Richmond Redevelopment and Housing Authority  
Division of Procurement Services  
901 Chamberlayne Parkway  
Richmond, Virginia 23220  
www.rrha.com

RRHA Invitation for Bid – RRHA-IFB-2019-44  
Gilpin Underground Piping Replacement  
Issue Date: October 20, 2019  
Pre-Bid Conference: October 31, 2019; 10:00 AM  
Closing Date and Time: November 12, 2019; 2:00 PM

This communication serves to apprise you and your firm of the above mentioned Invitation for Bids (IFB) for IFB-2019-44 Gilpin Underground Piping Replacement. We invite you and your firm to respond to this IFB. Please review carefully all sections, paying particular attention to the closing date and time listed above and within the body of the documents. RRHA does not discriminate against faith-based organizations (Code of Virginia, § 2.2-4343. 1D)

All Inquiries For Information Should Be Directed To:  
Corliss Spurlock, VCO  
Procurement Compliance Officer  
901 Chamberlayne Parkway  
Richmond, VA 23220  
(804) 780-4139 (voice mail)  
Email: corliss.spurlock@rrha.com
RICHMOND REDEVELOPMENT AND HOUSING AUTHORITY
901 Chamberlayne Parkway
RICHMOND, VIRGINIA 23220
#RRHA-IFB-2019-44

Issue Date: October 20, 2019
Title: Gilpin Underground Piping Replacement
Issuing Agency: Richmond Redevelopment and Housing Authority
901 Chamberlayne Parkway
Richmond, Virginia 23220

Location Where Work Will Be Performed: 901 Chamberlayne Pkwy, Richmond, VA (Gilpin)
Period of Contract: From Contract Award until project completion

Sealed Bids Will Be Received Until November 12, 2019 – 2:00PM, For Furnishing The Goods/Services Described Herein, And Then Opened In Public.

All Inquiries For Information Should Be Directed To: Corliss Spurluck, Procurement Compliance Officer at Corliss.Spurluck@rrha.com. Telephone Number: (804) 780-4139. All questions should be submitted via email five (5) days prior to closing.

IF BIDS ARE MAILED, SEND DIRECTLY TO ISSUING AGENCY SHOWN ABOVE. IF BIDS ARE HAND DELIVERED, DELIVER TO: Richmond Redevelopment and Housing Authority, Division of Procurement and Contract Administration, 901 Chamberlayne Parkway, Richmond, Virginia 23220.

In Compliance With This Invitation For Bid And To All The Conditions Imposed Therein And Hereby Incorporated By Reference, The Undersigned Offers And Agrees To Furnish The Services At The Prices Indicated In This Response. The Undersigned Further Certifies That He/She is Authorized To Sign This Document On Behalf Of The Submitting Firm.

Licensed Class____ Virginia Contractor No.____________ Specialty ______________________

Name and Address of Firm:
______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________

Date:______________________

By: ______________________ (Signature In Ink)
Name: ____________________ (Please Print)
Title: ____________________

FEI/FIN NO. __________________
Phone: (____) __________________
E-mail: _____________________
Fax: (____) __________________
D&B Number: ________________

NOTE: Changes to this IFB may be issued in the form of an addendum at any time prior to the due date and time for submitting bids. The Procurement Director maintains a mailing list of all vendors that were provided copies of this solicitation. The Procurement Director will send the addendum to any vendor who directly received a copy of the IFB from the Procurement Director. Any vendor who did not directly receive a copy of the IFB from RRHA is encouraged to visit RRHA’s web site regularly to learn of any changes to the solicitation (www.rrha.com) and to contact the Procurement Director to have their name added to the mailing list. RRHA’s purchasing regulations require each Bidder to submit a signed copy of the addendum to the above delivery address either prior to the bid due date and time or to be included with the firm’s response to the solicitation.
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I. **PURPOSE:** The intent and purpose of this Invitation for Bid is to solicit bids from responsive and responsible bidders for the **Gilpin Underground Piping Replacement** for Richmond Redevelopment and Housing Authority (RRHA).

II. **SCOPE OF WORK:** The Contractor shall provide all labor, materials, insurance, bonds, transportation, etc. including, but not limited to the following.

