Type MCP manufactured by Cutler-Hammer Co., type Mag-Break manufactured by General Electric Co., or equal.

D. Service Entrance Circuit Breakers

1. Where shown or required, a service entrance breaker shall be provided to disconnect all conductors in a building or structure from the service-entrance conductors.
2. The service entrance breaker shall be UL listed, service entrance rated.
3. Where a 480 Volt System 1,000 ampere breaker or larger is shown or required, ground fault protection shall be provided in accordance with NEC 230-95.
4. The service entrance breaker shall be provided with an appropriate enclosure labeled as "Service Disconnect," and the enclosure shall be connected to the grounding grid in accordance with Section 16450 Electrical Grounding and the National Electrical Code.

2.3 SWITCHES

A. Disconnect Switches

1. Disconnect switches as indicated on the plans and specifications shall be NEMA Heavy Duty Type HD, Underwriter's Laboratories listed. The switches shall be fusible type unless otherwise indicated on the Contract Drawings.
2. Switch Interior. All switches shall have switchblades that are fully visible in the OFF position when the door is open. Switches shall have removable arc suppressors, where necessary, to permit easy access to line-side lugs. Lugs shall be UL listed for aluminum and/or copper cables and front removable. All current carrying parts shall be plated.
3. Switch Mechanism. Switches shall have a quick-make, quick-break, operating handle and mechanism, which shall be an integral part of the box, not the cover. Switches shall have interlock to prevent unauthorized opening of the switch door in the ON position or closing of switch mechanism with the door open. Handle position shall indicate if switch is ON or OFF. Switch shall be lockable in the OFF position.
4. Enclosures. Switches shall be furnished in NEMA 1 general-purpose enclosures unless specified as NEMA 3R (rainproof), NEMA 4 (stainless steel), or NEMA 7 (Class1, Div 1) on the Contract Drawings. Covers on NEMA 1 enclosures shall be attached with pin type hinges.
5. Ratings. Switches shall be rated as indicated on the Contract Drawings. The switch must have a UL listed rejection feature to reject all fuses except Class R. UL listed short circuit ratings, when equipped with Class J or Class R fuses, shall be 200,000 amperes RMS symmetrical.

B. Molded Case Switches

1. Molded case switches shall be provided where shown on the Contract Drawings. Molded case switches shall be automatic type designed to open instantaneously at a factory preset magnetic trip point. Molded case switches shall be designed for 600 VAC, 3 pole, with a minimum withstand rating of 25,000 amperes.

2. Molded case switches shall be as manufactured by Square D, or equal.

2.4 FUSES

- A. Low Voltage (less than 600 volts) cartridge fuses shall be of the voltage and amperage rating listed on the drawings. Fuses shall be selected to provide overcurrent , short circuit, and blackout protection. They shall be of the type listed below unless otherwise indicated.
 1. Main service and feeder protection (above 600 amps) – Current limiting UL Class L above 600 amperes (current UL standards do not rate Class L fuses at 600 amperes or below).
 2. Main service and feeder protection at 600 amps and below – Current limiting UL Class J.
 3. Motor branch circuit, transformer, inductive loads protection (such as MCCs, starters,etc.) – UL Class J current limiting, time delay for motor inrush and short circuit protection.
- B. Manufacturers
 1. Bussman
 2. Littlefuse
 3. Eagle
 4. equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Electrical Contractor shall refer to all pertinent Sections of these Specifications for installation details of other equipment associated with panelboards and individual circuit breakers.
- B. Provide all miscellaneous bolts, washers, nuts, clips, Belleville washers, lockwashers, small hardware, etc., of corrosion resistant material to make installation complete.
- C. Provide minimum working clearance, as described in the National Electrical Code Article 110.26, for all electrical equipment.
- D. Verify the location of each piece of equipment at the site before installing enclosures or conduits.
- E. Mount all cabinets level and plumb, flush or surface as scheduled.
- F. Install recessed cabinet flush with finished wall.
- G. Be sure wall thickness will accept panel enclosures before ordering equipment.
- H. Paint all scratches, marris, and other imperfections in the finish, resulting from installation. Use matching paint.
- I. Provide complete and professional installation for all items of equipment included in this Section, and in accordance with the National Electrical Code.

3.2 INSTALLATION OF PANELBOARDS

- A. Mount panelboards 6'-6" minimum to centerline to top circuit breakers; 3'-0" to bottom of cabinet where possible, unless noted otherwise.
- B. Properly align panel in cabinet.
- C. Provide for empty 1-inch conduits from panel to ceiling space for all flush mounted panels. Arrange for future continuation of work.

3.3 FUSES

- A. Install fuses in fusible devices as shown. Arrange fuses such that fuse ratings may be read without removing the fuse.
- B. Install spare fuse cabinet with spare fuses in location shown (or adjacent to distribution switchgear).
- C. Spare Fuses. Furnish quantity equal to 20 percent of each type and six installed, but not less than one set of three of each of type and size.

** End of Section **

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SECTION 26 29 13 MOTOR CONTROLLERS

PART 1 GENERAL

1.1 SUMMARY

This Section includes motor controllers for the three-phase and single-phase motors operating at voltages not in excess of 600 VAC.

1.2 QUALITY ASSURANCE

- A. Material and installation shall be in accordance with the latest revision of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. Underwriters Laboratories (UL)
 - 4. International Electrotechnical Commission (IEC)
- B. Qualifications of manufacturer. Provide materials and equipment that are the products of manufacturers regularly engaged in the production of such products which are of equal material, design, and workmanship. Products shall have been in satisfactory commercial or industrial use for two (2) years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer.
- C. Uniformity: Unless otherwise specified, equipment or material of the same type of classification, used for the same purpose shall be the product of the same manufacturer. All material shall be new and of the current design of the manufacturer providing equipment or material. Solid state motor controllers, AC magnetic contactors, NEMA rated overloads, and molded case circuit breakers for motor circuit shall be of the same manufacturer.

1.3 SUBMITTALS

- A. Submittals shall conform to the requirements of Section 01 33 00 Submittals, and to the requirements given in Section 26 00 00 Electrical General. In addition, submittals shall include the manufacturer's name, trade name, place of manufacturer, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification, and technical paragraph reference.
- B. Submittals shall contain a material list with manufacturer's name and data describing the material and showing its compliance with specifications, associated standards and test requirements.
- C. Prior to obtaining any material in connection with this section, catalog data and detailed wiring connection diagrams shall be submitted. Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog data sheets. Submittal shall include ratings,

circuit diagrams, and dimensional data, as a minimum. Drawings shall include elementary and interconnection diagrams showing connections to internal components, and indicate field termination points for power and control interface. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted.

- D. Shop drawings shall present complete and accurate information relative to all working dimensions, equipment weights, assembly and section views, and all necessary details pertaining to coordinating the work of the Contract, lists of materials and finishes, parts list and the descriptions thereof, lists of spare parts and tools where such parts or tools are required, and any other information that is required to demonstrate compliance with the Contract Documents. Drawings for electrical equipment shall include elementary and interconnection diagrams showing connections to internal components, and indicating field termination points for power and control interface. Solid State Motor Controller Equipment supplier shall submit manufacturer's catalog data and diagrams, output cable lug sizes and ratings, and elevation view of Solid State Motor Controller with the door removed. Project specific wiring diagrams shall be provided.
- E. Submittal shall contain manufacturer's descriptive data including ratings, circuit diagrams, dimensional data, conduit entry restrictions, and heat dissipation to ambient. Submittals shall also contain manufacturer's part number for the equipment.
- F. Manufacturer's standard wiring diagrams and specific modifications to the wiring of the equipment shall be submitted. All terminal points for field, and interconnecting wiring shall be identified.
- G. Samples of any material shall be submitted upon Engineer's request.

1.4 CLOSEOUT SUBMITTALS

Provide project record documents which record actual circuit directories, as well as actual locations of components and circuits.

PART 2 PRODUCT

2.1 NEMA MAGNETIC MOTOR CONTROLLERS

A. NEMA Magnetic Motor Starters

- 1. Magnetic motor starters shall be 3-pole, 60 cycle magnetic starters, and shall be of the NEMA size appropriate for the motor horsepower and voltage shown but not be less than NEMA Size 1.
- 2. Unless otherwise specifically shown or specified, all magnetic motor starters shall be provided with:
 - a. Vertical lift operation.
 - b. A replaceable type, encapsulated operating coil rated at 120 VAC.
 - c. Overload relays.
 - d. Starter coils and contacts shall be easily replaceable without removing contactor from the enclosure.

3. Magnetic motor starters shall be rated to meet minimum number of load/life operations (contact electrical life under load) when motor starter is used for starting of squirrel cage motors and switching motor off only after the motor is up to speed, as follows:

<u>NEMA Size</u>	<u># of Operations</u>	<u>Operational Current</u>
1	2 million	27 amperes
2	2 million	45 amperes
3	1.5 million	90 amperes
4	1.5 million	135 amperes
5	2 million	270 amperes

4. Individual magnetic motor starters shall be provided with the required accessories to perform the control circuit as shown on Contract Drawings or specified. These accessories shall include but shall not be limited to the following:
- Single-phase control transformers of rating suitable for the load of the control circuit as actually installed, with fused secondary rated for 120 VAC.
 - Pushbutton stations or selector switches with legend plates or engraved nameplates as specified in Section 260916 Miscellaneous Electrical Controls.
 - Hand-Off-Auto selector switch, unless otherwise noted.
 - Push-to-test indicating lights with interchangeable covers as specified in Section 16902 Miscellaneous Electrical Controls.
 - Control circuit fuse where a separate control circuit is shown.
 - Two electrically convertible contact interlocks.
5. Each magnetic motor starter shall be of a type suitable to perform the control function shown and be in accordance with one of the following:
- Constant Speed, Full Voltage, Non-Reversing Starters (FVNR) shall provide basic contactors for forward control.
 - Constant Speed, Full Voltage Reversing Starters (FVR) shall provide basic contactors for the forward and reverse speed. Mechanical and electrical interlocks shall be provided to preclude the possibility of both contactors being closed at the same time.
 - Constant Speed, Reduced Voltage Starters (RV) shall be of the closed transition, auto-transformer type and shall include the required 3 pole and 5 pole contactors, auto-transformers, timing relays and appurtenances.
 - Multi-Speed Motor Starters shall provide the basic contactors for each speed, suitable interlocked. Where shown, sequence-compelling relays shall be provided.
6. Magnetic motor starter manufacturers:
- Allen-Bradley Bulletin 500, 505 Series
 - General Electric CR-306, CR-309 Series
 - Sq D Class 8536, 8702 Series
 - Cutler-Hammer A-200 Series, A-210 Series
 - equal (Samples of equal products shall be submitted in accordance with Part I)

B. NEMA Combination Motor Starter with Circuit Breaker (MCP) Disconnect

1. Combination magnetic motor starters shall be the combination type consisting of a motor circuit protector (MCP) and NEMA magnetic motor starter assembled and wired into a self-contained unit.
2. The magnetic motor starter shall be designed to coordinate with the circuit protective device to withstand a minimum short circuit current of 22,000 AIC or as shown on the Contract Drawings.
3. MCP and magnetic motor starter shall be packaged by one manufacturer. Combination motor starters shall be:
 - a. Allen-Bradley Bulletin 513, 507 Series
 - b. General Electric Type CR387, CR390 Series
 - c. Sq D Class 8539, 8739 Series
 - d. Cutler-Hammer Class A206, A216 Series
 - e. equal (Samples of equal products shall be submitted in accordance with Part I)
4. Disconnect switch shall be capable of being locked in the open position.

C. NEMA Combination Magnetic Motor Starter with Fused Switch Disconnect

1. Combination magnetic motor starters shall be the combination type consisting of a fused switch and NEMA magnetic motor starter assembled and wired into a self-contained unit.
2. The magnetic motor starter shall be designed to coordinate with the fused switch to withstand a minimum short circuit current of 100,000 AIC or as shown on the Contract drawings.
3. Fused switches shall be provided with Class R fuse clips.
4. Fused type combination starter shall be provided certified Type 2 coordination in accordance with IEC 947-4-1.
5. Fused switch and magnetic motor starter shall be packaged by one manufacturer. Combination motor starters shall be:
 - a. Allen-Bradley Bulletin 512, 506 Series
 - b. General Electric Type CR308, CR311 Series
 - c. Sq D Class 8538, 8738 Series
 - d. Cutler-Hammer Class A204, A214 Series
 - e. equal (Samples of equal products shall be submitted in accordance with Part I)

D. NEMA Manual Motor Starting Switches

1. Manual motor starting switches shall be provided for the control and protection of all single-phase motors which do not require control from a remote location.
2. Manual motor starting switches shall provide thermal overload protection, including trip-free operation, and a manual reset overload.

3. Integral start-stop pushbuttons or on-off toggle switches shall be provided as shown on the Contract Drawings.
 4. Manual motor starting switch manufacturers:
 - a. Allen-Bradley Bulletin 600 Series
 - b. General Electric CR101, CR1062
 - c. Sq D Class 2510, 2511, 2512
 - d. equal (Samples of equal products shall be submitted in accordance with part I)
- E. NEMA Overloads
1. The Contractor shall verify the ratings of overloads and install overloads suitable for the actual motors installed, and based on the actual nameplate information and other supplemental information furnished with the installed motors. Any replacement of motor overloads due to this verification not being performed shall be done at no additional cost to Owner.
 2. Overload relays shall be class 20, manual reset, eutectic alloy, thermal type overload device with visual trip indication, unless shown or specified otherwise. Overload relays shall be current transformer operated if required for coordination.
 3. Three spare overload relay thermal elements shall be provided for each type of element installed.
 5. Overload relay manufacturers:
 - a. Allen-Bradley Bulletin 592
 - b. General Electric CR324
 - c. Square D Class 9065
 - d. equal (Samples of equal products shall be submitted in accordance with part I)

PART 3 EXECUTION

3.1 MARKING ON MOTOR CONTROLLERS

- A. A motor controller shall be marked with the manufacturer's name or identification, the voltage, the current or horsepower rating, the short-circuit current rating, and other necessary data to properly indicate the applications for which it is suitable.

3.2 INSTALLATION

- A. Overload relays shall be installed in each leg of the starter.
 1. Overload relay characteristics shall be closely parallel the motor thermal characteristics.
 2. Ambient compensated overload relay thermal elements shall be installed where motor and overload are in different locations.
- B. Enclosures for motor controllers shall be of the type appropriate for each location.

3.3 FIELD QUALITY CONTROL

- A. Adjust the motor overloads to match the nameplate currents of the motors that they are protecting.

**** End of Section ****

SECTION 26 50 00
LIGHTING

PART 1 GENERAL

1.1 SUMMARY

This Section includes fixtures, lamps, and accessories required for a complete installation as shown and specified.

1.2 QUALITY ASSURANCE

- A. Material and installation shall be in accordance with the latest revision of the following codes, standards, and specifications, except where more stringent requirements have been specified herein:
 - 1. National Electrical Code (NEC)
 - 2. National Electrical Manufacturers Association (NEMA)
 - 3. Underwriters Laboratories (UL)
 - 4. American National Standard Institute (ANSI)
- B. Qualifications of manufacturer. Provide materials and equipment that are the products of manufacturers regularly engaged in the production of such products which are of equal material, design, and workmanship. Products shall have been in satisfactory commercial or industrial use for two (2) years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturer's catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer.
- C. Uniformity: Unless otherwise specified, equipment or material of the same type of classification, used for the same purpose shall be the product of the same manufacturer. All material shall be new and of the current design of the manufacturer providing equipment or material.

1.3 SUBMITTALS

- A. Submittals shall conform to the requirements of Section 01 33 00 Submittals, and to the requirements given in Section 26 00 00 Electrical General. In addition, submittals shall include the manufacturer's name, trade name, place of manufacturer, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification, and technical paragraph reference.
- B. Prior to obtaining any material in connection with this Section, detailed shop drawings on all material shall be submitted.
- C. Submittals shall contain a material list with manufacturer's name and data describing the material and showing its compliance with specifications, associated standards and test requirements.
- D. Prior to obtaining any material in connection with this section, catalog data and detailed wiring connection diagrams shall be submitted. Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams,

performance and characteristic curves, and catalog data sheets. Submittal shall include ratings, circuit diagrams, and dimensional data, as a minimum. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted.

- E. Shop drawings shall present complete and accurate information relative to all working dimensions, equipment weights, assembly and section views, and all necessary details pertaining to coordinating the work of the Contract, lists of materials and finishes, parts list and the descriptions thereof.
- F. Photometric data for fixtures shall be submitted upon Engineer's request .
- G. Samples of any material shall be submitted upon Engineer's request.

1.4 CLOSEOUT SUBMITTALS

Provide project record documents which record actual circuit directories, as well as actual locations of components and circuits.

PART 2 PRODUCT

2.1 GENERAL

- A. Unless otherwise shown or specified, all conductors shall be stranded copper.
- B. Lighting fixtures shall be provided with required hangers, mounting brackets, and hardware for installation in the location shown on the Contract Drawings.
- C. Provide low-temperature ballasts with minimum starting temperature of 0°F for all fixtures to be mounted outdoors. Energy-Saving Magnetic Ballasts: Full-light-output type, compatible with energy-saving lamps specified.
- D. Light fixtures shall be furnished as shown.
- E. Reflectors, reflector cones and visible trim of all lighting fixtures shall not be installed until completion of plastering, ceiling tile work, painting and general cleanup. They shall be carefully handled to avoid scratching or fingerprinting and shall be, at time of acceptance by Owner, completely clean.
- F. Adjustable fixtures shall be capable of being locked in position.
- G. Unpainted fixture parts shall be either anodized aluminum, non-corrosive grade stainless steel or an acceptable equivalent of non-corrosive material.
- H. Lamps shall be provided for all fixtures specified. The Contractor shall be responsible for all lamps broken or removed up to the date of acceptance of work.

2.2 FIXTURES

- A. Area light (Type A1)
 - 1. General: Pole mounted light fixture for general exterior area illumination in parking areas, equipment areas, or similar locations.
 - 2. Light Source: Light Emitting Diode LED

Light Output: 22,000 lumens, 187W (performance package P4), color temperature 3000K, 4000K, or 5000K.

3. Voltage: 120VAC - 277VAC
4. Housing: Rugged die-cast aluminum body. "No-drill" mounting arm allows mounting on existing pole drills. Light engines and housing sealed against moisture.
5. Finish: Dark bronze, black, natural aluminum, or white. Zinc-infused Super Durable TGIC thermoset powder coat finish with thickness of 3 mils.
6. Optical System: Precision acrylic refractive lenses.
7. Ballast: High reactance, high power factor, copper wound ballast.
8. Listings: CSA certified for use in wet locations.
9. Mounting: pole mount
10. Manufacturer: Lithonia RSX2 LED P4 40K R4 MVOLT

2.3 SUPPORT SYSTEMS

A. Support systems shall be provided with clamping nuts, square washers, splice plates, and hardware to assemble the system.

B. Poles

1. Poles shall be compatible for outdoor use. Factory templates shall be provided with units to assure proper anchoring bolts setting. Provide screws, nuts, and bolts; screws nuts and bolts shall be made of ANSI 300 series stainless steel.
2. Shape: The pole shall bear a square, non-tapered shaft.
Mounting height: 20'
Width: 5 inches
Shaft thickness: 0.188 inches
3. Mounting: The pole's anchor base shall be cast from 356 aluminum alloy (ASTM b-108), with the anchor bolt holes recessed and covered by aluminum caps. The anchor bolts shall have 12" galvanized tops per ASTM A-153, and shall be made of ¾" or 1" diameter steel rod with minimum yield strength of 50,000 psi.
4. Finishes: Weatherproof, dark bronze polyester powder finish, with high strength plastic cap on top.
5. Wire access: Each pole shall have a rectangular reinforced handhole having nominal dimensions of 2 1/8" x 5 1/8" on the shaft. A rain-tied handhole cover plate shall be provided.
6. Option: 10' poles shall be provided where specified.
7. Poles shall be as manufactured by Lithonia T20 SSA, or equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Mounting height for fixtures shall be as shown on the Contract Drawings. Where no mounting height is shown, fixtures shall be mounted so as to give the minimum of shading from pipes, beams and other obstructions, but in no case less than approximately 10'-0" above the finished floor unless a lower ceiling height is specified. Where pendent type fixtures are required, they shall be suspended by means of 3/4-inch, galvanized conduit stems and ball hangers from outlet boxes

or as detailed on the drawings. Check and verify field conditions to insure against mechanical or structural interference. Provide nighttime adjustment of all adjustable lighting units and floodlighting, as required, to satisfaction of Engineer.

- B. The contractor shall be responsible for coordinating the final location of fixtures and fixture supports with other work, such as duct work, building steel, overhead cranes and hoists, and mechanical piping and equipment.

**** End of Section ****

DIVISION 31

SECTION 31 25 00 EROSION AND SEDIMENT CONTROL

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SECTION 31 25 00
EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Work covered by this Section consists of furnishing all materials, equipment tools and labor to construct erosion and sediment control systems.
- B. The Work to be performed includes, but is not limited to silt fence, stabilized construction entrances, and site surface drainage conveyances as specified herein and as shown on the Contract Drawings.
- C. All erosion and sediment control devices shall be inspected daily by the CONTRACTOR and maintained continuously throughout the duration of the project by the CONTRACTOR. The CONTRACTOR is required to provide the ENGINEER with a Daily Inspection Form for Erosion and Sediment Controls that documents the condition of the erosion and sediment control devices and documents repairs and maintenance that is completed that day. The CONTRACTOR is required to indicate on the Daily Inspection Form for Erosion and Sediment Controls any observations of erosion and sediment controls that require maintenance, repair, or replacement, as well as indicate his/her recommendations for erosion and sediment controls that require maintenance, repair, or replacement. The County may conduct independent periodic inspections. This process will enable the CONTRACTOR to obtain approval from the ENGINEER prior to conducting any required maintenance, repairs, or replacements of erosion and sediment controls. The CONTRACTOR will not be compensated for maintenance, repairs, or replacement of erosion and sediment controls unless Daily Inspection Forms for Erosion and Sediment Controls are provided to the ENGINEER and the ENGINEER provides prior authorization of such maintenance, repairs, or replacement of erosion and sediment controls.
- D. The CONTRACTOR shall water seeded areas immediately upon placement of both temporary and permanent seeding. The CONTRACTOR shall provide sufficient watering of grass throughout the duration of the project.

1.2 REFERENCES

- A. Maryland Standards and Specifications for Soil Erosion and Sediment Control, 2011 Ed.

1.3 QUALITY ASSURANCE

- A. The CONTRACTOR shall provide the necessary straw bales, silt fence, and/or other temporary erosion control measures to contain all his/her work activities, and as shown on the Contract Drawings or as directed by the ENGINEER.
- B. Erosion control measures as shown on the Contract Drawings shall be established at the beginning of construction and maintained during the entire period of construction. Onsite areas that are subject to severe erosion, and offsite areas that are especially vulnerable to damage from erosion and/or sedimentation are to be identified and receive special attention in a manner approved by the ENGINEER.
- C. All land-disturbing activities are to be planned and conducted to minimize the size of the area to be exposed at any one time and the length of exposure. In any case, the area to be exposed at any one time shall not be greater than the construction phase in which work is being conducted, as delineated on the Contract Drawings.
- D. Surface water runoff originating upgrade of exposed areas shall be controlled to reduce erosion and sediment loss during the period of exposure.
- E. When the increase in peak velocity of storm water runoff resulting from a land-disturbing activity is sufficient to cause accelerated erosion of the receiving stream, the CONTRACTOR shall provide measures to control both the velocity and the rate of release so as to minimize accelerated erosion and increased sedimentation of the stream. Such measures shall be approved by the ENGINEER. All land-disturbing activities are to be planned and conducted to prevent offsite sedimentation damage.
- F. Vegetative Stabilization: Seeding both Temporary and Permanent shall be in accordance with the specifications on the Erosion and Sediment Control Drawings and Maryland Department of Environment specifications.
- G. Erosion and sediment control systems shall be maintained in functional and satisfactory condition by the CONTRACTOR until all the disturbed areas are stabilized and approval is given by the ENGINEER.
- H. Erosion and sediment control systems shall only be removed by the CONTRACTOR when the site has been fully stabilized and approved by the ENGINEER.

1.4 SUBMITTALS

- A. The CONTRACTOR shall submit to the ENGINEER the following items in accordance with Section 01 33 00, Submittals, or other related sections herein these special provisions:

1. Product data and source for all materials to be used ten (10) calendar days prior to placement.
2. Submit daily/rain event checklists, Erosion and Sediment Control inspection forms, and Daily Construction Reports.

PART 2 PRODUCTS

2.1 EROSION AND SEDIMENT CONTROL MATERIALS

- A. Silt Fence: CONTRACTOR shall supply silt fence to control surface-water runoff and sediment. Silt fence material shall meet or exceed the criteria specified on the Contract Drawings. CONTRACTOR shall submit manufacturer's product data to the ENGINEER for approval.
- B. Stabilized Construction Entrances: Stone for stabilized construction entrances shall meet requirements of AASHTO M 43, No. 2.

PART 3 EXECUTION

3.1 TRANSPORTATION, HANDLING AND STORAGE

- A. Materials shall be handled and stored in such a manner as to prevent damage to the material. Materials shall not be dropped or dragged over the ground. Any materials damage shall be replaced at no expense to the County.

3.2 EROSION AND SEDIMENT CONTROL STRUCTURES

- A. Silt Fence:
 1. Installation: CONTRACTOR shall install silt fence in accordance with specifications and installation instructions provided by the manufacturer or on the Contract Drawings, or as directed by the ENGINEER. The proposed silt fence shall be staked out and approved by the ENGINEER prior to installation. Authority of precedence shall be as follows: ENGINEER'S direction, Contract Drawings, Specifications, and manufacturer's installation instructions.
 2. Maintenance: Silt fencing shall be inspected daily and maintained continuously throughout the duration of the project. The CONTRACTOR is required to provide immediate replacement of tears in the fabric, strengthening of posts where movement is observed, and cleaning of excessive silt accumulation. Fabric torn shall be replaced without any delay. Silt shall be removed when it has accumulated to a level that is 20% of the height of the silt fence, or approximately 3 in. high from the ground surface. Silt shall be removed, hauled, and disposed of offsite.

3. The CONTRACTOR shall use portable sediment tank(s) or dirt bag(s) while dewatering. The CONTRACTOR may use other methods for dewatering as approved by the ENGINEER.
 4. Removal: Upon full stabilization of the areas the ENGINEER may require the CONTRACTOR to remove certain lengths of the silt fence. In such cases the CONTRACTOR shall remove all materials and dispose of them in an appropriate manner. All the disturbed areas by this operation shall be stabilized satisfactorily.
 5. All work shall meet with the ENGINEER'S approval.
- B. Temporary erosion control measures will be used to correct conditions that develop during construction that were not foreseen during design stage, that are needed prior to installation of permanent control features or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project. The ENGINEER will limit the area of the area of clearing and grubbing, and capping operations in progress, commensurate with the CONTRACTOR'S capability and progress in keeping with the finish grading, mulching, seeding, and other such permanent control measures current in accordance with the accepted schedule.
1. In the event that temporary erosion control measures are required due to the negligence, carelessness, or failure of the CONTRACTOR to install permanent controls as a part of the work as scheduled, and ordered by the ENGINEER for these reasons, such work shall be performed by the CONTRACTOR at his / her own expense.
 2. The erosion control features installed by the CONTRACTOR shall be acceptably maintained by the CONTRACTOR during the construction period.
- C. Permanent seeding shall be done in accordance with the requirements of the Specifications provided in the Contract Drawings and Maryland Department of Environment requirements. The CONTRACTOR shall water seeded areas immediately upon placement of permanent seeding. The CONTRACTOR shall provide sufficient watering of grass throughout the duration of the project.
1. The CONTRACTOR shall protect seeded areas against traffic or other use by warning signs or barricades, as approved by the ENGINEER. Surfaces gullied or otherwise damaged following seeding shall be repaired by regrading and reseeding as directed. The CONTRACTOR shall mow and water as directed, and otherwise maintain seeded areas in satisfactory condition until final inspection and acceptance of the work. It will be required that the CONTRACTOR establishes a good stand of grass of

uniform color and density to the satisfaction of the ENGINEER. If at the time when the Contract has been otherwise completed it is not possible to make an adequate determination of the color, density and uniformity of such stand of grass, payment for the unaccepted portions of the areas will be withheld until such time as the above requirements have been met.

- D. Removal and Disposal of Sediment and/or Debris: CONTRACTOR shall remove, upon direction by the ENGINEER, all accumulated sediment and/or debris that has accumulated behind or within any of the erosion and sediment control devices. CONTRACTOR shall dispose of offsite.
- E. CONTRACTOR shall inspect all erosion and sediment control devices daily and immediately following all precipitation events and submit to the ENGINEER the following workday written documentation that identifies any erosion and sediment control device that is in need of repair or in which sediment or debris has accumulated.

**** End of Section ****

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DIVISION 32

SECTION 32 92 00 LAWNS AND GRASSES

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SECTION 32 92 00
LAWNS AND GRASSES

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes requirements for seeding and mulching and as required for restoration and restabilization of any and all disturbed areas, stockpiles, and as directed by the ENGINEER, in accordance with the Contract Documents.

1.2 SUBMITTALS

- A. Submit certificates of compliance before delivery of materials as specified in Section 01 33 00 for the following items:
 - 1. Seed
 - 2. Sod
 - 3. Fertilizer
 - 4. Lime
 - 5. Mulch.

PART 2 PRODUCTS

2.1 TOPSOIL

- A. Existing topsoil which is stripped may be stockpiled for reuse.

2.2 SEED

- A. Unless otherwise specified herein, seed shall be certified by the Maryland Department of Agriculture and shall conform to requirements of Maryland Seed Law and Regulations.
- B. Provide the following for all areas:
 - 1. Mix
 - a. SHA Mix No. 1 applied at a rate of two (2) pounds per 1,000 ft²
 - b. Sow mixture between 3 March and 1 May and between 1 August and 31 October.

2.3 FERTILIZER

- A. The CONTRACTOR will submit soil samples to an approved soils testing laboratory for fertilizer recommendations. Recommendations shall be submitted to and approved by the ENGINEER before implementation.
- B. Fertilizer shall be uniform in composition, free flowing and delivered to the site fully labeled according to applicable state fertilizer laws and shall bear the name, tradename or trademark, and warranty of the producer.

2.4 LIME

- A. Lime shall be ground limestone containing at least 50% total oxides, calcium oxide plus magnesium oxide. Limestone shall be ground to fineness such that at least 50% will pass through a 100 mesh sieve and 98% will pass through a 20-mesh sieve.

2.5 MULCH

- A. Mulch for protection of all seeding shall conform to the following requirements:
 - 1. Straw shall be clean, weed free, unrotted, applied at a rate of not less than 70 to 90 pounds per 1,000 ft², 1.5 to 2.0 tons per acre, and shall be anchored with one of the following methods. Mulching anchoring tool for flat slopes, mulch nettings, cut back and emulsified asphalt applied five gallons per 1,000 ft², Curasol AH applied five gallons per 1,000 ft², Petroset applied per Manufacturer's recommendations, RMH Plus Tackifier applied per manufacturer's recommendations, or other equivalent binding solutions. Increase application rate on slopes 8 feet or more high as recommended by the manufacturer.
 - 2. Straw erosion control blanket shall be placed in all channel beds that are grass lined, as shown on Plans. Erosion control blankets shall be Type SC150 as manufactured by North American Green, Evansville, Indiana, or equal. Also, all slopes greater than or equal to 3H:1V shall have type SC150 erosion blanket or equal.
 - 3. Wood chips, coverage to be 1.5 inches deep.
 - 4. Mulch utilized as temporary protection and stabilization shall conform to the above materials requirements. Rate of application shall be directed by the ENGINEER. Stone mulch will be permitted at the option of the CONTRACTOR.

PART 3 EXECUTION

3.1 PERMANENT SEEDING

- A. Place 4 inches of topsoil on all areas not receiving asphalt pavement, crushed stone, or designated as access roads. Harrow, disc, or otherwise loosen subsoil to a depth of 4 inches.
- B. Remove objectionable material such as stones, 2 inches or larger, clods, brush, roots and trash from the top 4 inches of soil.
- C. Apply fertilizer and lime at the rates specified herein. Thoroughly mix into the top 4 inches. Scarify the area and rake until the surface is leveled to provide a maximum of 2 inches in variation, and the soil is friable and a uniform fine texture.
- D. Immediately prior to seeding apply additional fertilizer at the rates specified herein, and work into the top 2 inches of the soil.
- E. Apply seed mixture uniformly with mechanical power driven seeders, mechanical cyclone hand seeders or hydroseeding equipment. Slurry for hydroseeder may contain seed and fertilizer only. Disc seed 1 inch into soil in drainage ditch areas. Apply jute matting to areas shown on Drawings. Do not rake, roll, or drag the seedbed in all other areas if hydroseeder is used.

3.2 TIME RESTRICTIONS

- A. Apply mulch at the rates specified herein, to all areas.

3.3 TIME RESTRICTIONS

- A. When permanent seeding is specified or directed and seeding is not allowed because of time restrictions specified, utilize one or more of the following methods to prevent erosion and sedimentation until such time as permanent seeding or sodding is allowed:
 - 1. Place and anchor straw mulch or wood chips.
 - 2. Apply temporary seeding.
 - 3. Prepare soil as for permanent seeding and then mulch as specified; overseed during next seasonal seeding period.
 - 4. Provide other erosion control measures acceptable to the ENGINEER.

- B. Remove straw or wood chips used as temporary mulch or work into subsoil at a minimum depth of 6 inches prior to initiation of permanent seeding application.

3.4 MAINTENANCE OF SEEDED OR SODDED AREAS

- A. Maintain seeded areas until accepted in writing by the ENGINEER.
- B. Water seeded, sodded and tree planting areas as necessary to maintain adequate moisture in the upper 4 inches of soil and keep grass mowed to a height of 2 to 3 inches. Do not remove more than one third of the grass leaf during initial mowing.
- C. Inspect areas for failures and necessary repairs due to poor vegetative growth, traffic, or equipment damage, weather damage, or erosion.
- D. Provide replacements during the specified planting seasons for areas where repairs are deemed to be necessary by the Inspector at no cost to the OWNER. This shall include repairs and replacements due to erosional or weather-related damage.
- E. If stand of turf is inadequate as determined by the ENGINEER, overseed and fertilize using half of the rates originally applied, or resod. If stand is over 60% damaged, as determined by the ENGINEER, reestablish following original lime, fertilizer, seed bed preparation, and seeding recommendations.

** End of Section **

SECTION F: DRAWINGS (Bound Separately)

G-001	TITLE SHEET
C-101	EXISTING CONDITIONS AND DEMOLITION PLAN
C-102	PROPOSED SITE LAYOUT
C-103	EROSION AND SEDIMENT CONTROL PLAN
C-501	DETAILS
C-502	EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
C-503	EROSION AND SEDIMENT CONTROL NOTES
S1.1	STRUCTURAL PLAN, DETAILS, AND NOTES
S2.1	SECTIONS AND DETAILS
E-101	ELECTRICAL SITE PLAN, NOTES, ABBREVIATEION, AND LEGEND
E-102	ELECTRICAL DETAILS AND ONE-LINE DIAGRAM

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SECTION E: GEOTECHNICAL REPORT

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STABLE GROUND IN-SITU
ENGINEERING INVESTIGATIONS & CONSULTING

September 26, 2024

Steven Lemasters
EA Engineering, Science, and Technology, Inc., PBC
11200 Racetrack Road, Unit A101
Berlin, Maryland 21811

Reference: Geotechnical Engineering Study
Berlin Transfer Station
9696 Mill Haven Rd, Berlin, MD 21811
SGI Project Number: 24052

Dear Mr. Lemasters:

Stable Ground In-Situ, LLC (SGI) is pleased to present this letter concerning the geotechnical evaluation at the homeowner drop-offs area of the Berlin Transfer Station. Based on conversations with EA Engineering, it is understood that the existing drop-off will be rebuilt with steel sheet piling for the elevated dumping area.

On September 18, 2024, SGI was onsite to perform a geotechnical evaluation for the proposed rebuild. In order to determine soil characteristics, parameters and general subsurface information, SGI advanced three (3) Cone Penetration Test (CPT) soundings to depths of between 20 and 25 feet below existing grades. Soundings were designated CPT-1 through CPT-3. Approximate locations were selected by EA Engineering and can be seen in *Figure 1: Testing Location Map*.

Sheet Piling Design Values and Retaining Wall Bearing Capacity

Our investigation and analysis finds that the structure can be constructed using sheet piling walls. A generalized geological section has been created for each sounding location and attached to this letter. This provides estimated design values in various formats. The active and at-rest earth pressure coefficients can be seen in the attached layer tabular results. Given that the sheet piling wall will likely be unrestrained, SGI recommends that an equivalent fluid pressure (EFP) of $K_a * \gamma$ be utilized [active earth pressure coefficient times soil bulk unit weight].

Note that any clay or silt laden soils should be avoided as drainage area fill and general fill. USCS soil types SP, SP-SM or SM are preferred fill materials behind any required aggregate drainage area against the wall.

As a general estimate for non-expansive, granular fill material in a level condition, an EFP of 40pcf can be utilized.

Should the designer choose to use a more traditional concrete retaining wall, SGI estimates that a net design soil bearing capacity of **3,000 pounds per square foot (psf)** is applicable for



construction of wall footings. This is contingent on existing soils are not disturbed below the bottom of footing.

In general, exterior footings should be placed at least 24 inches below grade for frost protection. Footing depth should never be less than the minimum applicable local building code and should comply with any coastal specific requirements.

It is important that any organic or deleterious materials be removed prior to footing construction and that any fill material (or disturbed native soils) be compacted properly. An experienced soils inspector or engineer should verify the subgrade before pouring of concrete; especially when cut or fill operations have taken place.

Note that minor changes and gradual transitions can be expected between sounding locations. Should any drastic changes be observed during construction phases, please contact SGI to determine what, if any, recommendations should be made.

All professional services were performed in accordance with generally accepted engineering practice. Should there be any questions or additional information required, please contact SGI at 410-422-4674 or 267-896-5380.

Best Regards,

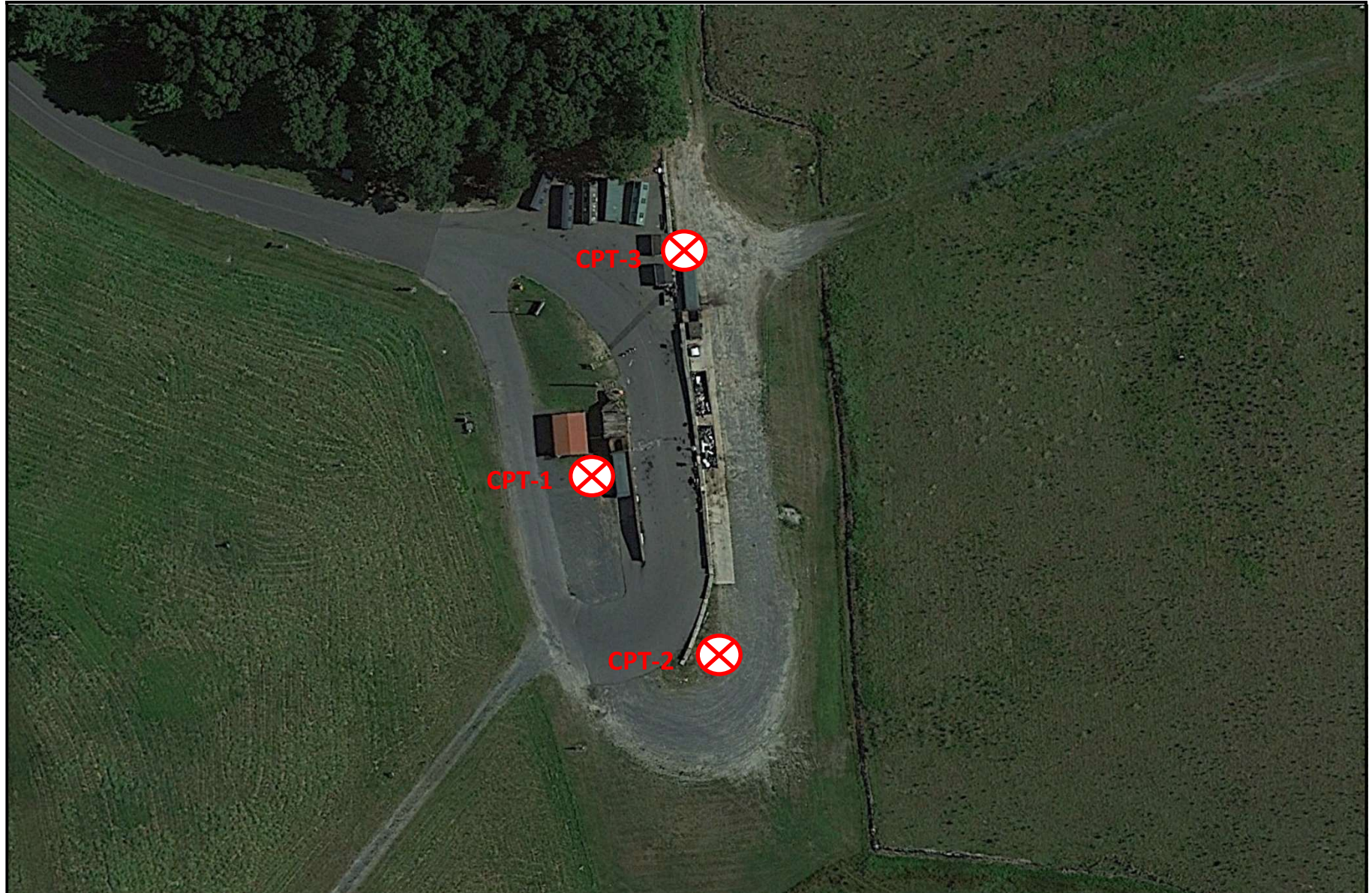
Ryan C. Ward, P.E.
Principal

rward@sgi-insitu.com



Fernando Garcia, P.E., D. GE.
Principal

fgarcia@sgi-insitu.com



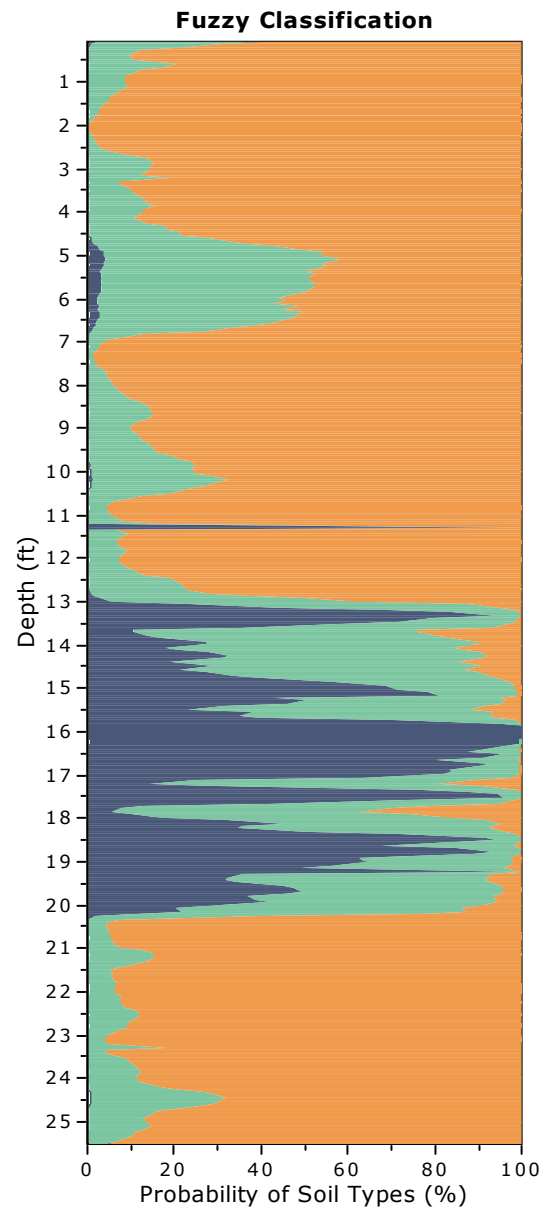
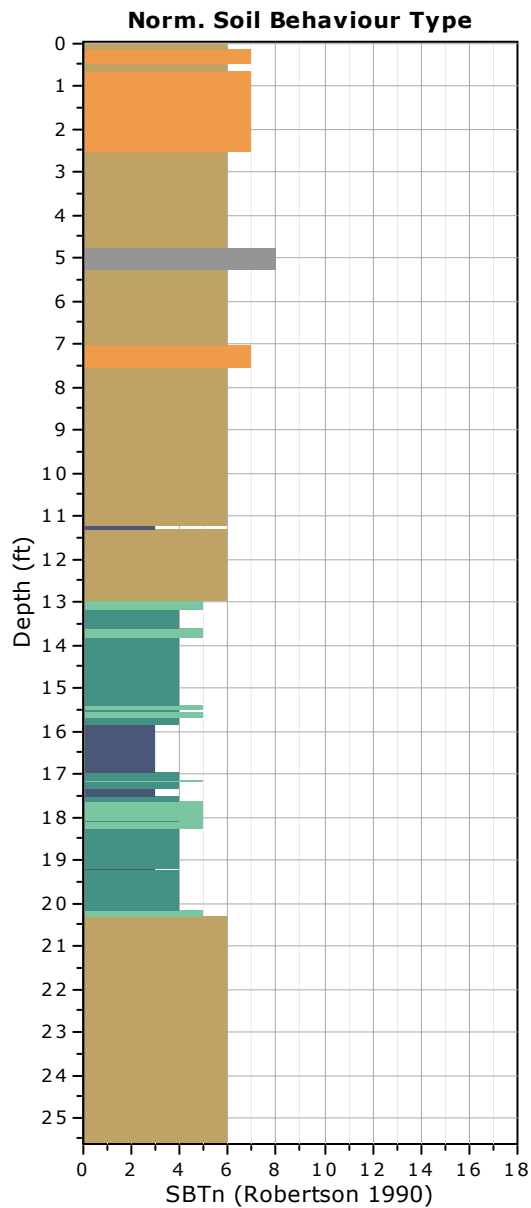