A. **GENERAL REQUIREMENTS:**

1. Contractor’s Personnel:
   
   a) The Contractor will screen and employ only qualified personnel who shall be skilled in the performance of their duties and acceptable to RRHA. The Contractor agrees to immediately remove any employee RRHA determines to be unacceptable.

   b) The Contractor agrees to follow all reasonable security precautions and procedures requested by RRHA.

   c) The Contractor shall be responsible for the conduct and performance of the Contractor's employees and compliance with the following rules:
      
      (1) Contractor's employees appearing to be under the influence of alcohol or drugs shall not be permitted in the buildings or on the properties.

      (2) No loud or boisterous conduct will be permitted.

      (3) RRHA reserves the right to request removal of any of the Contractor's employees from the building or property at any time for reasonable cause. The Contractor or the designated supervisory representative shall have such employee leave the facility premises upon receipt of such request.

2. Applicable Regulations and Guidelines:

   a) The Contractor shall be knowledgeable of applicable federal, state and local regulations, codes and guidelines.

   b) The Contractor shall be solely responsible for obtaining and complying with the applicable regulations and specifications with regard to their performance of the work and employee and public safety.

B. **SPECIFIC REQUIREMENTS:** The Contractor shall be responsible for the **Gilpin Underground Piping Replacement** (Attachment A – Specifications and Project Manual (Drawings)).

III. **PRE-BID CONFERENCE AND SITE VISIT:** A pre-bid conference will be held, **October 31, 2019, 10:00AM – Calhoun Center, 436 Calhoun Street, Richmond, VA 23220**.

A. **Purpose:** The purpose of this conference is to allow potential bidders an opportunity to present questions and obtain clarification relative to any facet of this solicitation. While attendance at the conference is not a prerequisite to submitting a bid, contractors who intend to submit a bid
are encouraged to attend. Bring a copy of the solicitation with you. Any changes resulting from this conference will be issued in a written addendum to the solicitation.

IV. TERMS AND CONDITIONS:

A. APPLICABLE LAWS AND COURTS: This solicitation and any resulting contract shall be governed in all respects by the laws of the Commonwealth of Virginia, City of Richmond and any litigation with respect thereto shall be brought in the courts of the Commonwealth. This contract is made, entered into, and shall be performed in the jurisdiction of the City of Richmond, Commonwealth of Virginia. The Contractor shall comply with all applicable federal, state and local laws, rules and regulations. The Contractor shall procure any permits and licenses required for its business or the services to be provided by it hereunder.

B. ANTI-DISCRIMINATION: By submitting their bids, bidders certify that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and §2.2-4311 of the Virginia Public Procurement Act (VPPA). If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. (Code of Virginia § 2.2-4343.1E).

1. In every contract over $10,000 the provisions of (1) and (2) below apply:

   a) During the performance of this contract, the contractor agrees as follows:

      (1) The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

      (2) The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.

      (3) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements. The contractor will include the provisions of #1 above in every subcontract or purchase order over $10,000, so that the provisions will be binding upon each subcontractor or vendor.
C. ETHICS IN PUBLIC CONTRACTING: By submitting their bids, bidders certify that their bids are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder, supplier, manufacturer or subcontractor in connection with their bid, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

D. IMMIGRATION REFORM AND CONTROL ACT OF 1986: By submitting their bids, bidders certify that they do not and will not during the performance of this contract employ illegal alien workers or otherwise violate the provisions of the federal Immigration Reform and Control Act of 1986.

E. DEBARMENT STATUS: By submitting their bids, bidders certify that they are not currently debarred by RRHA, The Commonwealth of Virginia or the Federal Government from submitting offers or proposals on contracts of the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.

F. ANTITRUST: By entering into a contract, the contractor conveys, sells, assigns, and transfer to all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by under said contract.

G. CLARIFICATION OF TERMS: If any prospective bidder has questions about the specifications other solicitation documents, the prospective bidder should contact the Contract Officer whose name appears on the face of the solicitation no later than five working days before the due date. Any revisions to the solicitation will be made only by addendum issued by the buyer.