STABLE GROUND IN-SITU
ENGINEERING INVESTIGATIONS & CONSULTING

CPT Logs and Interpretations



Project: Berlin Transfer Station
Location: Berlin, Maryland



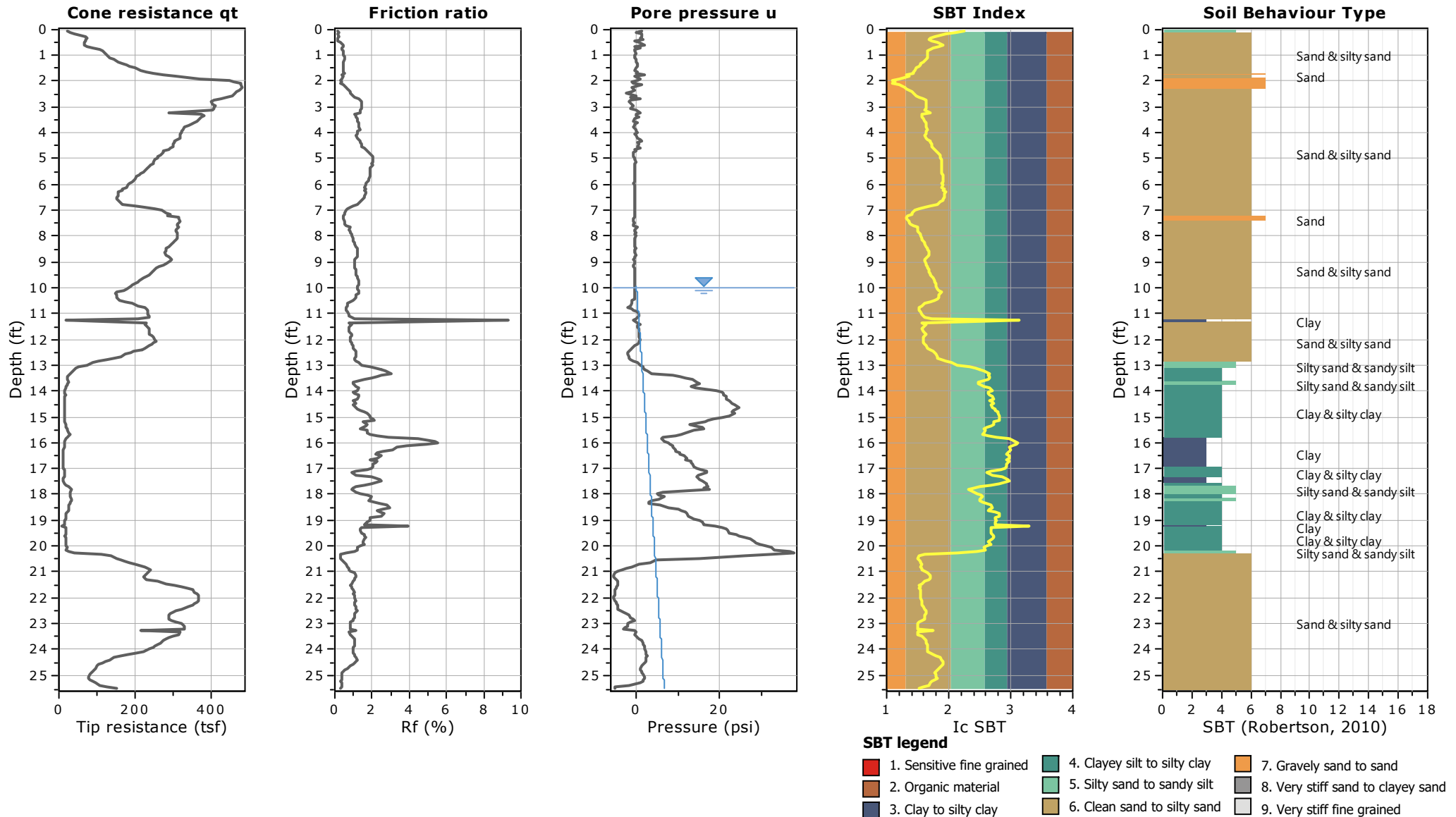
Fuzzy classification legend

- Highly probable clayey soil
- Highly probable mixture soil
- Highly probable sandy soil



Project: Berlin Transfer Station
Location: Berlin, Maryland

Total depth: 25.51 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3330145° lon -75.1937141°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

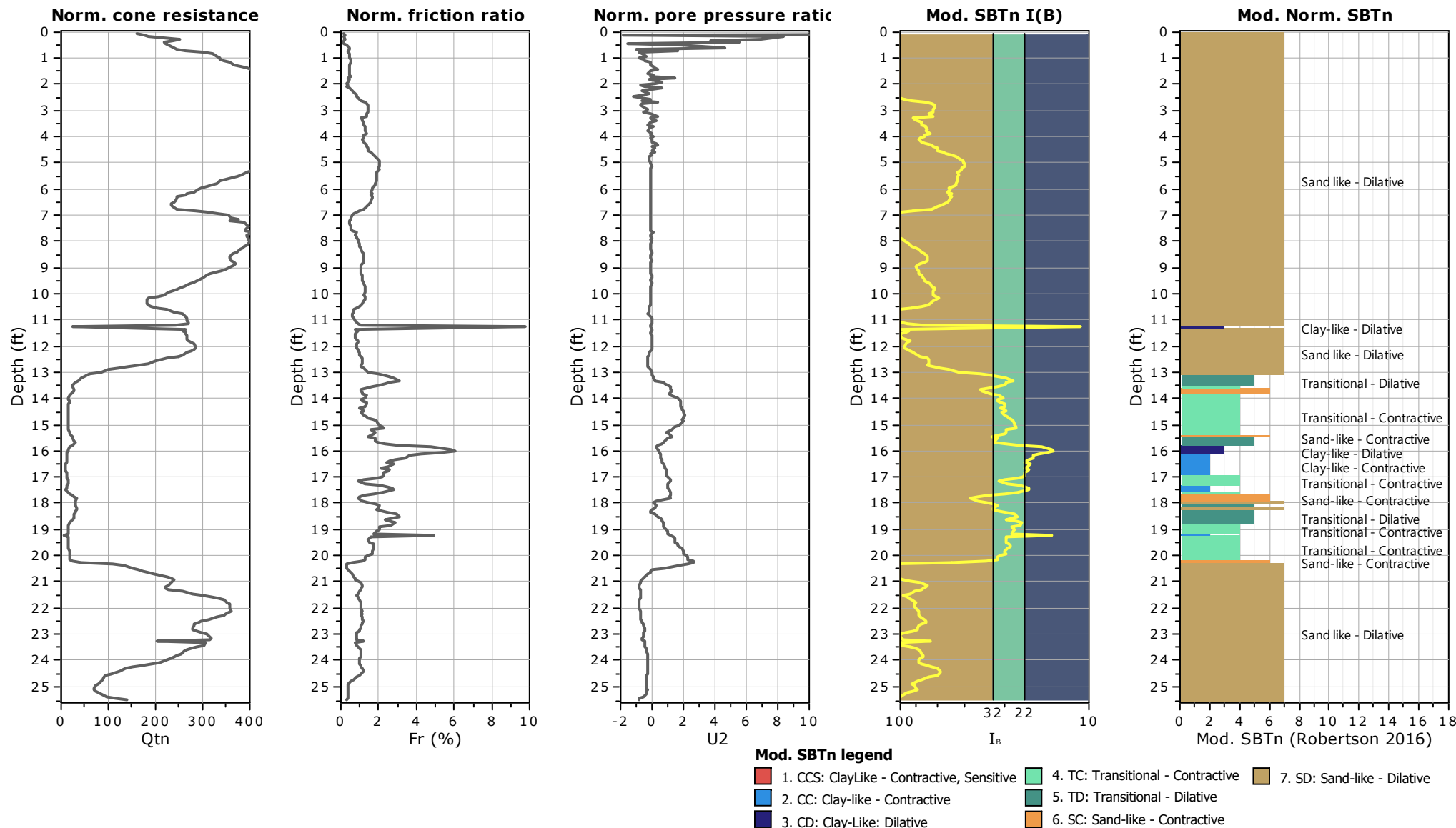




Total depth: 25.51 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3330145° lon -75.1937141°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

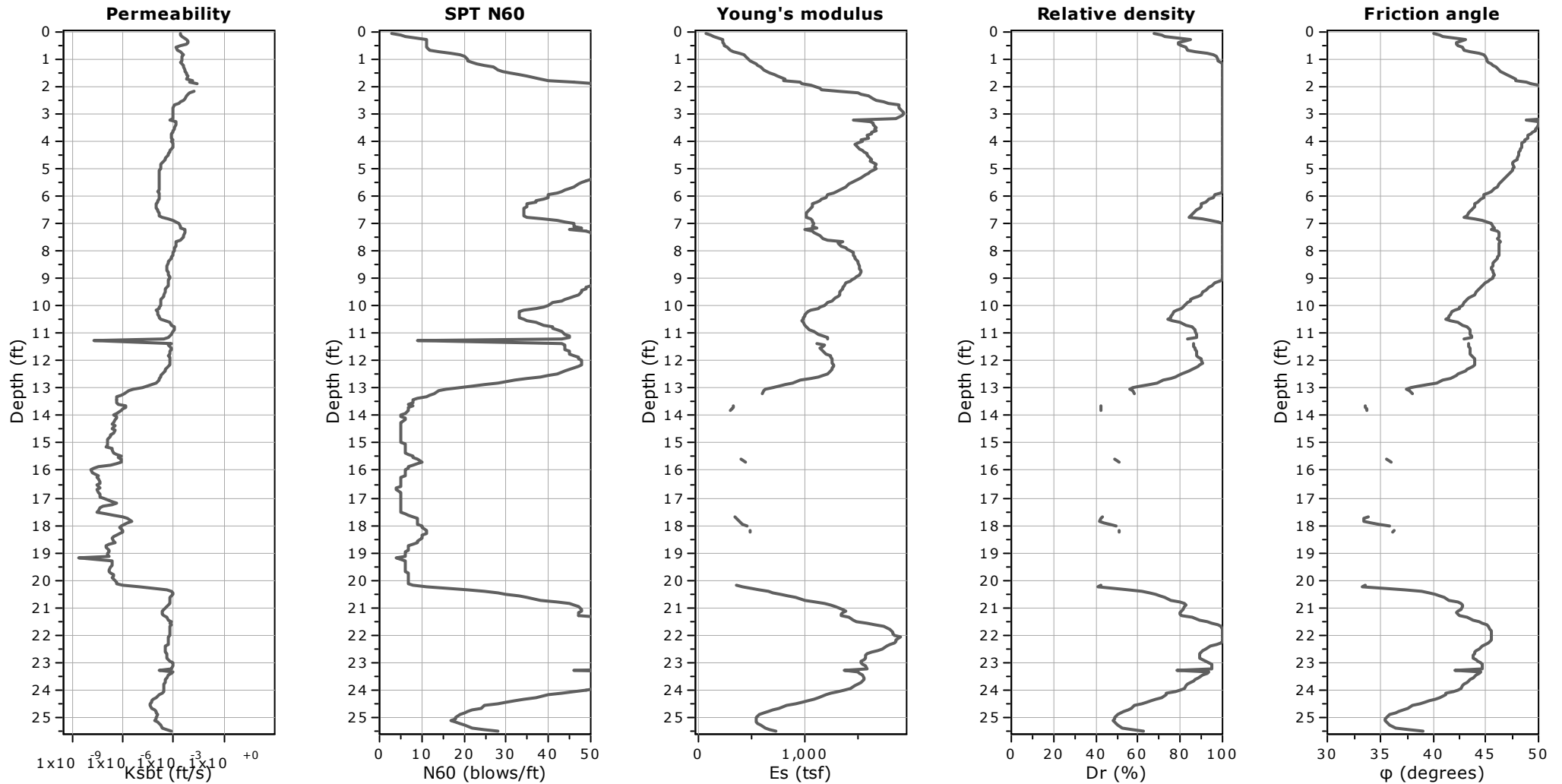
Project: Berlin Transfer Station

Location: Berlin, Maryland





Project: Berlin Transfer Station
Location: Berlin, Maryland



Calculation parameters

Permeability: Based on SBT_n

SPT N_{60} : Based on I_c and q_t

Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

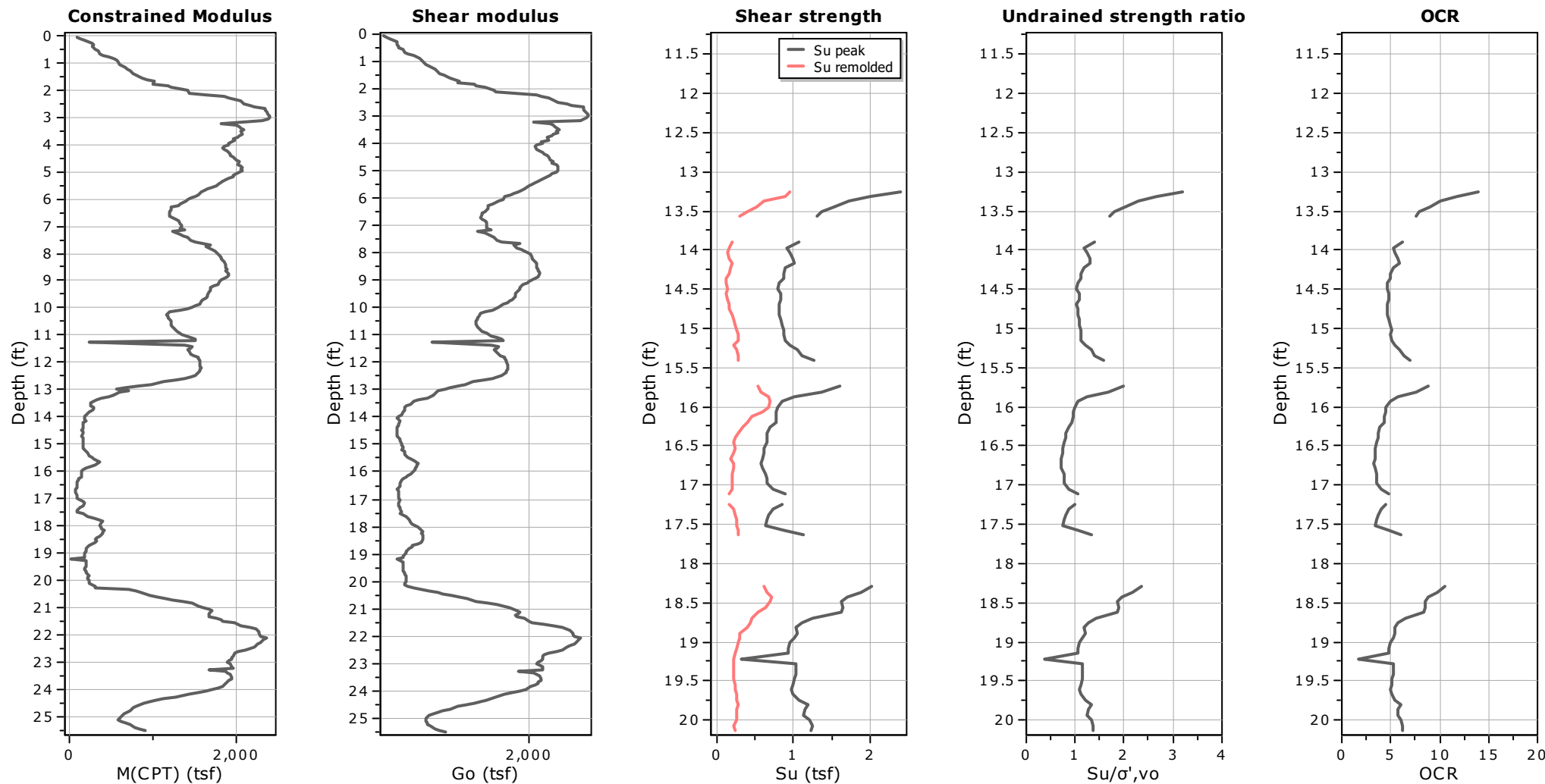
Relative density constant, C_{Dr} : 350.0

Phi: Based on Kulhawy & Mayne (1990)



Project: Berlin Transfer Station

Location: Berlin, Maryland



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable α using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt} : 14

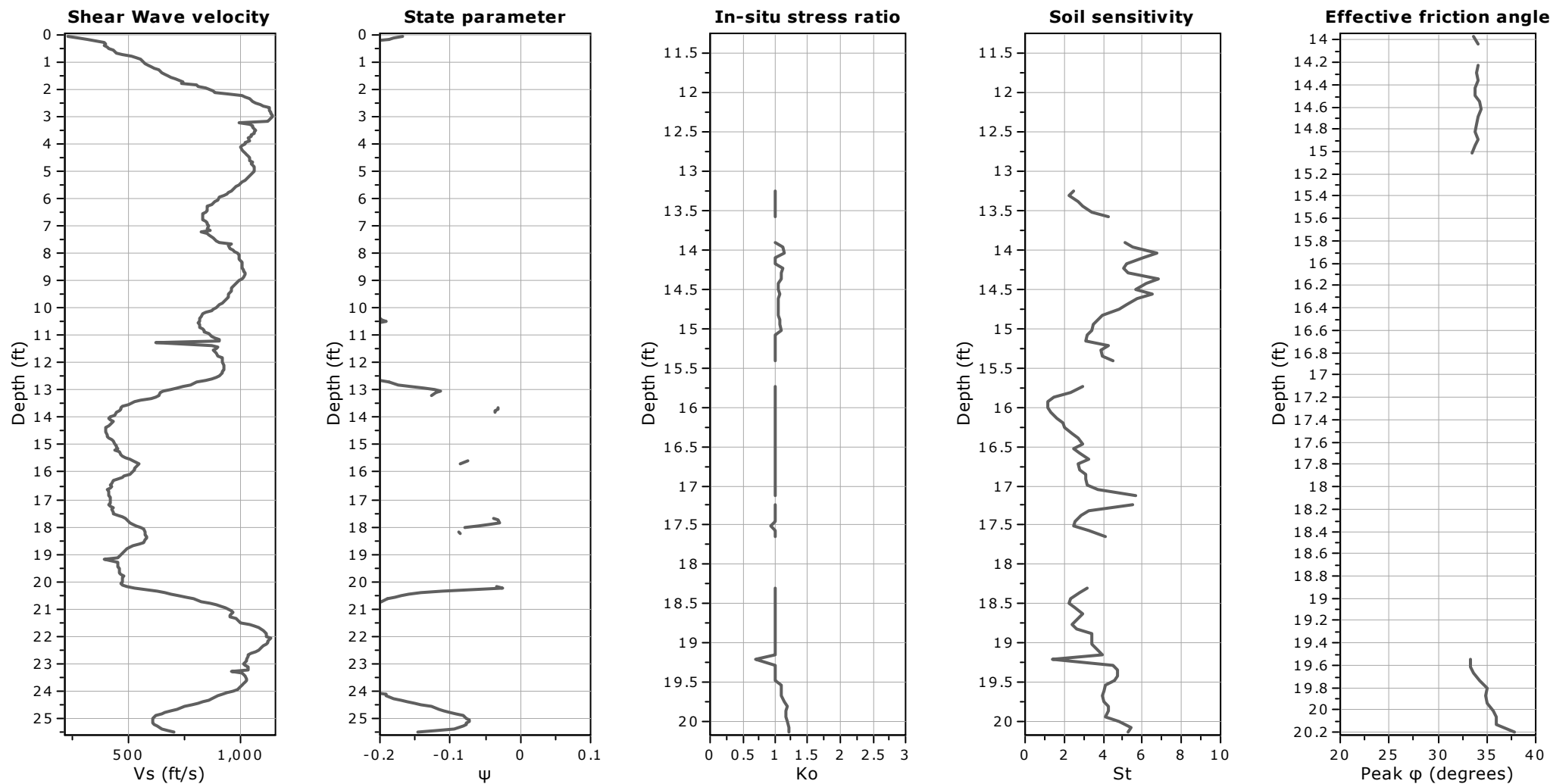
OCR factor for clays, N_{kt} : 0.33

—●— Flat Dilatometer Test data



Project: Berlin Transfer Station

Location: Berlin, Maryland



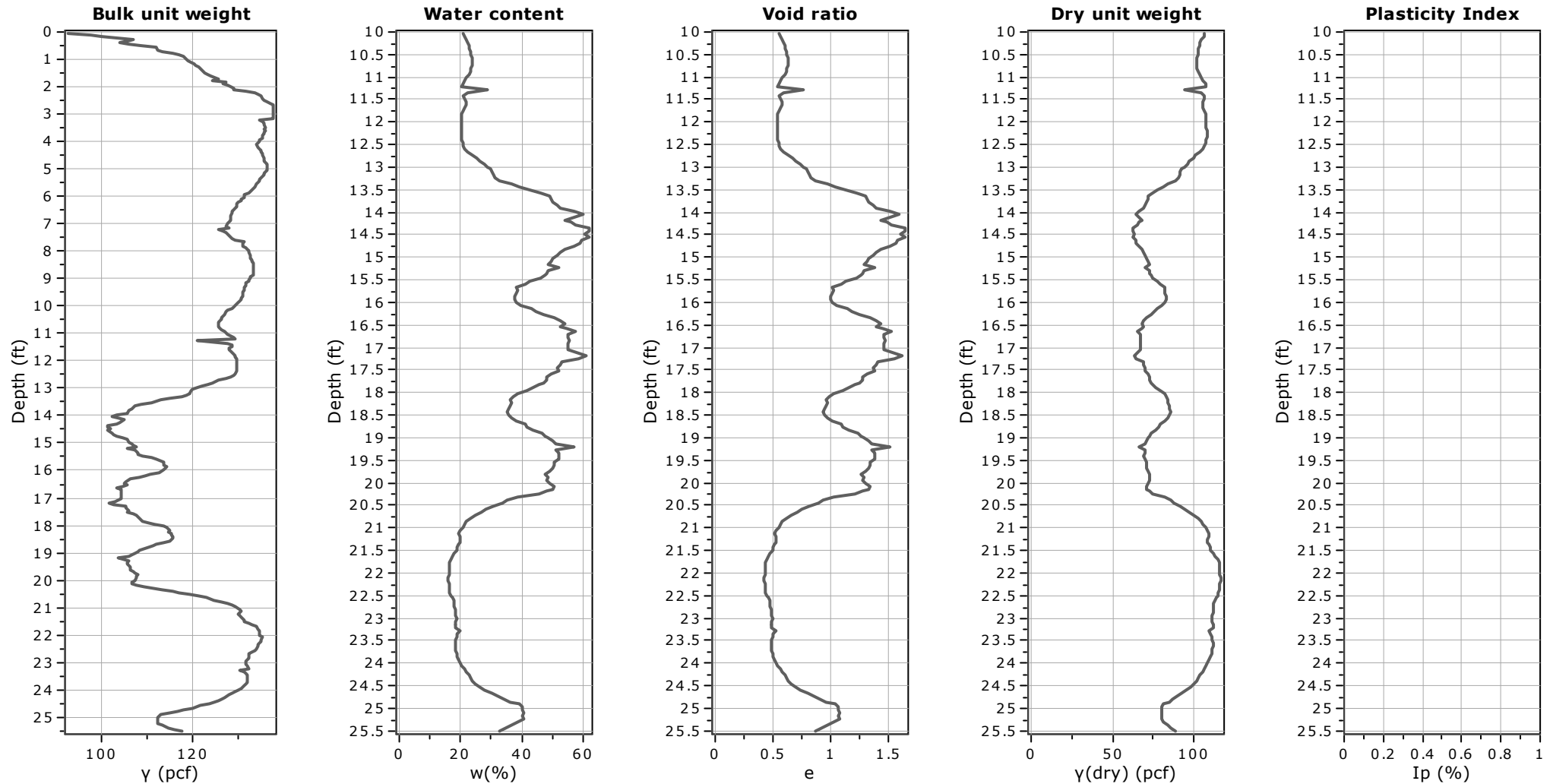
Calculation parameters

Soil Sensitivity factor, N_s : 7.00



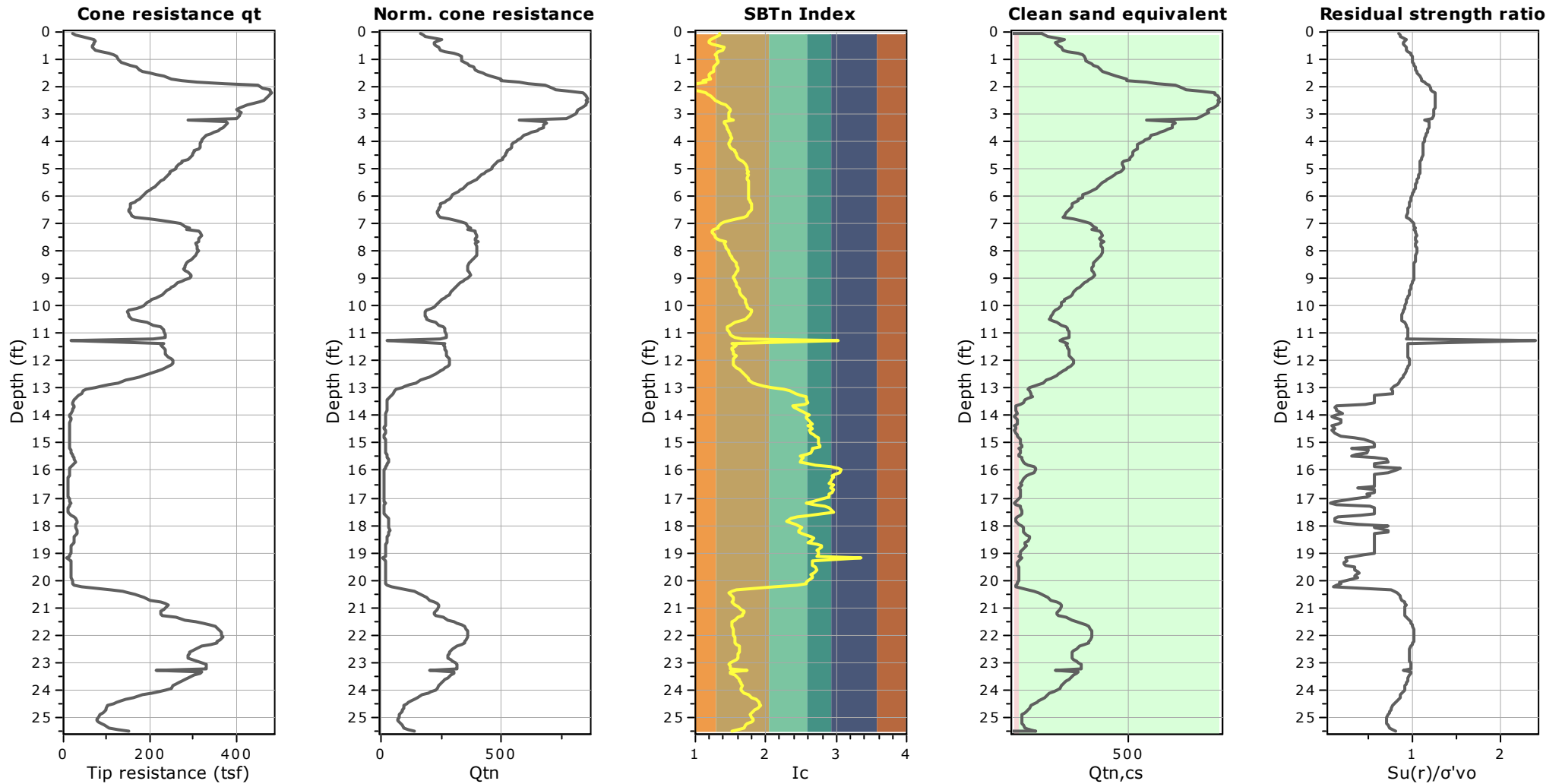
Project: Berlin Transfer Station

Location: Berlin, Maryland



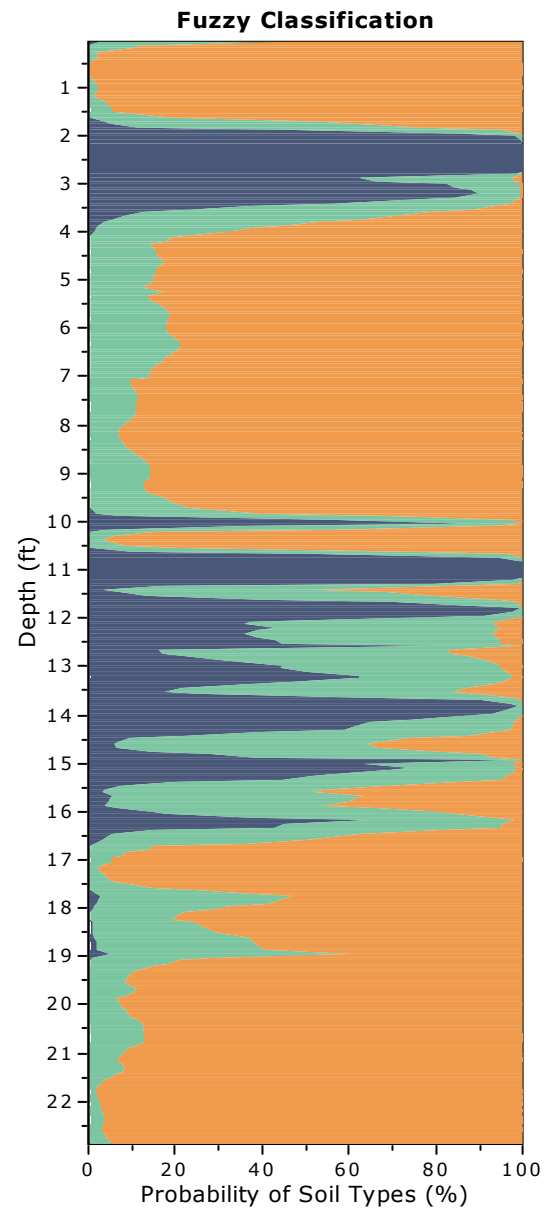
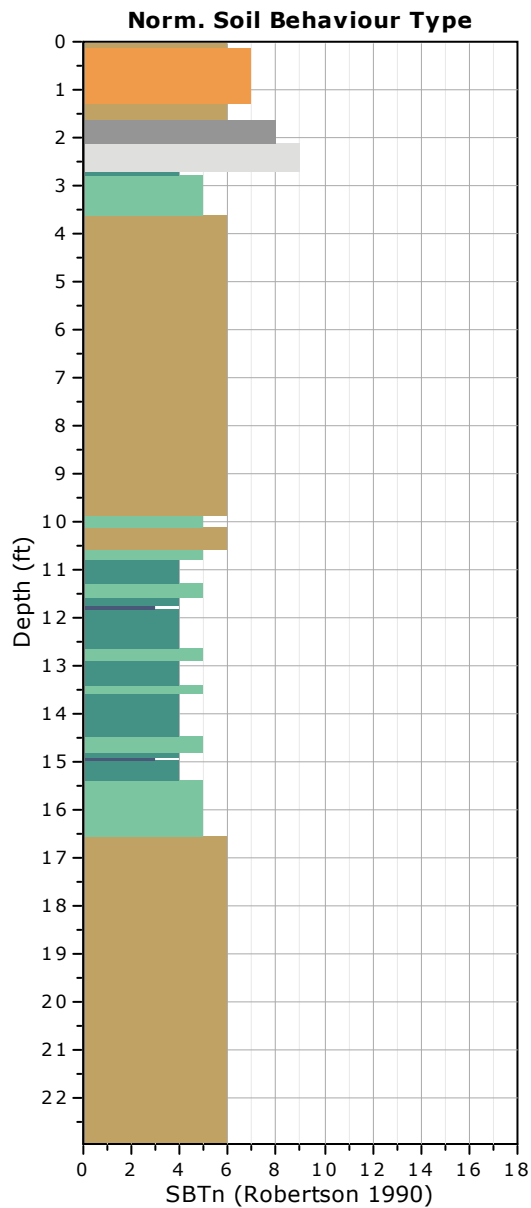


Project: Berlin Transfer Station
Location: Berlin, Maryland





Project: Berlin Transfer Station
Location: Berlin, Maryland



Fuzzy classification legend

- Highly probable clayey soil
- Highly probable mixture soil
- Highly probable sandy soil

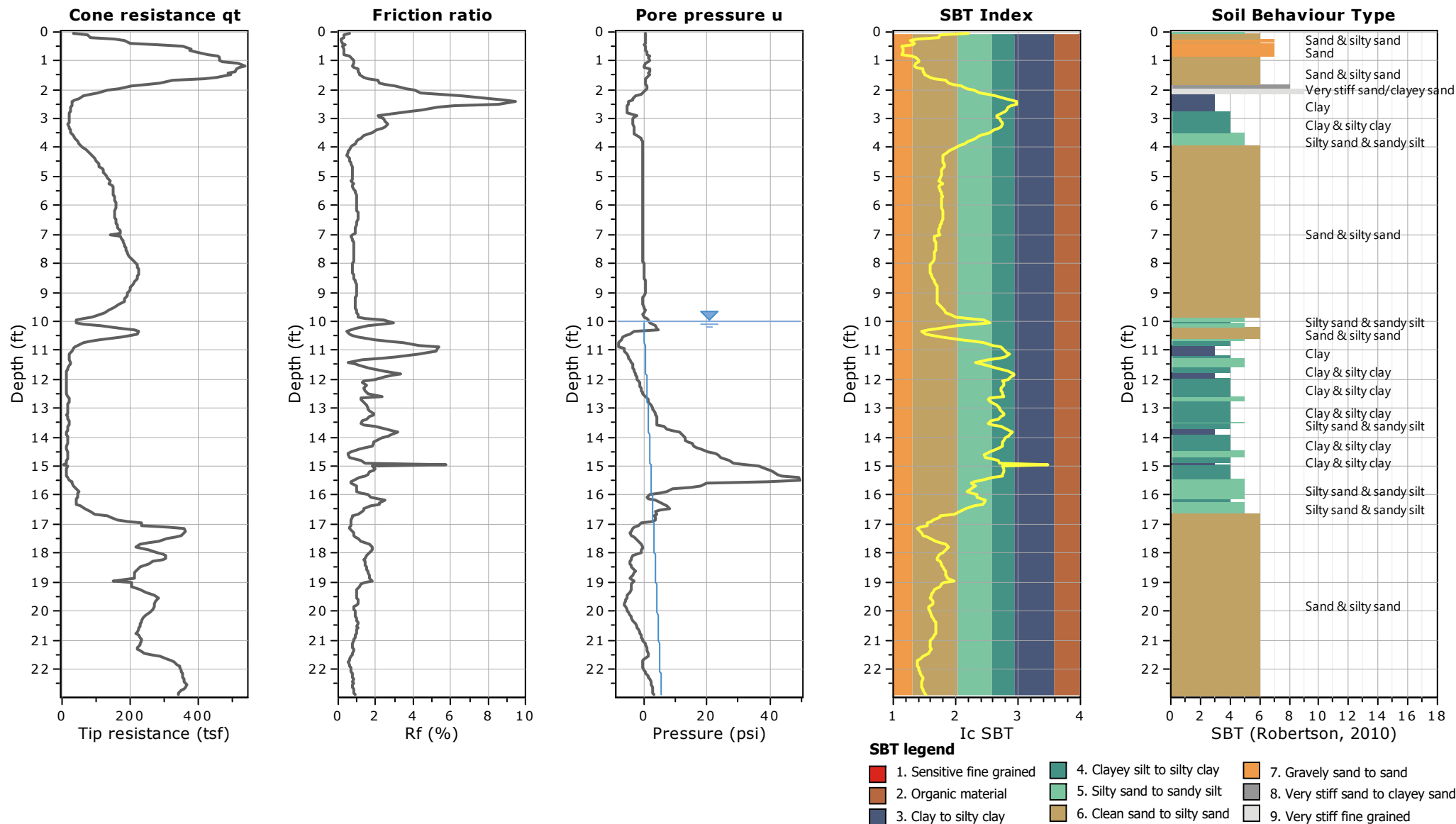


Project: Berlin Transfer Station

Location: Berlin, Maryland

CPT-2

Total depth: 22.88 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3327999° lon -75.1934808°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

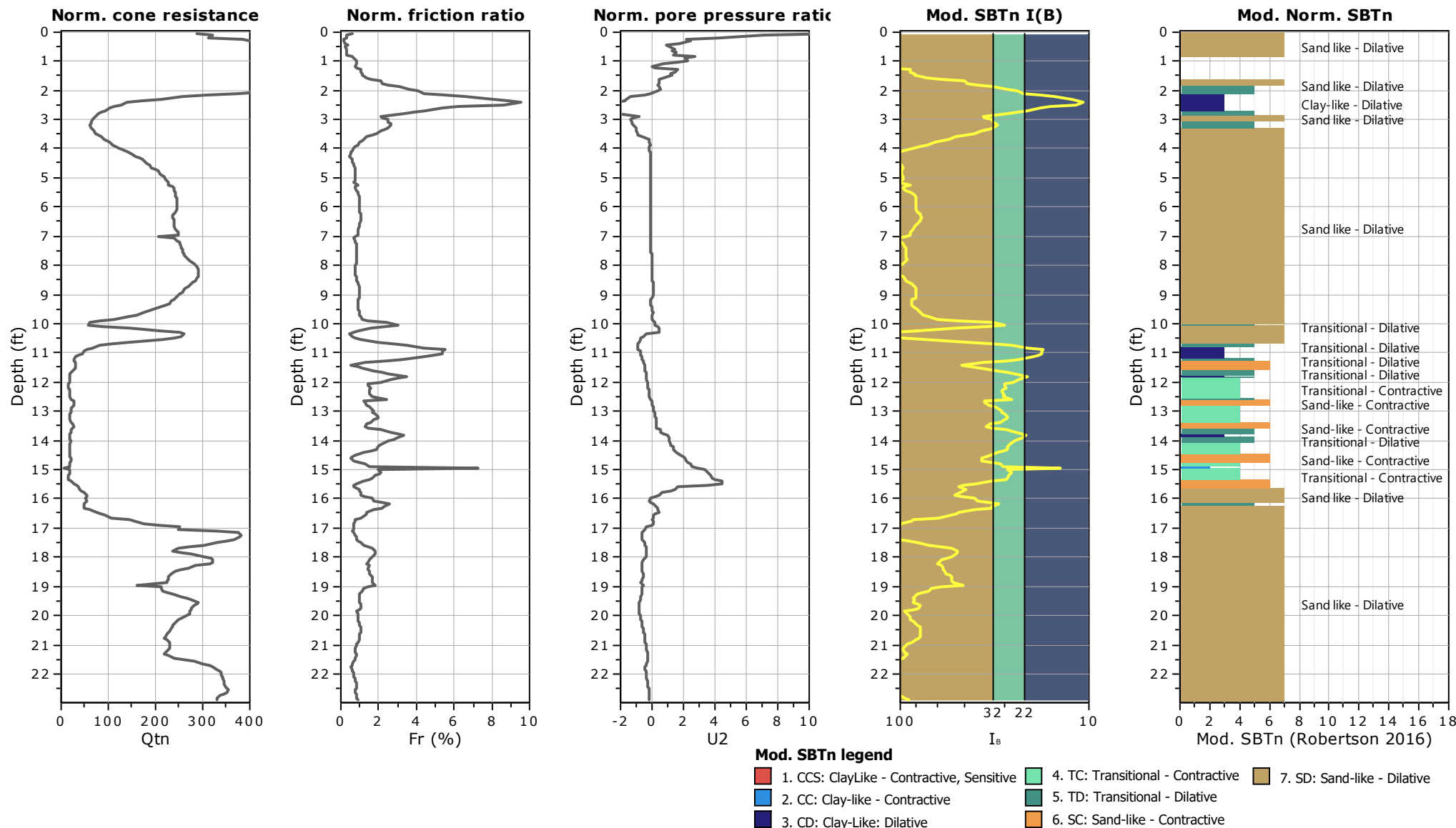




Total depth: 22.88 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3327999° lon -75.1934808°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

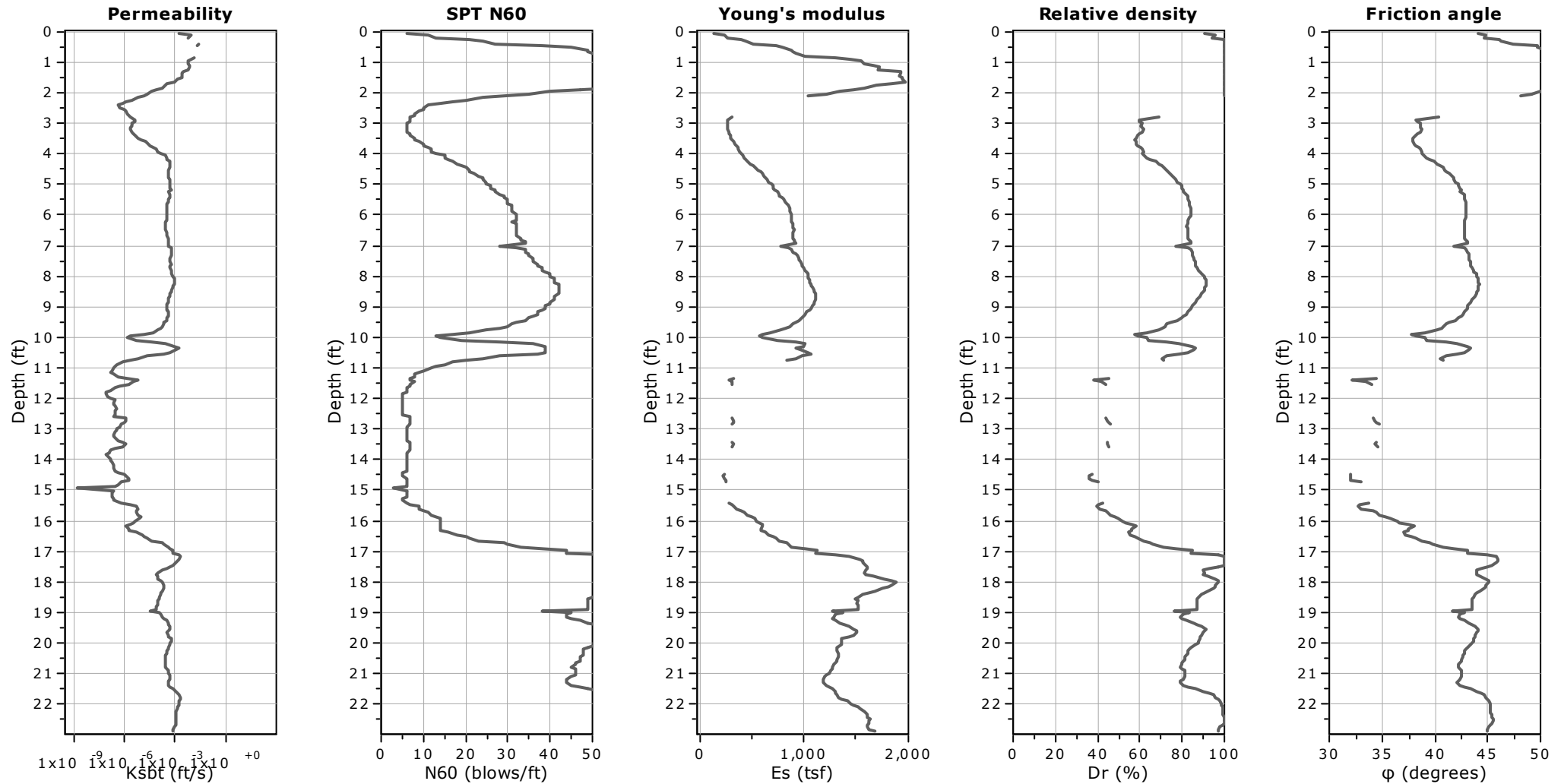
Project: Berlin Transfer Station

Location: Berlin, Maryland





Project: Berlin Transfer Station
Location: Berlin, Maryland



Calculation parameters

Permeability: Based on SBT_n

SPT N_{60} : Based on I_c and q_t

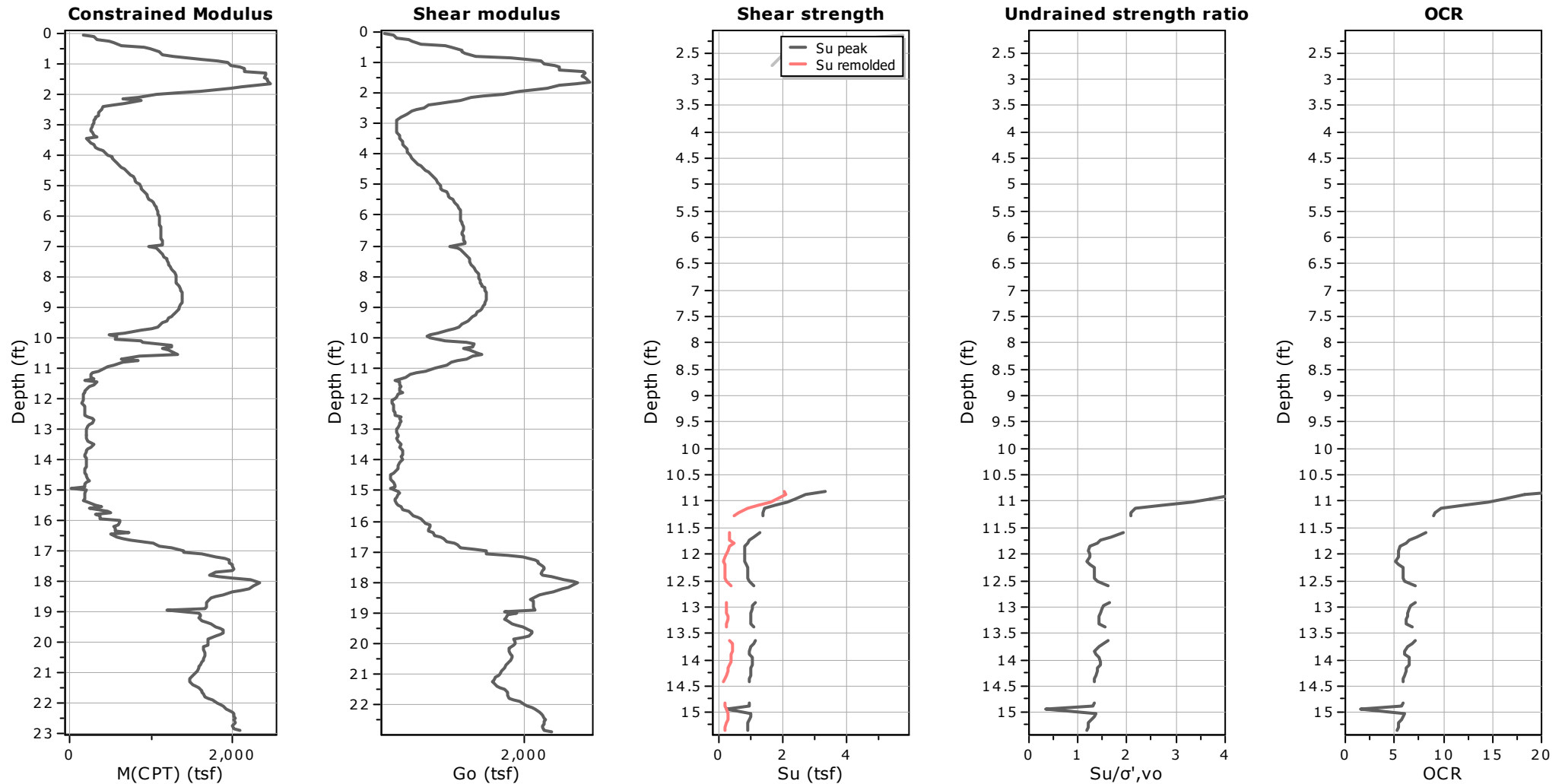
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr} : 350.0