H. PAYMENT:

1. To Prime Contractor:

   a) Invoices for items ordered, delivered and accepted shall be submitted by the contractor directly to the payment address shown on the purchase order/contract. All invoices shall show the state contract number and/or purchase order number; social security number (for individual contractors) of the federal employer identification number (for proprietorships, partnerships, and corporations).

   b) Any payment terms requiring payment in less than 30 days will be regarded as requiring payment 30 days after invoice or delivery, whichever occurs last. This shall not affect offers of discounts for payment in less than 30 days, however.

   c) All goods or services provided under this contract or purchase orders, that are to be paid for with public funds, shall be billed by the contractor at the contract price.

   d) The following shall be deemed to be the date of payment: the date of postmark in all cases where payment is made by mail, or the date of offset when offset proceedings have been instituted as authorized under the Virginia Debt Collection Act.
e) Unreasonable Charges. Under certain emergency procurements and for most time and material purchases, final job costs cannot be accurately determined at the time orders are placed. In such cases, contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges that appear to be unreasonable will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. Upon determining that invoiced charges are not reasonable, RRHA shall promptly notify the contractor, in writing, as to those charges which it considers unreasonable and the basis for the determination. A contractor may not institute legal action unless a settlement cannot be reached within thirty (30) days of notification. The provisions of this section do not relieve RRHA of its prompt payment obligations with respect to those charges which are not in dispute (Code of Virginia § 2.2-4363).

2. To Subcontractors:

a) A contractor awarded a contract under this solicitation is hereby obligated:

(1) To pay the subcontractor(s) within seven (7) days of the contractor's receipt of payment from for the proportionate share of the payment received for work performed by the subcontractor(s) under the contract; or

(2) To notify RRHA and the subcontractor(s), in writing, of the contractor's intention to withhold payment and the reason.

b) The contractor is obligated to pay the subcontractor(s) interest at the rate of one percent per month (unless otherwise provided under the terms of the contract) on all amounts owed by the contractor that remain unpaid seven (7) days following receipt of payment from, except for amounts withheld as stated in (2) above. The date of mailing of any payment by U.S. Mail is deemed to be payment to the addressee. These provisions apply to each sub-tier contractor performing under the primary contract. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of RRHA.

I. PRECEDENCE OF TERMS: The following General Terms and Conditions, APPLICABLE LAWS AND COURTS, ANTI-DISCRIMINATION, ETHICS IN PUBLIC CONTRACTING, IMMIGRATION REFORM AND CONTROL ACT OF 1986, DEBARMENT STATUS, ANTITRUST, CLARIFICATION OF TERMS, PAYMENT, HUD FORMS shall apply in all instances. In the event there is a conflict between any of the other General Terms and Conditions and any special Terms and Conditions in this solicitation, the state and federal procurement guidelines outlined in the Code of Virginia, Virginia Public Procurement Act and the HUD handbook 7460.8 Rev 2 shall apply.

J. QUALIFICATIONS OF BIDDERS: RRHA may make such reasonable investigations as deemed proper and necessary to determine the ability of the bidder to perform the services/furnish the goods and the bidder shall furnish to RRHA all such information and data for this purpose as may be requested. RRHA reserves the right to inspect bidder's physical facilities prior to award to satisfy questions regarding the bidder's capabilities. further reserves the right to reject any bid if the evidence submitted by, or investigations of, such bidder fails to
satisfy that such bidder is properly qualified to carry out the obligations of the contract and to provide the services and/or furnish the goods contemplated therein.

K. TESTING AND INSPECTION: RRHA reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications.

L. ASSIGNMENT OF CONTRACT: A contract shall not be assignable by the contractor in whole or in part without the written consent of RRHA. None of the required work shall be subcontracted by the contractor without the prior, written consent of RRHA which may be withheld by in its sole discretion. The contractor shall be as fully responsible to RRHA for acts and omissions of the contractor's subcontractor(s) and of persons either directly or indirectly employed by its subcontractors, as the contractor is for the acts and omissions of persons directly employed by the contractor. The contractor shall include in each subcontract the contractor enters into for the provision of services under this contract, all provisions required to be included in such subcontracts established elsewhere within this contract.

M. CHANGES TO THE CONTRACT: Changes can be made to the contract in any of the following ways:

1. The parties may agree in writing to modify the scope of the contract. An increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract.

2. RRHA may order changes within the general scope of the contract at any time by written notice to the contractor. Changes within the scope of the contract include, but are not limited to, things such as services to be performed, the method of packing or shipment, and the place of delivery or installation. The contractor shall comply with the notice upon receipt. The contractor shall be compensated for any additional costs incurred as the result of such order and shall give RRHA a credit for any savings. Said compensation shall be determined by one of the following methods:

   a) By mutual agreement between the parties in writing.

   b) By agreeing upon a unit price or using a unit price set forth in the contract, if the work to be done can be expressed in units, and the contractor accounts for the number of units or work performed, subject to RRHA's right to audit the contractor's records and/or to determine the correct number of units independently.

   c) By ordering the contractor to proceed with the work and keep records of all costs incurred and savings realized. A markup for overhead and profit may be allowed if provided by the contract. The same markup shall be used for determining a decrease in price as the result of savings realized. The contractor shall present RRHA with all vouchers and records of expenses incurred and savings realized. RRHA shall have the right to audit the records of the contractor as it deems necessary to determine costs or savings. Any claim, for an adjustment in price under this provision must be asserted by written notice to RRHA within thirty (30) days from the date of receipt of the written notice. If the parties fail to agree on an amount of adjustment, the question of an increase or decrease in the contract price or time for performance shall be resolved in accordance the procedures for resolving disputes
provided by the Disputes Clause of this contract or, if there is none, in accordance with state and federal guidelines.

N. DEFAULT: In case of failure to deliver goods and services in accordance with the contract terms and conditions, after due oral or written notice, may procure them from other sources and hold the contractor responsible for any resulting additional purchase and administrative costs. This remedy shall be in addition to any other remedies which RRHA, state and federal laws may have in place.

O. INSURANCE: By signing and submitting a bid under this solicitation, the Bidder certifies that if awarded the contract, it will have the following insurance coverage at the time the contract is awarded. The Bidder further certifies that the contractor and any subcontractors will maintain this insurance coverage during the entire term of the contract and that all insurance coverage will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission. The contractor's insurance company will supply a Certificate of Insurance to RRHA listing the below required limits and the Certificate of Insurance shall name and endorse RRHA as an additional insured.

MINIMUM INSURANCE COVERAGE AND LIMITS REQUIRED FOR MOST CONTRACTS:

1. Workers' Compensation – The Contractor shall also obtain and maintain worker's compensation insurance as required by statutory requirements and benefits, and in such policy limits as mandated, by the State and shall require any subcontractor engaged by the Contractor to satisfy such requirement as well. Coverage is compulsory for employers of three or more employees, to include the employer. Contractors who fail to notify RRHA of increases in the number of employees that change their workers' compensation requirements under the Code of Virginia during the course of the contract shall be in noncompliance with the contract.

2. Automobile Liability (minimum) – $1,000,000 combined single limit.

3. Commercial General Liability (minimum) - $1,000,000 per occurrence, $2,000,000 aggregate, including $50,000 for fire damage. Commercial General Liability is to include bodily injury and property damage, personal injury and advertising injury, products and completed operations coverage. Must be named as an additional insured and so endorsed on the policy.

4. The Contractor shall indemnify, hold harmless and defend RRHA, its officers, agents, servants, and employees from and against any claims, demands, losses, liabilities, damages, causes of actions and costs and expenses of whatsoever kind or nature arising from or related to:

   a) The provision of services by or the failure to provide any services or the use of any services or materials furnished (or made available) by the Contractor or its agents, servants or employees;
b) Any conduct or misconduct of the Contractor or its agents, servants or employees not included in subparagraph (1) hereof and for which, its agents, servants or employees are alleged to be liable;

c) The negligence or other actionable fault of any subcontractors engaged by the Contractor;

d) Claims, suits, actions or proceedings of whatsoever nature that are brought by the Contractor's employees, candidates for employment and statutory employees, as determined under the State workers' compensation laws.