Phi: Based on Kulhawy & Mayne (1990)



Project: Berlin Transfer Station
Location: Berlin, Maryland



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable α using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt} : 14

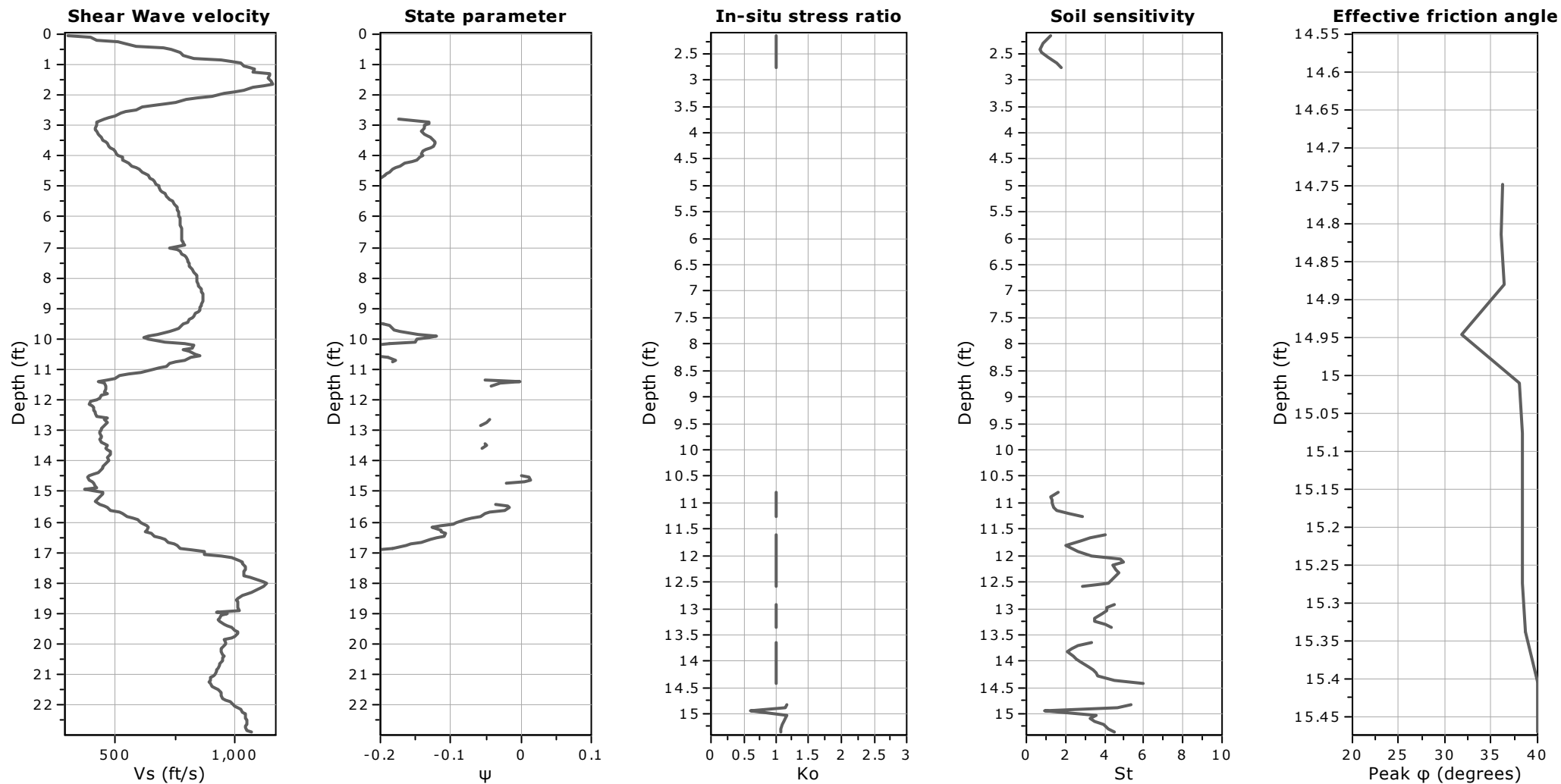
OCR factor for clays, N_{kt} : 0.33

—●— Flat Dilatometer Test data



Project: Berlin Transfer Station

Location: Berlin, Maryland

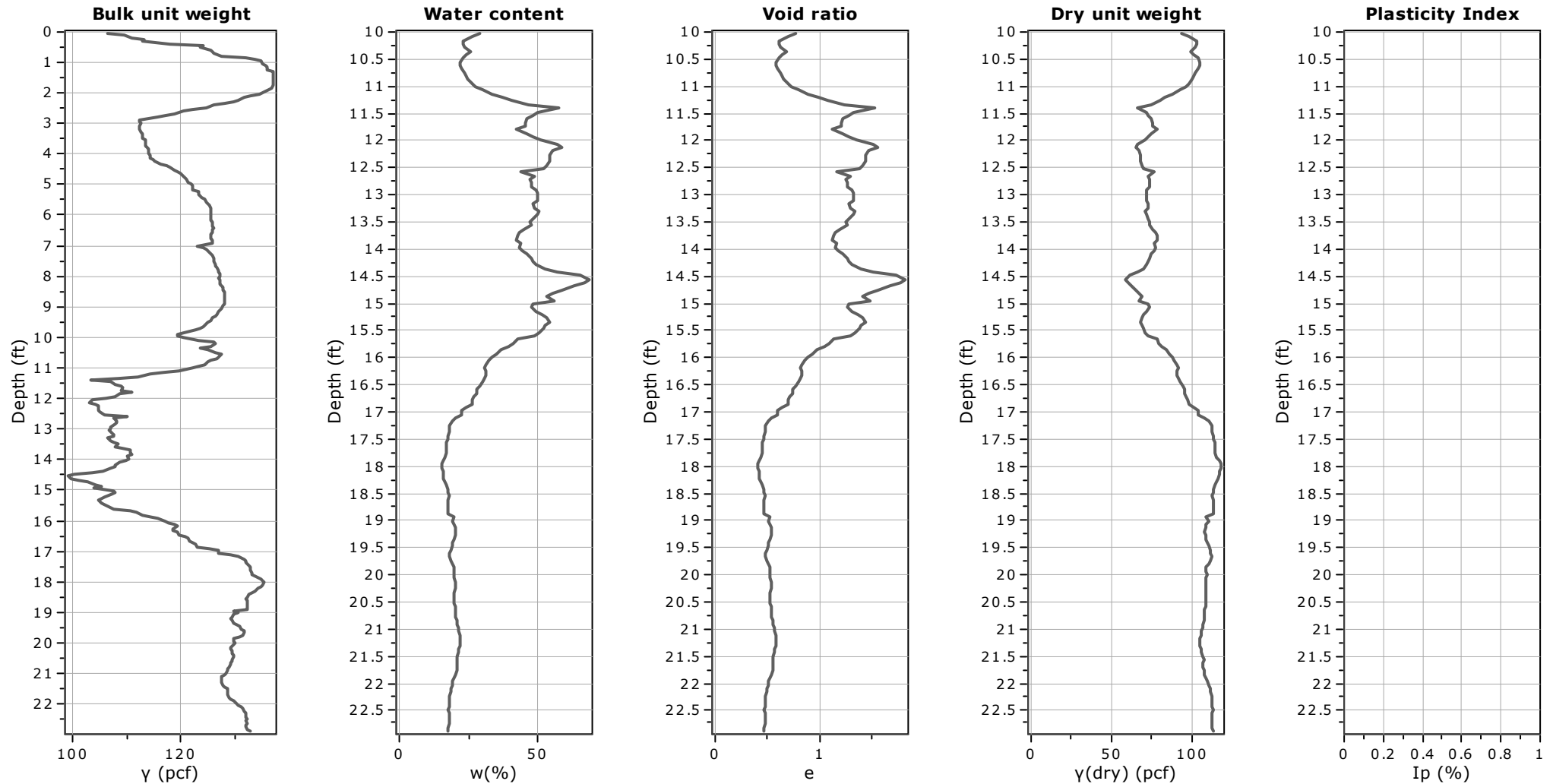


Calculation parameters

Soil Sensitivity factor, N_s : 7.00

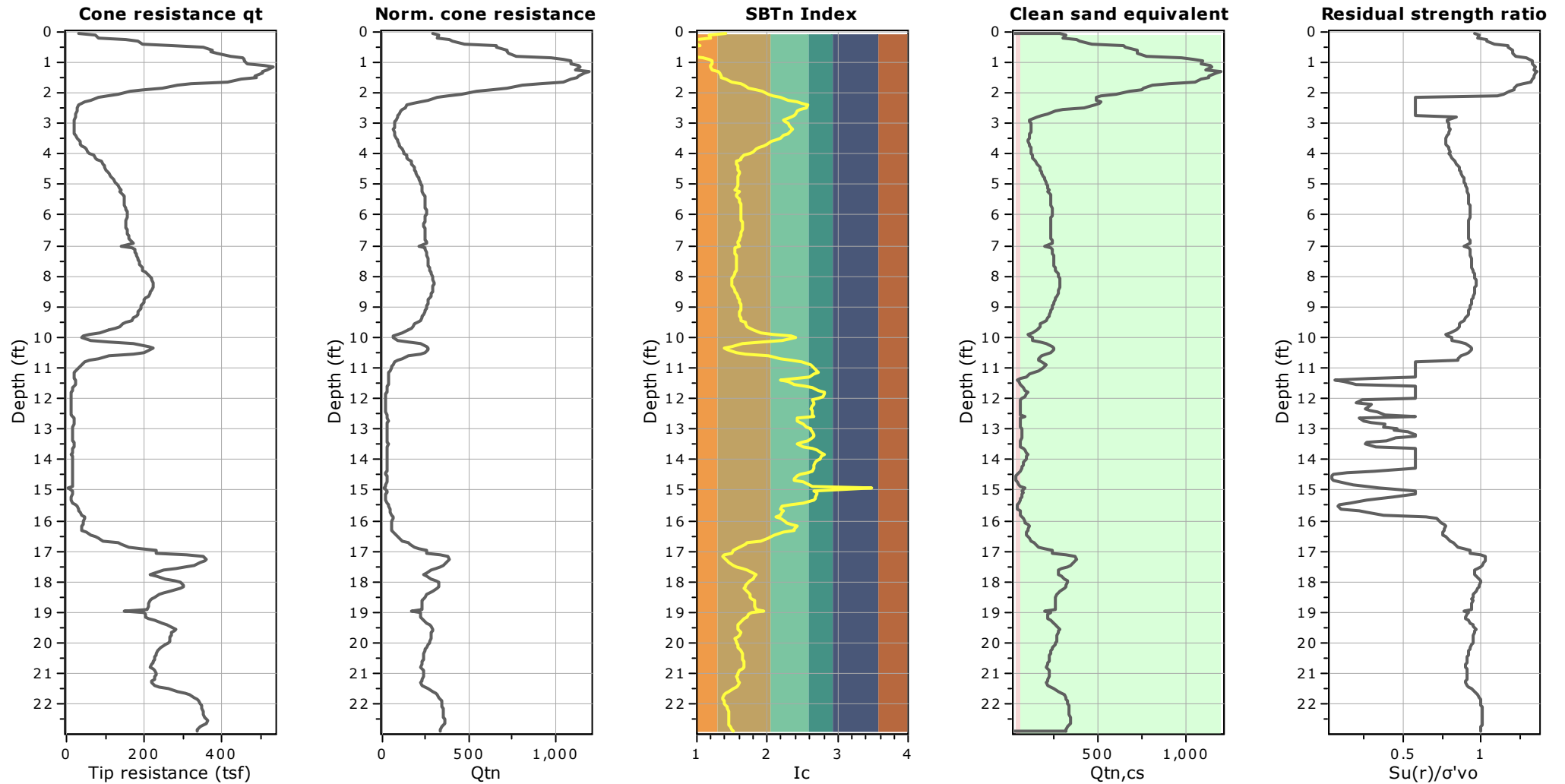


Project: Berlin Transfer Station
Location: Berlin, Maryland



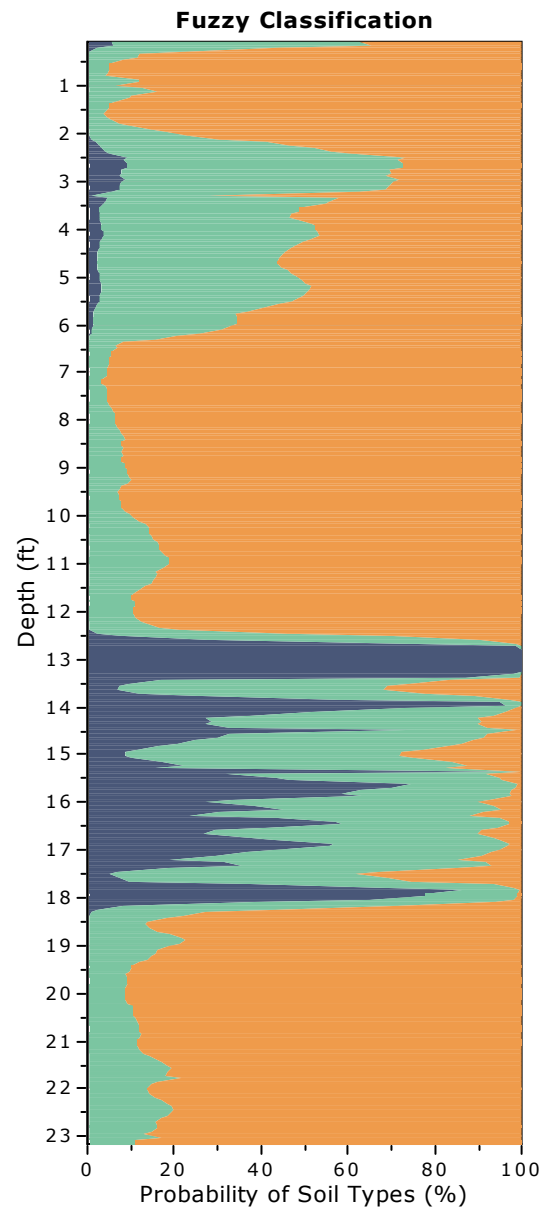
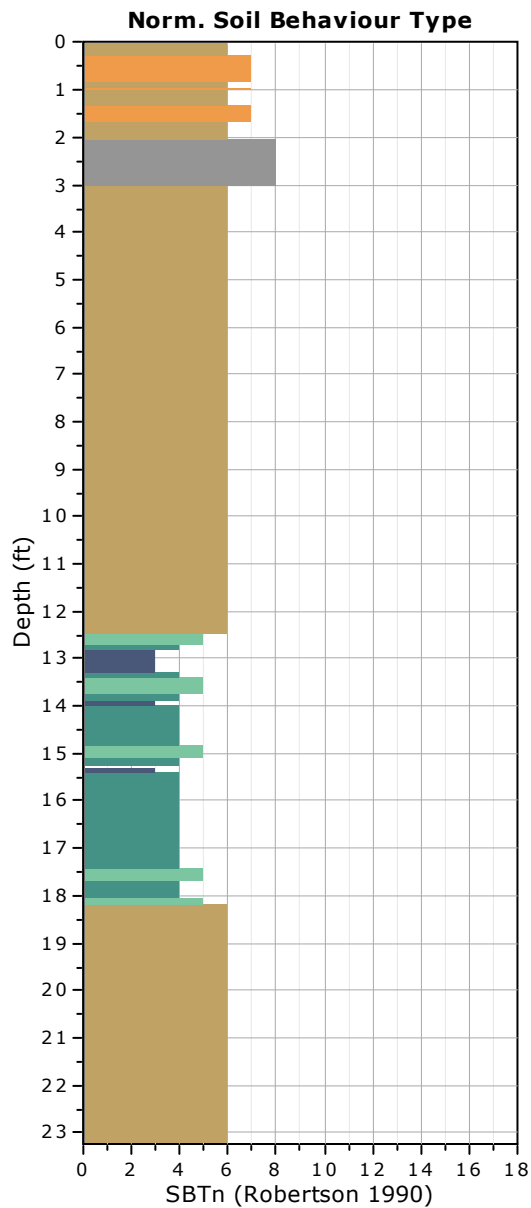


Project: Berlin Transfer Station
Location: Berlin, Maryland





Project: Berlin Transfer Station
Location: Berlin, Maryland



Fuzzy classification legend

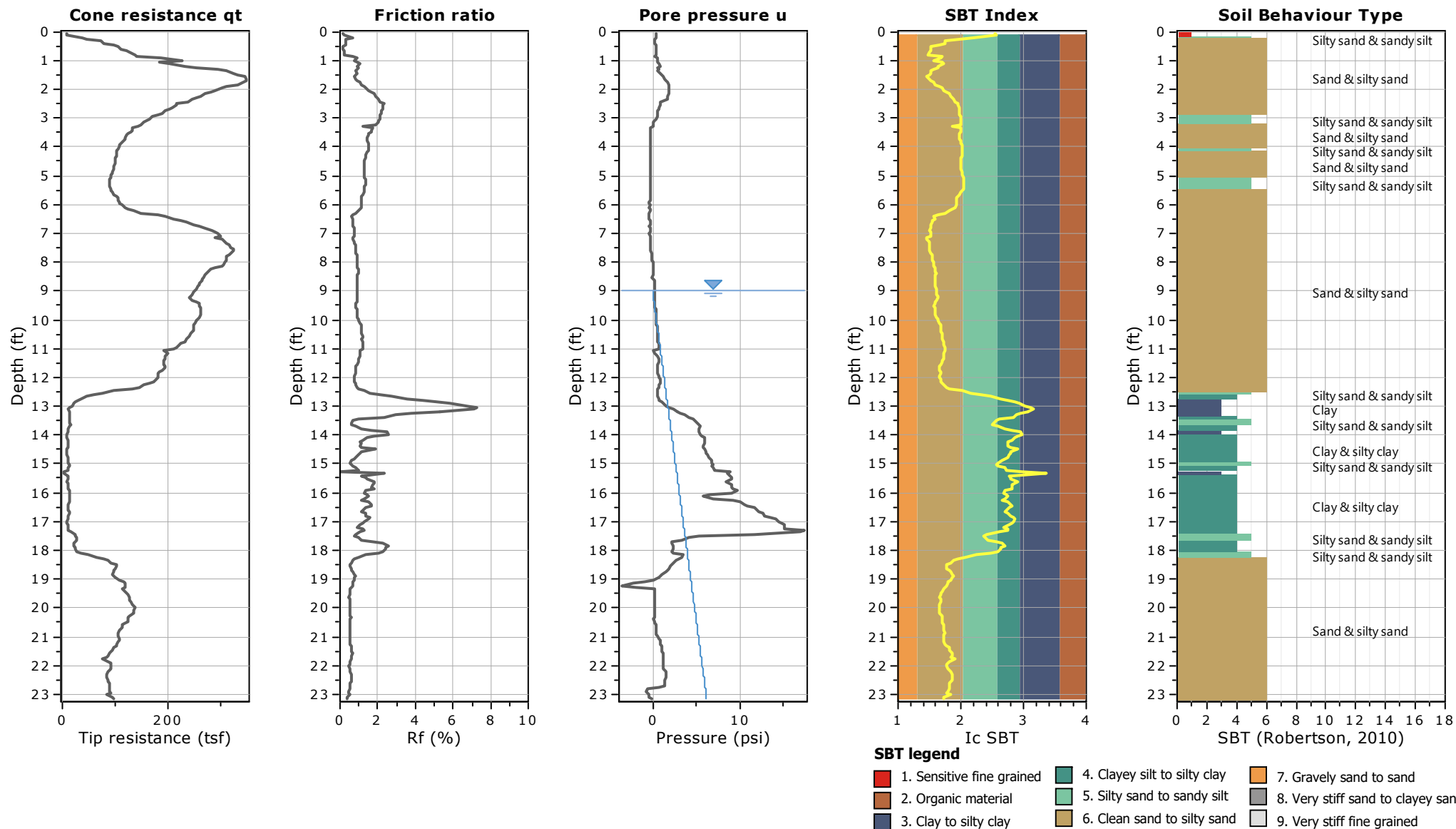
- Highly probable clayey soil
- Highly probable mixture soil
- Highly probable sandy soil