P. ANNOUNCEMENT OF AWARD: Upon the award or the announcement of the decision to award a contract over $50,000, as a result of this solicitation, RRHA will publicly post such notice on website (www.rhra.com) for a minimum of 10 days. The notice is also posted in the Division of Procurement Services.

Q. DRUG-FREE WORKPLACE: During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, of/or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees place by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

R. SMOKE-FREE WORKPLACE: RRHA "smoke-free" policy bans the use of prohibited tobacco products in all public housing living units, indoor common areas in public housing, and in PHA administrative office buildings. The smoke-free policy also extend to all outdoor areas up to 25 feet from the public housing and administrative office buildings. Contractors and all personnel are prohibited from the use of any prohibited tobacco products on RRHA property.

S. NONDISCRIMINATION OF CONTRACTORS: A Bidder, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, national origin, age, disability, faith-based organizational status, any other basis prohibited by state law relating to discrimination in employment or because the Bidder or contractor employs ex-offenders unless he has made a written determination that employing ex-offenders on the specific contract is not in its best interest. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, service, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, shall offer the individual, within a reasonable period of time after the date of
his/her objection, access to equivalent goods, services, or disbursements from an alternative provider.

T. PERSONNEL:

1. The Contractor represents that it will secure, at its own expense, all personnel necessary to perform the required services hereunder. Such personnel shall not be employees of RRHA nor shall they have any contractual relationship with RRHA. All commitments made by the Contractor in the Bid with respect to (i) the Contractor's qualifications and its satisfaction of mandatory requirements in the IFB and (ii) the number and qualifications of its personnel to be assigned to this Contract, shall be incorporated herein by this reference.

2. All the required services will be performed by the Contractor or under its supervision, and all personnel employed by the Contractor shall be fully qualified and shall be authorized or permitted under State and local law to perform such services. The Contractor shall not reassign any personnel specifically designated in the Bid to perform services under this Contract without RRHA's prior approval. The Contractor certifies that it will comply with RRHA's request for the reassignment of any employee of Contractor performing the Required Services hereunder when RRHA determines, in its reasonable opinion that such employee is not suited to work on this Contract.

U. NO WAIVER: No failure or delay by a party to insist on the strict performance of any term of this Contract, or to exercise any right or remedy consequent on a breach thereof, shall constitute a waiver of any breach or any subsequent breach of such term. Neither this Contract nor any of its terms may be changed or modified, waived, or terminated (unless as otherwise provided hereunder) except by an instrument in writing signed by the party against whom the enforcement of the change, waiver or termination is sought. No waiver of any breach shall affect or alter this contract, but each and every terms of this Contract shall continue in full force and effect with respect to any other than existing or subsequent breach thereof. The remedies provided in this Contract are cumulative and not exclusive of the remedies provided by law or in equity.

V. MINORITY AND SECTION 3 BUSINESS PARTICIPATION: The Contractor shall use its best efforts to comply with the commitment it has made in the Bid relative to the participation of businesses primarily (at least 51%) owned by minorities, women or public housing residents or small businesses (collectively, "Disadvantaged Business Enterprises") in the performance of this Contract. By executing this Contract, the Contractor accepts the right of RRHA to appoint an employee to monitor the Contractor's compliance with the commitments and requirements of this Paragraph. The Contractor agrees to promptly submit reports to RRHA, on request, detailing the level of participation in this contract. RRHA shall have the right to review all relevant documents of the Contractor relating to the participation of Minority and Section 3 Businesses in this Contract on an ongoing basis.
V. SPECIAL TERMS AND CONDITIONS:

A. NOTICES:

1. Any notice, instruction, request or demand required to be given or made to the Contractor hereunder shall be deemed to be duly and properly given or made if delivered or mailed, postage pre-paid, the contractor.

2. Any notice, request, information, or documents required to be given or delivered hereunder by the Contractor to or any of its representatives, unless stated otherwise elsewhere in this Contract, shall be signed or approved in writing by the Contractor, and shall be sufficiently given or delivered if mailed, certified or registered with postage prepaid to

   Richmond Redevelopment and Housing Authority  
   Procurement and Contract Administration  
   901 Chamberlayne Parkway  
   Richmond, Virginia 23220  
   ATTN: Corliss Spurlock

   Or to such representative or address as may be designate in writing to Procurement and Contract Administration.

B. ASBESTOS: Whenever and wherever during the course of performing any work under this contract, the Contractor discovers the presence of asbestos or suspects that asbestos is present, he shall stop the work immediately, secure the area, notify the Building Owner and await positive identification of the suspect material. During the downtime in such a case, the Contractor shall not disturb any surrounding surfaces but shall protect the area with suitable dust covers. In the event the Contractor is delayed due to the discovery of asbestos or suspected asbestos, then a mutually agreed extension of time to perform the work shall be allowed the Contractor but without additional compensation due to the time extension.

C. AUDIT: The Contractor hereby agrees to retain all books, records, and other documents relative to this contract for five (5) years after final payment, or until audited by the Commonwealth of Virginia, whichever is sooner. RRHA, its authorized agents, and/or State auditors shall have full access to and the right to examine any of said materials during said period.

D. AVAILABILITY OF FUNDS: It is understood and agreed between the parties herein that RRHA shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.

E. AWARD To Multiple Bidders: The Agency reserves the right to make multiple awards as a result of this solicitation. The award(s) will be made to the lowest responsive and responsible bidder(s) meeting the requirements of the solicitation. The Commonwealth reserves the right to conduct any tests it may deem advisable and to make all evaluations. The Commonwealth also reserves the right to reject any or all bids, in whole or in part, to waive informalities and to delete items prior to making the award, whenever it is deemed in the sole opinion of the procuring public body to be in its best interest.
F. **Bid Acceptance Period:** Any bid in response to this solicitation shall be valid for 90 days. At the end of the 90 days the bid may be withdrawn at the written request of the Bidder. If the bid is not withdrawn at that time it remains in effect until an award is made or the solicitation is canceled.

G. **Bid Prices:** Bids shall be in the form of a firm fixed price.

H. **Bid Submittals:** Bidders shall attach the following documents to their bid documents.
(Please sign or initial to indicate your review and acceptance)

1. Completed and signed Bid Form
2. Bid Bond
3. Payment Bond
4. Performance Bond
5. Bidder’s Business License
6. Subcontractors’ Business License
7. Contractor’s Current Certificate of Insurance
8. Subcontractors’ Current Certificate of Insurance
9. Completed HUD 5370 – General Terms and Conditions for Construction Contracts
10. HUD 5369 – Instructions to Bidders for Contracts
11. Completed and notarized Statement of Bidder’s Qualifications
12. Completed and notarized Non-Collusive Affidavit
13. Completed Certificate of Non-Segregated Facilities
14. Completed Section 3 and Minority Business Certificate of Compliance
15. Initialed General Decision Number: VA190139 – Residential
16. Signed Addenda (if any)
I. **CONFLICT OF INTEREST:** The Contractor warrants that he has fully complied with the State and Local Government Conflict of Interests Act (Section 2.1-639.1 et seq. of the Code of Virginia), The Virginia Governmental Fraud Act (Section 18.2-498.1 et seq.), Articles 2 and 3 of Chapter 10 (Crimes Against the Administration of Justice) of Title 18.2, and Article 4 (Ethics in Public Contracting) of the Public Procurement Act (Section 11-72 et seq.).

J. **CONSTRUCTION SCHEDULE:** The Contractor shall submit a construction schedule with the bid to reflect the completion time of the project. The completion time may be a factor in making the contract award.

K. **CONTRACTOR'S TITLE TO MATERIALS:** No materials or supplies for the work shall be purchased by the contractor or by any subcontractor subject to any chattel mortgage or under a conditional sales or other agreement by which an interest is retained by the seller. The contractor warrants that he has clear title to all materials and supplies for which he invoices for payment.

L. **CONTRACTOR/SUBCONTRACTOR LICENSE REQUIREMENT:** By my signature on this solicitation, I certify that this firm/individual and subcontractor is properly licensed for providing the goods/services specified.