Total depth: 23.15 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 9.00 ft
Coords: lat 38.333469° lon -75.1935478°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Project: Berlin Transfer Station

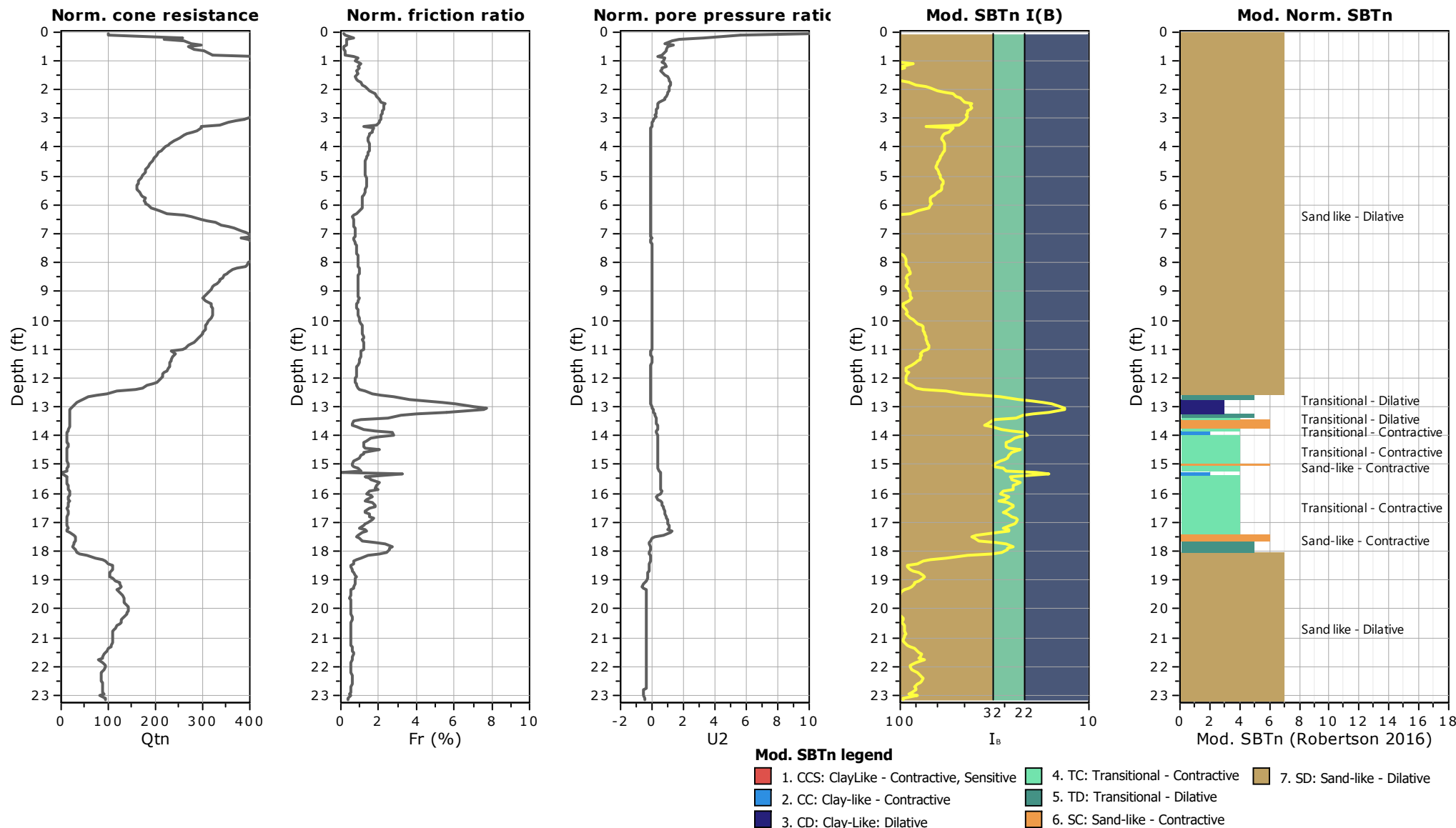
Location: Berlin, Maryland





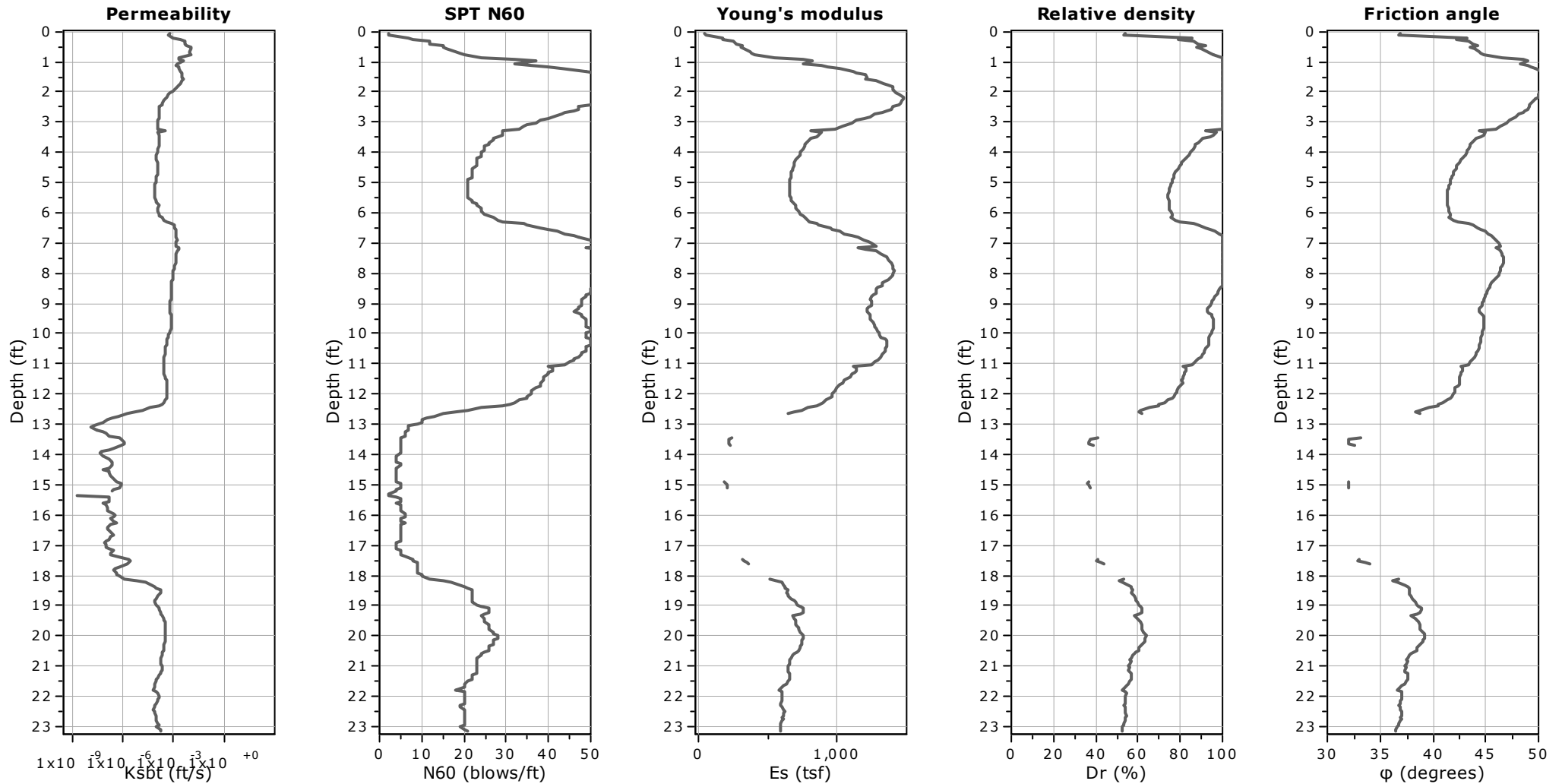
Project: Berlin Transfer Station

Location: Berlin, Maryland





Project: Berlin Transfer Station
Location: Berlin, Maryland



Calculation parameters

Permeability: Based on SBT_n

SPT N₆₀: Based on I_c and q_t

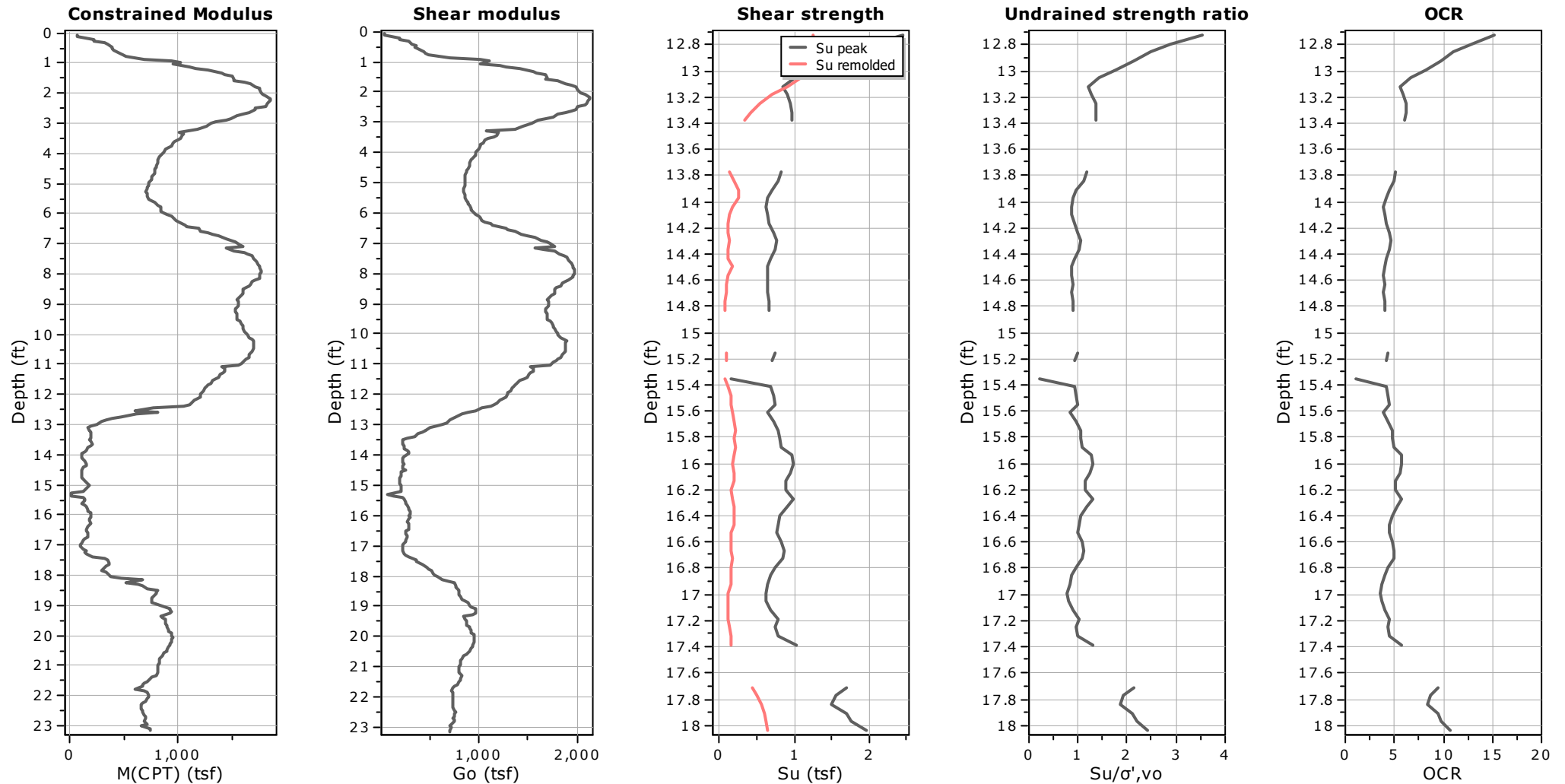
Young's modulus: Based on variable alpha using I_c (Robertson, 2009)

Relative density constant, C_{Dr}: 350.0

Phi: Based on Kulhawy & Mayne (1990)



Project: Berlin Transfer Station
Location: Berlin, Maryland



Calculation parameters

Constrained modulus: Based on variable α using I_c and Q_{tn} (Robertson, 2009)

Go: Based on variable α using I_c (Robertson, 2009)

Undrained shear strength cone factor for clays, N_{kt} : 14

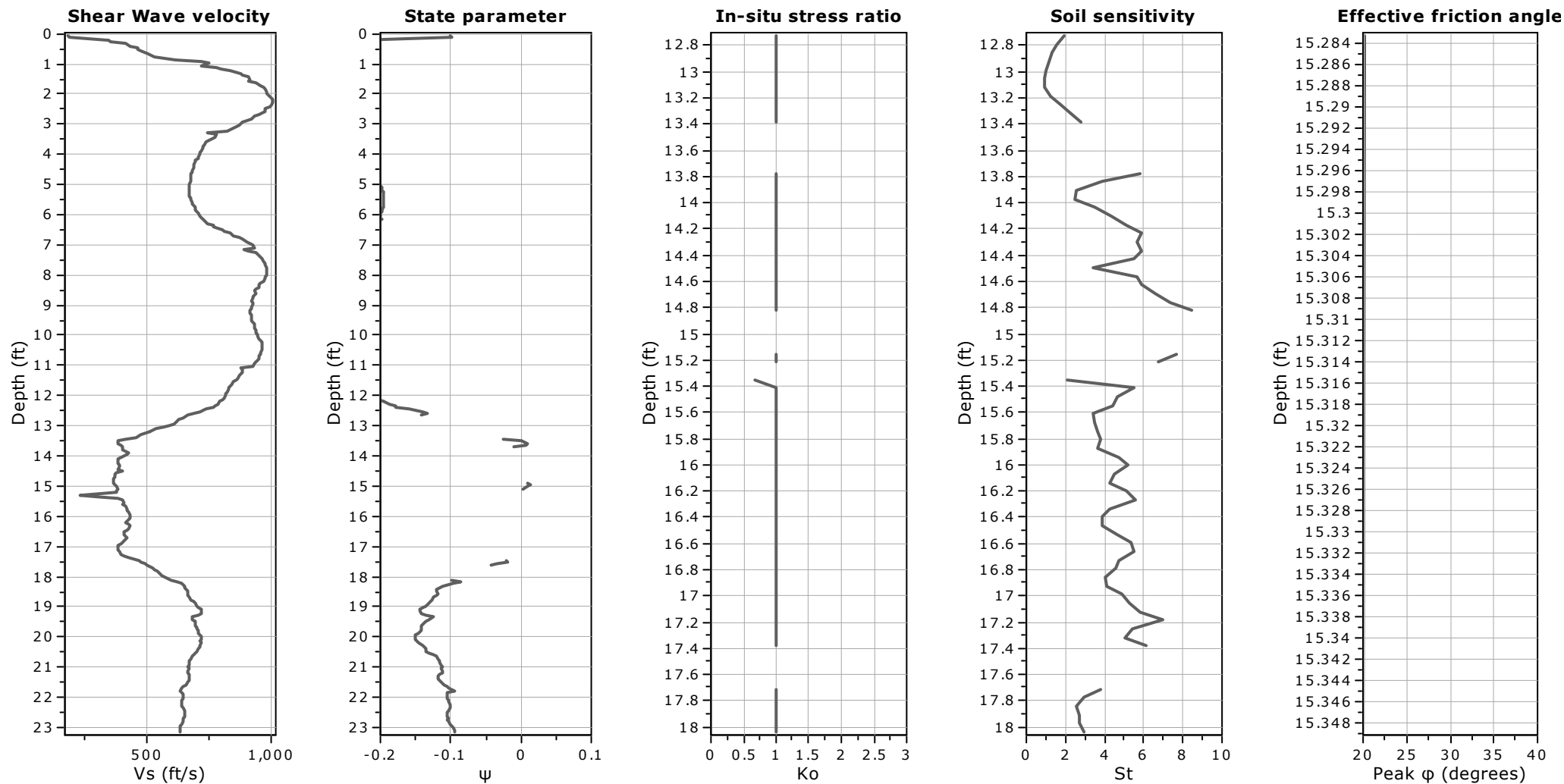
OCR factor for clays, N_{kt} : 0.33

—●— Flat Dilatometer Test data



Project: Berlin Transfer Station

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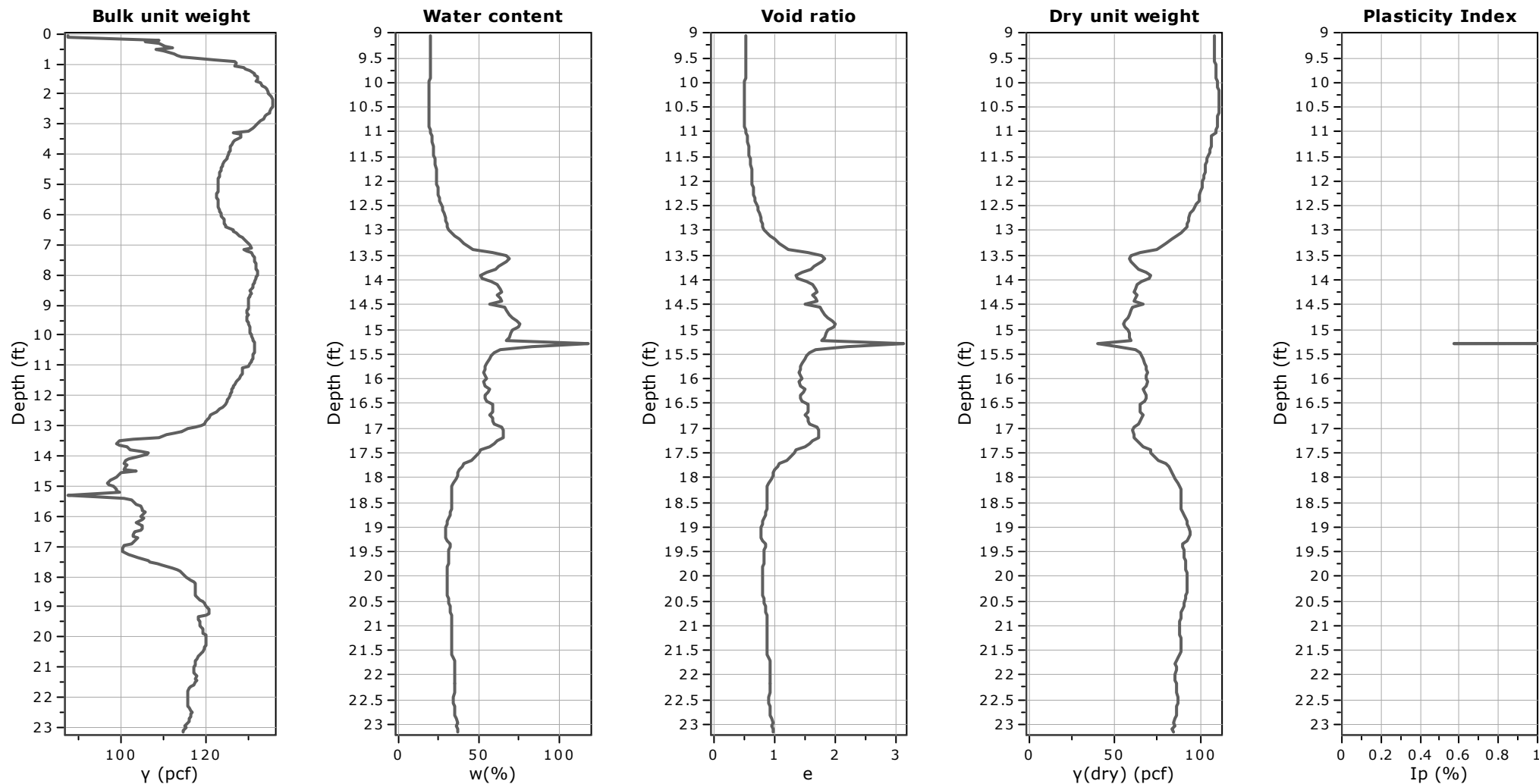
Calculation parameters

Soil Sensitivity factor, N_s : 7.00



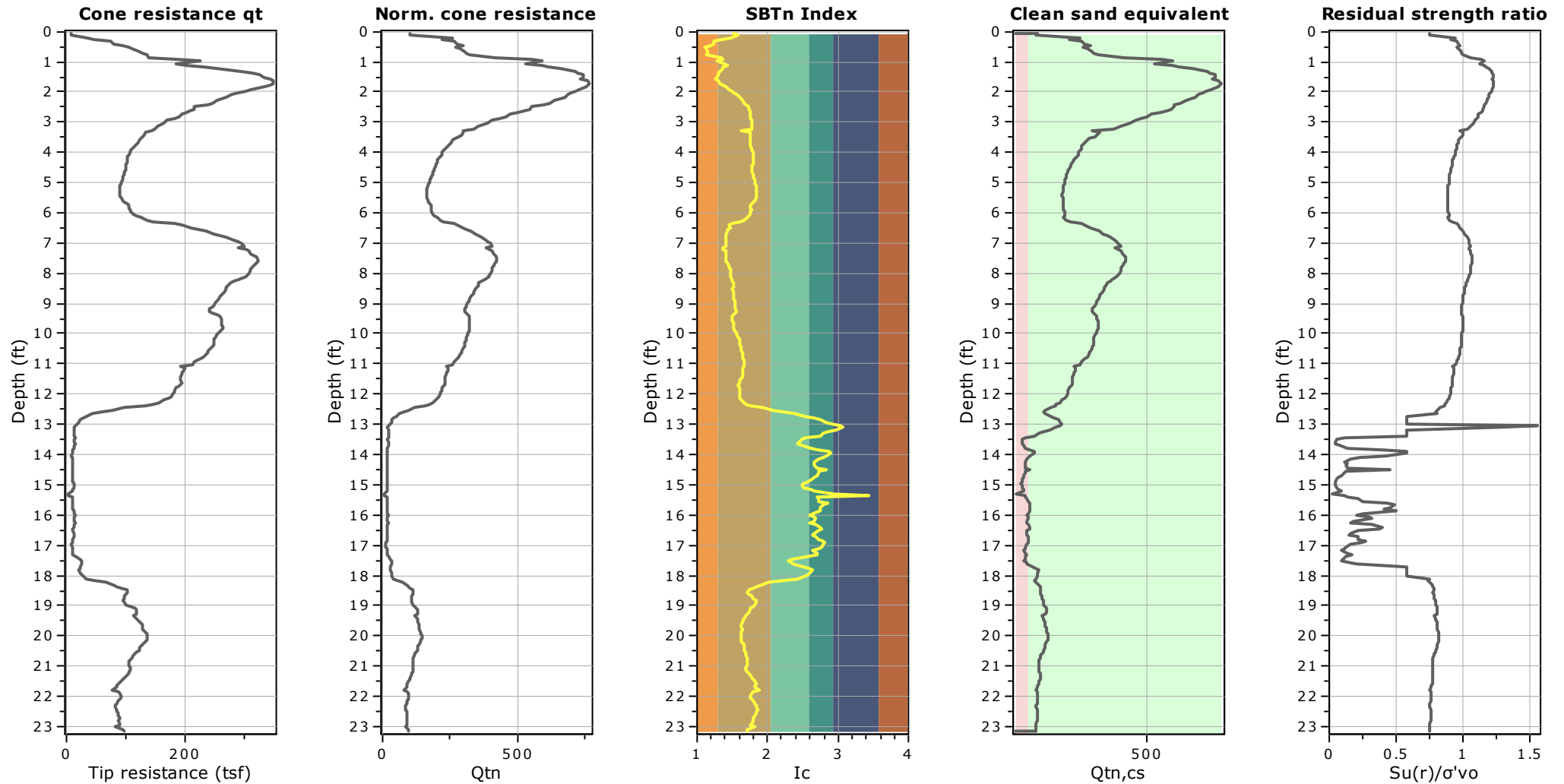
Project: Berlin Transfer Station

Location: Berlin, Maryland





Project: Berlin Transfer Station
Location: Berlin, Maryland



Presented below is a list of formulas used for the estimation of various soil properties. The formulas are presented in SI unit system and assume that all components are expressed in the same units.

:: Unit Weight, g (kN/m³) ::

$$g = g_w \cdot \left(0.27 \cdot \log(R_f) + 0.36 \cdot \log\left(\frac{q_t}{p_a}\right) + 1.236 \right)$$

where g_w = water unit weight

:: Permeability, k (m/s) ::

$$I_c < 3.27 \text{ and } I_c > 1.00 \text{ then } k = 10^{0.952 - 3.04 \cdot I_c}$$

$$I_c \leq 4.00 \text{ and } I_c > 3.27 \text{ then } k = 10^{-4.52 - 1.37 \cdot I_c}$$

:: N_{SPT} (blows per 30 cm) ::

$$N_{60} = \left(\frac{q_c}{p_a} \right) \cdot \frac{1}{10^{1.1268 - 0.2817 \cdot I_c}}$$

$$N_{1(60)} = Q_{tn} \cdot \frac{1}{10^{1.1268 - 0.2817 \cdot I_c}}$$

:: Young's Modulus, E_s (MPa) ::

$$(q_t - \sigma_v) \cdot 0.015 \cdot 10^{0.55 \cdot I_c + 1.68}$$

(applicable only to $I_c < I_{c\_cutoff}$)

:: Relative Density, Dr (%) ::

$$100 \cdot \sqrt{\frac{Q_{tn}}{k_{DR}}} \quad \text{(applicable only to SBT}_n\text{: 5, 6, 7 and 8 or } I_c < I_{c\_cutoff}\text{)}$$

:: State Parameter, ψ ::

$$\psi = 0.56 - 0.33 \cdot \log(Q_{tn,cs})$$

:: Drained Friction Angle, ϕ (°) ::

$$\phi = \phi'_{cv} + 15.94 \cdot \log(Q_{tn,cs}) - 26.88$$

(applicable only to SBT_n: 5, 6, 7 and 8 or $I_c < I_{c\_cutoff}$)

:: 1-D constrained modulus, M (MPa) ::

If $I_c > 2.20$

$\alpha = 14$ for $Q_{tn} > 14$

$\alpha = Q_{tn}$ for $Q_{tn} \leq 14$

$$M_{CPT} = \alpha \cdot (q_t - \sigma_v)$$

If $I_c \geq 2.20$

$$M_{CPT} = 0.03 \cdot (q_t - \sigma_v) \cdot 10^{0.55 \cdot I_c + 1.68}$$

:: Small strain shear Modulus, G_0 (MPa) ::

$$G_0 = (q_t - \sigma_v) \cdot 0.0188 \cdot 10^{0.55 \cdot I_c + 1.68}$$

:: Shear Wave Velocity, V_s (m/s) ::

$$V_s = \left(\frac{G_0}{\rho} \right)^{0.50}$$

:: Undrained peak shear strength, S_u (kPa) ::

$$N_{kt} = 10.50 + 7 \cdot \log(F_r) \text{ or user defined}$$

$$S_u = \frac{(q_t - \sigma_v)}{N_{kt}}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Remolded undrained shear strength, $S_u(\text{rem})$ (kPa) ::

$$S_{u(\text{rem})} = f_s \quad \text{(applicable only to SBT}_n\text{: 1, 2, 3, 4 and 9 or } I_c > I_{c\_cutoff}\text{)}$$

:: Overconsolidation Ratio, OCR ::

$$k_{OCR} = \left[\frac{Q_{tn}^{0.20}}{0.25 \cdot (10.50 + 7 \cdot \log(F_r))} \right]^{1.25} \text{ or user defined}$$

$$OCR = k_{OCR} \cdot Q_{tn}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: In situ Stress Ratio, K_0 ::

$$K_0 = (1 - \sin \phi') \cdot OCR^{\sin \phi'}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Soil Sensitivity, S_t ::

$$S_t = \frac{N_s}{F_r}$$

(applicable only to SBT_n: 1, 2, 3, 4 and 9 or $I_c > I_{c\_cutoff}$)

:: Peak Friction Angle, ϕ' (°) ::

$$\phi' = 29.5^\circ \cdot B_q^{0.121} \cdot (0.256 + 0.336 \cdot B_q + \log Q_t)$$

(applicable for $0.10 < B_q < 1.00$)

References

- Robertson, P.K., Cabal K.L., Guide to Cone Penetration Testing for Geotechnical Engineering, Gregg Drilling & Testing, Inc., 5th Edition, November 2012
- Robertson, P.K., Interpretation of Cone Penetration Tests - a unified approach., Can. Geotech. J. 46(11): 1337–1355 (2009)
- N Barounis, J Philpot, Estimation of in-situ water content, void ratio, dry unit weight and porosity using CPT for saturated sands, Proc. 20th NZGS Geotechnical Symposium

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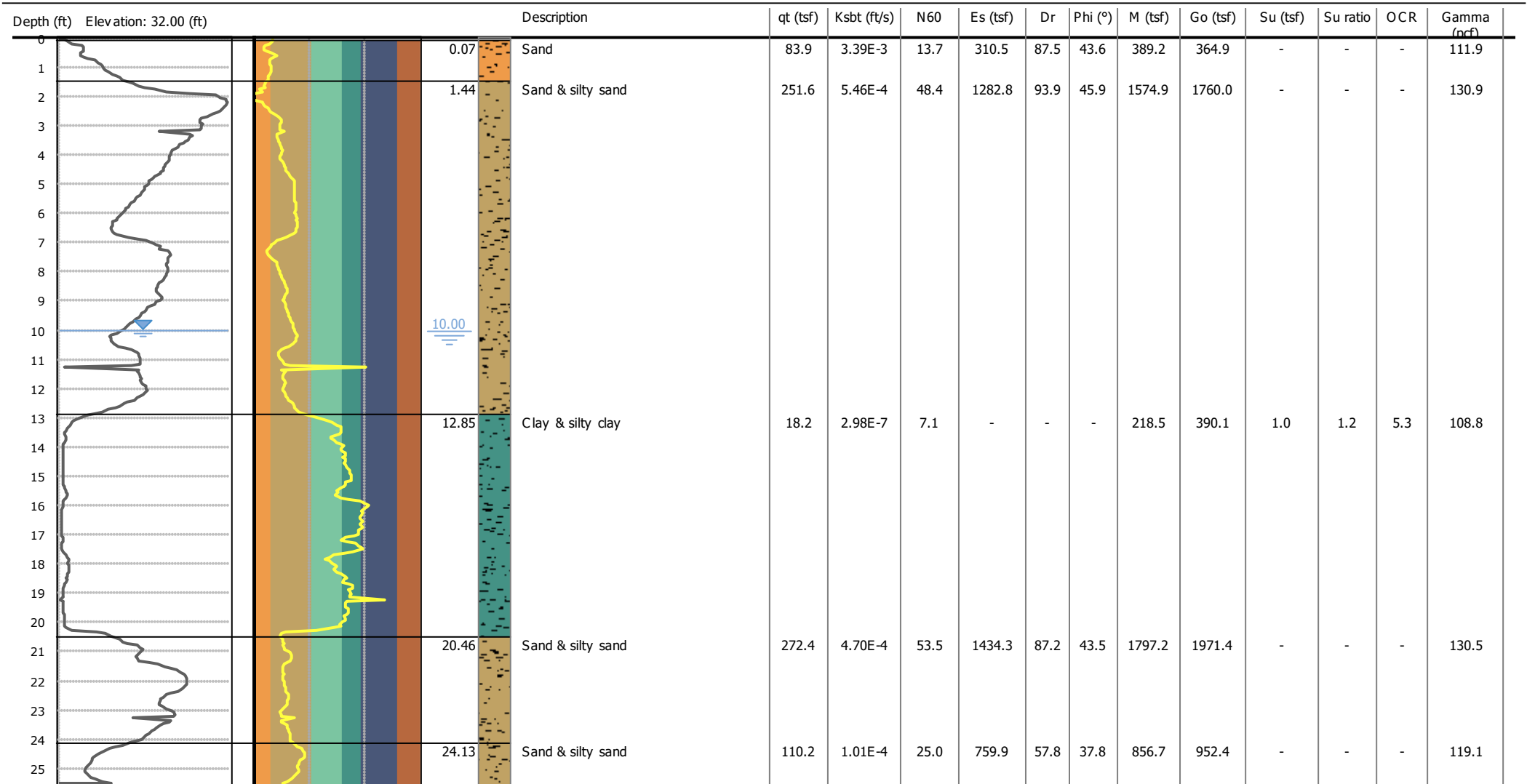
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Estimated Geologic Sections

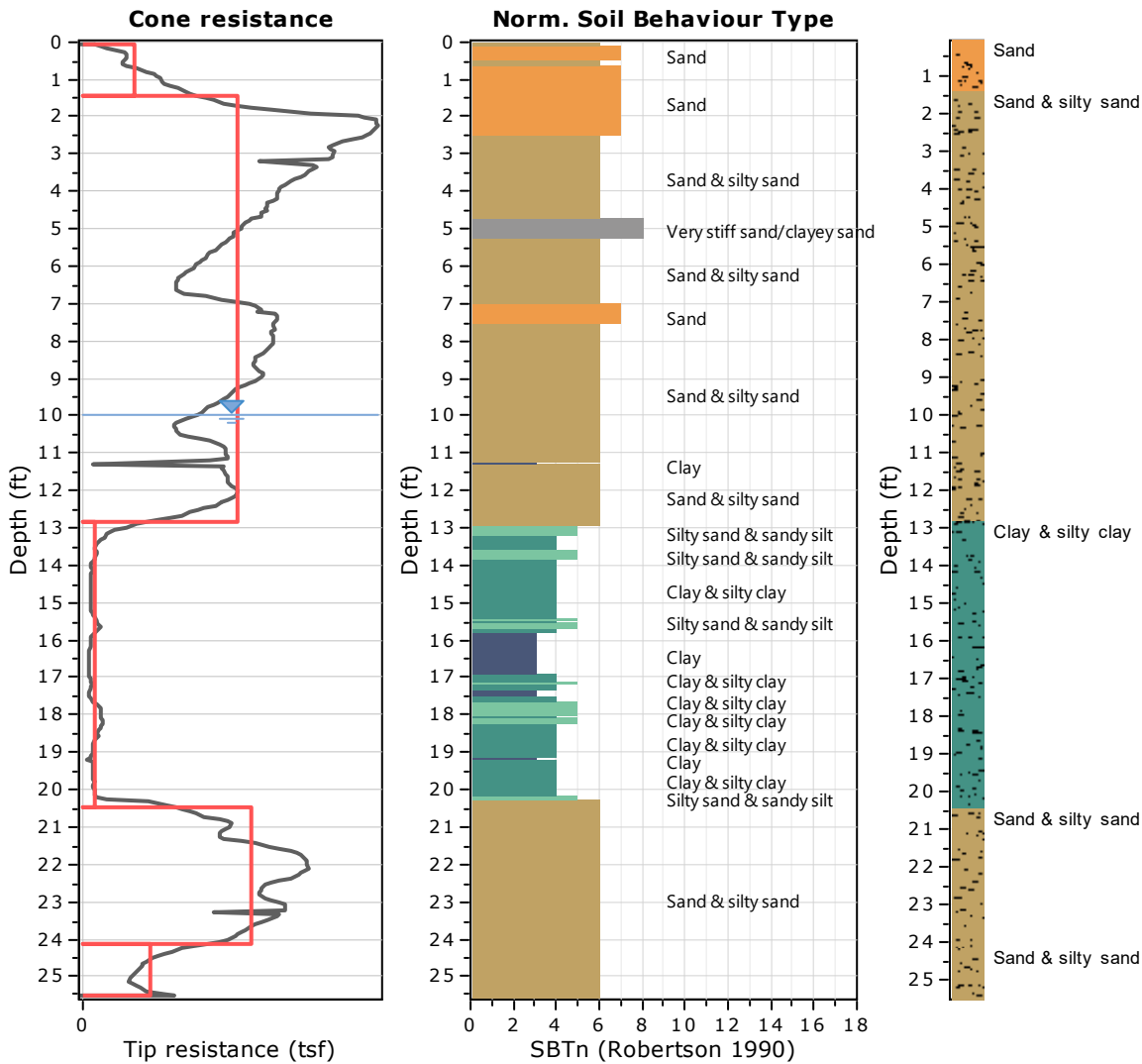


Total depth: 25.51 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3330144703136° lon -75.193714137433°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Project: Berlin Transfer Station
Location: Berlin, Maryland



SGI does not recommend using Phi angles over 40 degrees for design



Tabular results

::: Layer No: 1 :::

Code: Layer_1 **Start depth:** 0.07 (ft), **End depth:** 1.44 (ft)

Description: Sand

Basic results

Total cone resistance: 83.89 ±46.36 tsf

Sleeve friction: 0.28 ±0.30 tsf

Ic: 1.29 ±0.06

σ_v' : 0.03 ±0.02 tsf

SBT_n: 7

SBT_n description: Sand

Schneider zone: N/A

Schneider desc.: N/A

Estimation results

Permeability: 3.39E-03 ±1.52E-03 ft/s

N₆₀: 13.69 ±7.57 blows

Es: 310.49 ±168.86 tsf

Dr (%): 87.47 ±10.80

φ (degrees): 43.63 ±1.85 °

Unit weight: 111.87 ±8.45 pcf

Constrained Mod.: 389.15 ±211.63 tsf

Go: 364.91 ±229.50 tsf

Su: 0.00 ±0.00 tsf

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

K0=0.36 Ka=0.22

::: Layer No: 2 :::**Code:** Layer_2 **Start depth:** 1.44 (ft), **End depth:** 12.85 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 251.64 ±86.08 tsf
 Sleeve friction: 2.63 ±1.30 tsf
 Ic: 1.53 ±0.22
 σ_v' : 0.38 ±0.21 tsf
 SBT_n: 6
 SBTn description: Sand & silty sand
 Schneider zone: N/A
 Schneider desc.: N/A

Estimation results

Permeability: 5.46E-04 ±2.95E-03 ft/s
 N₆₀: 48.43 ±12.17 blows
 Es: 1282.85 ±276.26 tsf
 Dr (%): 93.92 ±7.92
 ϕ (degrees): 45.91 ±2.80 °
 Unit weight: 130.89 ±3.77 pcf

Constrained Mod.: 1574.88 ±369.78 tsf
 Go: 1760.00 ±439.05 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.36 Ka=0.22

::: Layer No: 3 :::**Code:** Layer_3 **Start depth:** 12.85 (ft), **End depth:** 20.46 (ft)**Description:** Clay & silty clay**Basic results**

Total cone resistance: 18.15 ±21.63 tsf
 Sleeve friction: 0.31 ±0.26 tsf
 Ic: 2.61 ±0.27
 σ_v' : 0.82 ±0.05 tsf
 SBT_n: 4
 SBTn description: Clay & silty clay
 Schneider zone: Zone 3
 Schneider desc.: Transitional soils

Estimation results

Permeability: 2.98E-07 ±8.09E-05 ft/s
 N₆₀: 7.09 ±4.34 blows
 Es: 0.00 ±0.00 tsf
 Dr (%): 0.00 ±0.00
 ϕ (degrees): 0.00 ±0.00 °
 Unit weight: 108.78 ±5.11 pcf

Constrained Mod.: 218.53 ±168.64 tsf
 Go: 390.13 ±172.69 tsf
 Su: 0.97 ±0.38 tsf
 Su ratio: 1.15 ±0.45
 O.C.R.: 5.33 ±2.09
 K₀=0.70 Ka=0.60

::: Layer No: 4 :::**Code:** Layer_4 **Start depth:** 20.46 (ft), **End depth:** 24.13 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 272.37 ±60.72 tsf
 Sleeve friction: 2.43 ±0.92 tsf
 Ic: 1.58 ±0.06
 σ_v' : 0.97 ±0.04 tsf
 SBT_n: 6
 SBTn description: Sand & silty sand
 Schneider zone: N/A
 Schneider desc.: N/A

Estimation results

Permeability: 4.70E-04 ±2.15E-04 ft/s
 N₆₀: 53.50 ±11.30 blows
 Es: 1434.29 ±297.19 tsf
 Dr (%): 87.25 ±9.54
 ϕ (degrees): 43.53 ±1.59 °
 Unit weight: 130.53 ±4.20 pcf

Constrained Mod.: 1797.23 ±372.64 tsf
 Go: 1971.42 ±456.71 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.36 Ka=0.22

::: Layer No: 5 :::**Code:** Layer_5 **Start depth:** 24.13 (ft), **End depth:** 25.51 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 110.23 ±42.23 tsf
 Sleeve friction: 0.69 ±0.70 tsf
 Ic: 1.80 ±0.09
 σ_v' : 1.06 ±0.01 tsf
 SBT_n: 6
 SBTn description: Sand & silty sand
 Schneider zone: Zone 2
 Schneider desc.: Essentially drained sands

Estimation results

Permeability: 1.01E-04 ±8.64E-05 ft/s
 N₆₀: 25.03 ±8.90 blows
 Es: 759.94 ±263.73 tsf
 Dr (%): 57.77 ±9.46
 ϕ (degrees): 37.81 ±2.14 °
 Unit weight: 119.11 ±6.30 pcf

Constrained Mod.: 856.66 ±319.23 tsf
 Go: 952.37 ±393.72 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.40 Ka=0.25



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Project: Berlin Transfer Station
Location: Berlin, Maryland

CPT-1

Total depth: 25.51 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3330144703136° lon -75.193714137433°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Summary table of mean values

From depth To depth (ft)	Thickness (ft)	Permeability (ft/s)	SPT _{N60} (blows/ft)	E _s (tsf)	D _r (%)	Friction angle	Constrained modulus, M (tsf)	Shear modulus, G _o (tsf)	Undrained strength, S _u (tsf)	Undrained strength ratio	OCR	Unit weight (pcf)
0.07	1.37	3.39E-03	13.7	310.5	87.5	43.6	389.2	364.9	0.0	0.0	0.0	111.9
1.44		(±1.52E-03)	(±7.6)	(±168.9)	(±10.8)	(±1.8)	(±211.6)	(±229.5)	(±0.0)	(±0.0)	(±0.0)	(±8.5)
1.44	11.41	5.46E-04	48.4	1282.8	93.9	45.9	1574.9	1760.0	0.0	0.0	0.0	130.9
12.85		(±2.95E-03)	(±12.2)	(±276.3)	(±7.9)	(±2.8)	(±369.8)	(±439.1)	(±0.0)	(±0.0)	(±0.0)	(±3.8)
12.85	7.61	2.98E-07	7.1	0.0	0.0	0.0	218.5	390.1	1.0	1.2	5.3	108.8
20.46		(±8.09E-05)	(±4.3)	(±0.0)	(±0.0)	(±0.0)	(±168.6)	(±172.7)	(±0.4)	(±0.5)	(±2.1)	(±5.1)
20.46	3.67	4.70E-04	53.5	1434.3	87.2	43.5	1797.2	1971.4	0.0	0.0	0.0	130.5
24.13		(±2.15E-04)	(±11.3)	(±297.2)	(±9.5)	(±1.6)	(±372.6)	(±456.7)	(±0.0)	(±0.0)	(±0.0)	(±4.2)
24.13	1.38	1.01E-04	25.0	759.9	57.8	37.8	856.7	952.4	0.0	0.0	0.0	119.1
25.51		(±8.64E-05)	(±8.9)	(±263.7)	(±9.5)	(±2.1)	(±319.2)	(±393.7)	(±0.0)	(±0.0)	(±0.0)	(±6.3)

Depth values presented in this table are measured from free ground surface



Total depth: 22.88 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3327998644412° lon -75.1934807852487°

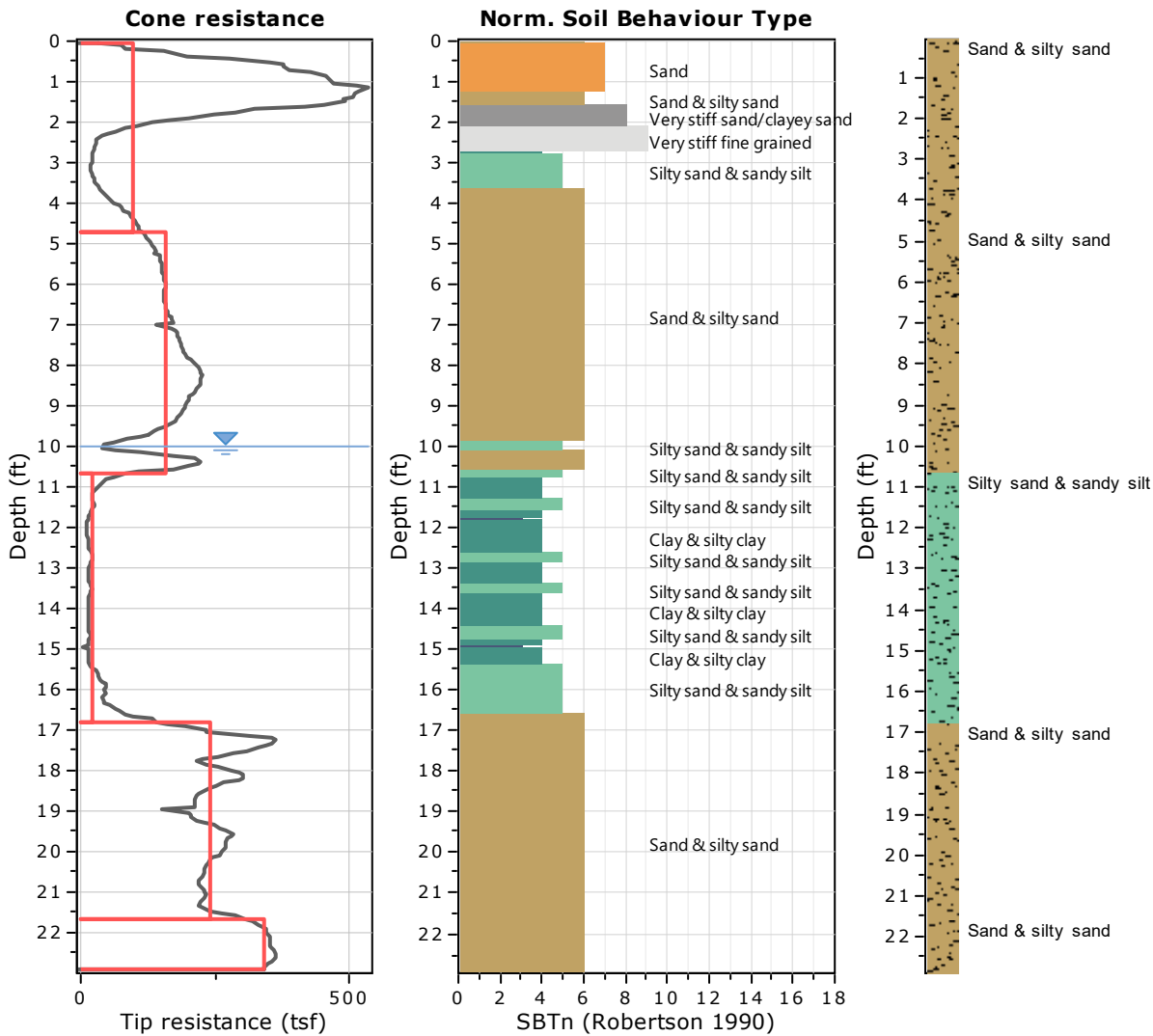
Project: Berlin Transfer Station
Location: Berlin, Maryland

Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Depth (ft)	Elevation: 32.00 (ft)	Description	qt (tsf)	Ksbt (ft/s)	N60	Es (tsf)	Dr	Phi (°)	M (tsf)	Go (tsf)	Su (tsf)	Su ratio	OCR	Gamma (pcf)
0		0.07 Sand & silty sand	97.6	9.31E-5	21.1	633.2	80.1	44.7	683.9	799.7	-	-	-	122.8
1														
2														
3														
4														
5		4.72 Sand & silty sand	158.9	3.25E-4	32.3	896.7	81.6	42.6	1099.4	1185.3	-	-	-	125.5
6														
7														
8														
9														
10		10.00 Silty sand & sandy silt	21.7	6.79E-7	7.8	426.1	48.3	35.4	267.5	417.3	-	-	-	110.4
11														
12														
13														
14														
15														
16														
17		16.78 Sand & silty sand	241.7	2.98E-4	49.6	1382.6	86.1	43.4	1695.5	1901.3	-	-	-	130.5
18														
19														
20														
21														
22		21.63 Sand & silty sand	342.7	1.30E-3	61.3	1503.2	97.7	45.1	1884.1	2076.7	-	-	-	131.1

0 500
Tip resistance (tsf) Ic

SGI does not recommend using Phi angles over 40 degrees for design



Tabular results

::: Layer No: 1 :::

Code: Layer_1 **Start depth:** 0.07 (ft), **End depth:** 4.72 (ft)

Description: Sand & silty sand

Basic results

Total cone resistance: 97.58 ±193.73 tsf

Sleeve friction: 1.20 ±2.36 tsf

Ic: 1.65 ±0.51

σ_v' : 0.11 ±0.09 tsf

SBT_n: 6

SBT_n description: Sand & silty sand

Schneider zone: N/A

Schneider desc.: N/A

Estimation results

Permeability: 9.31E-05 ±5.15E-03 ft/s

N₆₀: 21.07 ±28.33 blows

Es: 633.15 ±641.52 tsf

Dr (%): 80.05 ±18.53

φ (degrees): 44.67 ±6.19 °

Unit weight: 122.76 ±9.85 pcf

Constrained Mod.: 683.88 ±779.54 tsf

Go: 799.73 ±909.31 tsf

Su: 0.00 ±0.00 tsf

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

K0=0.36 Ka=0.22

::: Layer No: 2 :::**Code:** Layer_2 **Start depth:** 4.72 (ft), **End depth:** 10.68 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 158.93 ±40.90 tsf
 Sleeve friction: 1.46 ±0.31 tsf
 Ic: 1.62 ±0.16
 σ_v' : 0.46 ±0.11 tsf
 SBT_n: 6
 SBT_n description: Sand & silty sand
 Schneider zone: Zone 2
 Schneider desc.: Essentially drained sands

Estimation results

Permeability: 3.25E-04 ±2.91E-04 ft/s
 N₆₀: 32.30 ±6.49 blows
 Es: 896.75 ±139.63 tsf
 Dr (%): 81.59 ±6.97
 ϕ (degrees): 42.60 ±1.26 °
 Unit weight: 125.48 ±2.17 pcf

Constrained Mod.: 1099.38 ±202.40 tsf
 Go: 1185.32 ±202.80 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.36 Ka=0.22

::: Layer No: 3 :::**Code:** Layer_3 **Start depth:** 10.68 (ft), **End depth:** 16.78 (ft)**Description:** Silty sand & sandy silt**Basic results**

Total cone resistance: 21.72 ±22.87 tsf
 Sleeve friction: 0.36 ±0.52 tsf
 Ic: 2.50 ±0.25
 σ_v' : 0.71 ±0.04 tsf
 SBT_n: 5
 SBT_n description: Silty sand & sandy silt
 Schneider zone: N/A
 Schneider desc.: N/A

Estimation results

Permeability: 6.79E-07 ±2.03E-05 ft/s
 N₆₀: 7.81 ±5.46 blows
 Es: 426.10 ±215.88 tsf
 Dr (%): 48.31 ±9.87
 ϕ (degrees): 35.35 ±2.58 °
 Unit weight: 110.39 ±6.71 pcf

Constrained Mod.: 267.47 ±195.82 tsf
 Go: 417.25 ±255.52 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.43 Ka=0.27

::: Layer No: 4 :::**Code:** Layer_4 **Start depth:** 16.78 (ft), **End depth:** 21.63 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 241.70 ±45.18 tsf
 Sleeve friction: 2.54 ±0.90 tsf
 Ic: 1.64 ±0.12
 σ_v' : 0.87 ±0.05 tsf
 SBT_n: 6
 SBT_n description: Sand & silty sand
 Schneider zone: Zone 2
 Schneider desc.: Essentially drained sands

Estimation results

Permeability: 2.98E-04 ±3.88E-04 ft/s
 N₆₀: 49.57 ±7.46 blows
 Es: 1382.65 ±217.48 tsf
 Dr (%): 86.08 ±7.40
 ϕ (degrees): 43.36 ±1.25 °
 Unit weight: 130.55 ±2.75 pcf

Constrained Mod.: 1695.46 ±261.89 tsf
 Go: 1901.29 ±338.12 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.36 Ka=0.22

::: Layer No: 5 :::**Code:** Layer_5 **Start depth:** 21.63 (ft), **End depth:** 22.88 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 342.69 ±19.85 tsf
 Sleeve friction: 2.44 ±0.42 tsf
 Ic: 1.43 ±0.04
 σ_v' : 0.97 ±0.01 tsf
 SBT_n: 6
 SBT_n description: Sand & silty sand
 Schneider zone: Zone 2
 Schneider desc.: Essentially drained sands

Estimation results

Permeability: 1.30E-03 ±3.67E-04 ft/s
 N₆₀: 61.30 ±4.34 blows
 Es: 1503.25 ±125.14 tsf
 Dr (%): 97.73 ±2.66
 ϕ (degrees): 45.11 ±0.39 °
 Unit weight: 131.13 ±1.41 pcf

Constrained Mod.: 1884.07 ±156.84 tsf
 Go: 2076.67 ±194.36 tsf
 Su: 0.00 ±0.00 tsf
 Su ratio: 0.00 ±0.00
 O.C.R.: 0.00 ±0.00
 K₀=0.36 Ka=0.22



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Project: Berlin Transfer Station
Location: Berlin, Maryland

CPT-2

Total depth: 22.88 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 10.00 ft
Coords: lat 38.3327998644412° lon -75.1934807852487°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Summary table of mean values

From depth To depth (ft)	Thickness (ft)	Permeability (ft/s)	SPT _{N60} (blows/ft)	E _s (tsf)	D _r (%)	Friction angle	Constrained modulus, M (tsf)	Shear modulus, G ₀ (tsf)	Undrained strength, S _u (tsf)	Undrained strength ratio	OCR	Unit weight (pcf)
0.07	4.65	9.31E-05	21.1	633.2	80.1	44.7	683.9	799.7	0.0	0.0	0.0	122.8
4.72		(±5.15E-03)	(±28.3)	(±641.5)	(±18.5)	(±6.2)	(±779.5)	(±909.3)	(±0.0)	(±0.0)	(±0.0)	(±9.8)
4.72	5.96	3.25E-04	32.3	896.7	81.6	42.6	1099.4	1185.3	0.0	0.0	0.0	125.5
10.68		(±2.91E-04)	(±6.5)	(±139.6)	(±7.0)	(±1.3)	(±202.4)	(±202.8)	(±0.0)	(±0.0)	(±0.0)	(±2.2)
10.68	6.10	6.79E-07	7.8	426.1	48.3	35.4	267.5	417.3	0.0	0.0	0.0	110.4
16.78		(±2.03E-05)	(±5.5)	(±215.9)	(±9.9)	(±2.6)	(±195.8)	(±255.5)	(±0.0)	(±0.0)	(±0.0)	(±6.7)
16.78	4.85	2.98E-04	49.6	1382.6	86.1	43.4	1695.5	1901.3	0.0	0.0	0.0	130.5
21.63		(±3.88E-04)	(±7.5)	(±217.5)	(±7.4)	(±1.3)	(±261.9)	(±338.1)	(±0.0)	(±0.0)	(±0.0)	(±2.7)
21.63	1.25	1.30E-03	61.3	1503.2	97.7	45.1	1884.1	2076.7	0.0	0.0	0.0	131.1
22.88		(±3.67E-04)	(±4.3)	(±125.1)	(±2.7)	(±0.4)	(±156.8)	(±194.4)	(±0.0)	(±0.0)	(±0.0)	(±1.4)

Depth values presented in this table are measured from free ground surface



Total depth: 23.15 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 9.00 ft
Coords: lat 38.3333468977632° lon -75.1935478404741°

Project: Berlin Transfer Station

Location: Berlin, Maryland

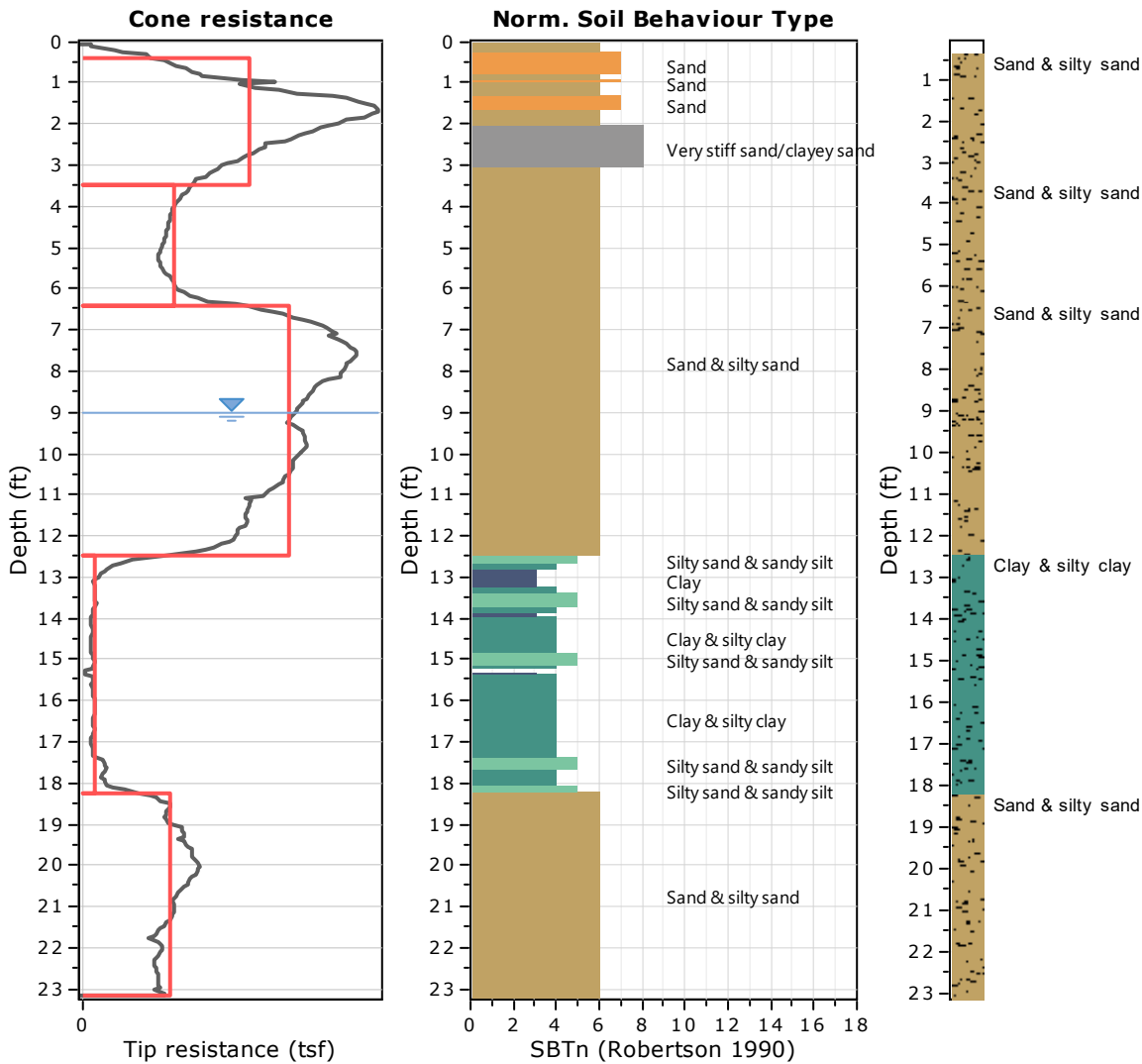
Cone Type: Nova u2

Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Depth (ft)	Elevation: 32.00 (ft)	Description	qt (tsf)	Ksbt (ft/s)	N60	Es (tsf)	Dr	Phi (°)	M (tsf)	Go (tsf)	Su (tsf)	Su ratio	OCR	Gamma (pcf)
0														
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														
22														
23														

0 1 2 3 4
Tip resistance (tsf) Ic

SGI does not recommend using Phi angles over 40 degrees for design



Tabular results

::: Layer No: 1 :::

Code: Layer_1 **Start depth:** 0.39 (ft), **End depth:** 3.48 (ft)

Description: Sand & silty sand

Basic results

Total cone resistance: 196.75 ±81.63 tsf

Sleeve friction: 2.05 ±1.77 tsf

Ic: 1.48 ±0.23

σ_v' : 0.10 ±0.06 tsf

SBT_n: 6

SBT_n description: Sand & silty sand

Schneider zone: N/A

Schneider desc.: N/A

Estimation results

Permeability: 8.50E-04 ±3.61E-03 ft/s

N₆₀: 36.52 ±14.53 blows

Es: 935.12 ±404.92 tsf

Dr (%): 98.01 ±3.77

φ (degrees): 47.85 ±2.43 °

Unit weight: 128.49 ±8.33 pcf

Constrained Mod.: 1155.88 ±503.16 tsf

Go: 1263.12 ±612.25 tsf

Su: 0.00 ±0.00 tsf

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

K0=0.36 Ka=0.22

::: Layer No: 2 :::**Code:** Layer_2 **Start depth:** 3.48 (ft), **End depth:** 6.43 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 107.09 ±21.56 tsf

Sleeve friction: 1.34 ±0.23 tsf

Ic: 1.77 ±0.08

 σ_v' : 0.31 ±0.05 tsfSBT_n: 6SBT_n description: Sand & silty sand

Schneider zone: Zone 2

Schneider desc.: Essentially drained sands

Estimation results

Permeability: 1.23E-04 ±1.96E-04 ft/s

N₆₀: 23.82 ±3.17 blows

Es: 720.46 ±59.42 tsf

Dr (%): 79.58 ±5.48

 ϕ (degrees): 42.27 ±0.92 °

Unit weight: 123.92 ±1.30 pcf

Constrained Mod.: 837.65 ±104.78 tsf

Go: 940.54 ±86.22 tsf

Su: 0.00 ±0.00 tsf

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

K0=0.36 Ka=0.22

::: Layer No: 3 :::**Code:** Layer_3 **Start depth:** 6.43 (ft), **End depth:** 12.46 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 241.34 ±45.56 tsf

Sleeve friction: 2.18 ±0.49 tsf

Ic: 1.54 ±0.09

 σ_v' : 0.56 ±0.08 tsfSBT_n: 6SBT_n description: Sand & silty sand

Schneider zone: N/A

Schneider desc.: N/A

Estimation results

Permeability: 6.19E-04 ±4.82E-04 ft/s

N₆₀: 46.23 ±6.87 blows

Es: 1212.51 ±151.32 tsf

Dr (%): 91.71 ±8.36

 ϕ (degrees): 44.42 ±1.56 °

Unit weight: 129.44 ±2.16 pcf

Constrained Mod.: 1519.19 ±190.53 tsf

Go: 1653.30 ±231.26 tsf

Su: 0.00 ±0.00 tsf

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

K0=0.36 Ka=0.22

::: Layer No: 4 :::**Code:** Layer_4 **Start depth:** 12.46 (ft), **End depth:** 18.23 (ft)**Description:** Clay & silty clay**Basic results**

Total cone resistance: 15.06 ±18.89 tsf

Sleeve friction: 0.22 ±0.40 tsf

Ic: 2.64 ±0.23

 σ_v' : 0.75 ±0.03 tsfSBT_n: 4SBT_n description: Clay & silty clay

Schneider zone: N/A

Schneider desc.: N/A

Estimation results

Permeability: 2.72E-07 ±1.58E-05 ft/s

N₆₀: 5.91 ±4.51 blows

Es: 0.00 ±0.00 tsf

Dr (%): 0.00 ±0.00

 ϕ (degrees): 0.00 ±0.00 °

Unit weight: 106.09 ±7.61 pcf

Constrained Mod.: 178.75 ±179.39 tsf

Go: 319.26 ±214.24 tsf

Su: 0.86 ±0.40 tsf

Su ratio: 1.11 ±0.53

O.C.R.: 5.15 ±2.43

K0=0.70 Ka=0.60

::: Layer No: 5 :::**Code:** Layer_5 **Start depth:** 18.23 (ft), **End depth:** 23.15 (ft)**Description:** Sand & silty sand**Basic results**

Total cone resistance: 101.37 ±18.28 tsf

Sleeve friction: 0.59 ±0.11 tsf

Ic: 1.75 ±0.10

 σ_v' : 0.88 ±0.04 tsfSBT_n: 6SBT_n description: Sand & silty sand

Schneider zone: Zone 2

Schneider desc.: Essentially drained sands

Estimation results

Permeability: 1.37E-04 ±9.21E-05 ft/s

N₆₀: 22.32 ±2.88 blows

Es: 662.47 ±55.68 tsf

Dr (%): 57.26 ±3.41

 ϕ (degrees): 37.74 ±0.81 °

Unit weight: 117.70 ±1.61 pcf

Constrained Mod.: 784.17 ±104.50 tsf

Go: 821.43 ±80.15 tsf

Su: 0.00 ±0.00 tsf

Su ratio: 0.00 ±0.00

O.C.R.: 0.00 ±0.00

K0=0.40 Ka=0.25



Stable Ground In-Situ, LLC
ENGINEERING INVESTIGATIONS AND CONSULTING
BUILD CONFIDENTLY
www.sgi-insitu.com

Project: Berlin Transfer Station
Location: Berlin, Maryland

CPT-3

Total depth: 23.15 ft, Date: 9/18/2024
Surface Elevation: 32.00 ft, Est. GWL: 9.00 ft
Coords: lat 38.3333468977632° lon -75.1935478404741°
Cone Type: Nova u2
Cone Operator: R. Ward, PE/F. Garcia PE, D.GE

Summary table of mean values

From depth To depth (ft)	Thickness (ft)	Permeability (ft/s)	SPT _{N60} (blows/ft)	E _s (tsf)	D _r (%)	Friction angle	Constrained modulus, M (tsf)	Shear modulus, G _o (tsf)	Undrained strength, S _u (tsf)	Undrained strength ratio	OCR	Unit weight (pcf)
0.39	3.09	8.50E-04	36.5	935.1	98.0	47.9	1155.9	1263.1	0.0	0.0	0.0	128.5
3.48		(±3.61E-03)	(±14.5)	(±404.9)	(±3.8)	(±2.4)	(±503.2)	(±612.3)	(±0.0)	(±0.0)	(±0.0)	(±8.3)
3.48	2.95	1.23E-04	23.8	720.5	79.6	42.3	837.7	940.5	0.0	0.0	0.0	123.9
6.43		(±1.96E-04)	(±3.2)	(±59.4)	(±5.5)	(±0.9)	(±104.8)	(±86.2)	(±0.0)	(±0.0)	(±0.0)	(±1.3)
6.43	6.03	6.19E-04	46.2	1212.5	91.7	44.4	1519.2	1653.3	0.0	0.0	0.0	129.4
12.46		(±4.82E-04)	(±6.9)	(±151.3)	(±8.4)	(±1.6)	(±190.5)	(±231.3)	(±0.0)	(±0.0)	(±0.0)	(±2.2)
12.46	5.77	2.72E-07	5.9	0.0	0.0	0.0	178.7	319.3	0.9	1.1	5.2	106.1
18.23		(±1.58E-05)	(±4.5)	(±0.0)	(±0.0)	(±0.0)	(±179.4)	(±214.2)	(±0.4)	(±0.5)	(±2.4)	(±7.6)
18.23	4.92	1.37E-04	22.3	662.5	57.3	37.7	784.2	821.4	0.0	0.0	0.0	117.7
23.15		(±9.21E-05)	(±2.9)	(±55.7)	(±3.4)	(±0.8)	(±104.5)	(±80.2)	(±0.0)	(±0.0)	(±0.0)	(±1.6)

Depth values presented in this table are measured from free ground surface