   Contractor Name: ______________________

   Subcontractor Name: ______________________

   License # ______________________ Type ______________________

M. **CONTRACTOR REGISTRATION:** If a contract for construction, removal, Rehabilitation or improvement of a building or other real property is for one hundred and twenty thousand dollars ($120,000) or more, or if the total value of all such contracts undertaken by bidder within any 12-month period is seven hundred and fifty thousand dollars ($750,000) or more, the bidder is required under Title 54.1-1100, Code of Virginia (1950), as amended, to be licensed by the State Board of Contractors a "CLASS A CONTRACTOR." If such a contract is for seventy-five hundred dollars ($7,500) or more but less than one hundred and twenty thousand dollars ($120,000), or if the total value of all such contracts undertaken by bidder within any 12-month period is between one hundred and fifty thousand dollars ($150,000) and seven hundred and fifty thousand dollars ($750,000) or more, the bidder is required to be licensed as a "CLASS B CONTRACTOR." If such a contract is for one-thousand dollars ($1,000) or more but less than seventy-five hundred dollars ($7,500), or if the contractor does less than $150,000 in business in a 12-month period, the bidder is required to be licensed as a "CLASS C CONTRACTOR." The board shall require a master tradesmen license as a condition of licensure for electrical, plumbing and heating, ventilation and air conditioning contractors. The bidder shall place on the outside of the envelope containing the bid and shall place in the bid over his signature whichever of the following notations is appropriate, inserting his contractor license number:

   Licensed Class A Virginia Contractor No. ________ Specialty ________
   Licensed Class B Virginia Contractor No. ________ Specialty ________
   Licensed Class C Virginia Contractor No. ________ Specialty ________
If the bidder shall fail to provide this information on his bid/proposal or on the envelope containing the bid/proposal and shall fail to promptly provide said contractor license number to the Commonwealth in writing when requested to do so before or after the opening of bids/proposals, he shall be deemed to be in violation of § 54.1-1115 of the Code of Virginia (1950), as amended, and his bid/proposal will not be considered.

If a bidder shall fail to obtain the required license prior to submission of his bid/proposal, the bid shall not be considered.

N. **DETERMINATION OF RESPONSIBILITY:** Each bidder shall be prepared if so requested by RRHA, to present further evidence of his experience, qualification and financial ability to carry out the terms of the contract. Prior to award of the contract, an evaluation will be made to determine if the low bidder has the capability, in all respects, to perform fully the contract requirements and the moral and business integrity and reliability which will assure good faith performance. Factors to be evaluated include but are not limited to:

1. Sufficient financial ability to perform the contract as evidenced by the bidder's ability to obtain payment and performance bonds from an acceptable surety;

2. Appropriate experience to perform the work described in the bid documents;

3. Any judgments entered against the bidder, or any officers, directors, partners or RRHA for breach of a contract for construction;

4. Any substantial noncompliance with the terms and conditions of prior construction contracts with a public body without good cause where the substantial noncompliance is documented; or RRHA reserves the right to disqualify or refuse to accept the bid.

O. **IDENTIFICATION OF BID ENVELOPE:** If a special envelope is not furnished, or if return in the special envelope is not possible, the signed bid should be returned in a separate envelope or package and identified as follows:

```
From: ____________________________  November 12, 2019  2:00PM
      Name of Bidder

      Street or Box Number

      City, State, Zip Code

RRHA-IFB-2019-44  IFB No.

Gilpin Underground Piping Replacement  IFB Title
```

An envelope should be addressed as directed on Page 1 of solicitation.

Bids may be hand delivered to the designated location in the office issuing the solicitation. No other correspondence or other bids should be placed in the envelope.
P. **INDEMNIFICATION:** Contractor agrees to indemnify, defend and hold harmless the Commonwealth of Virginia, its officers, agents, and employees from any claims, damages and actions of any kind or nature, whether at law or in equity, arising from or caused by the use of any materials, goods, or equipment of any kind or nature furnished by the Contractor/any services of any kind or nature furnished by the Contractor, provided that such liability is not attributable to the sole negligence of the using agency or to failure of the using agency to use the materials, goods, or equipment in the manner already and permanently described by the Contractor on the materials, goods, or equipment delivered.

Q. **MINORITY/WOMEN OWNED BUSINESS SUBCONTRACTING AND REPORTING:** Where it is practicable for any portion of the awarded contract to be subcontracted to other suppliers, the Contractor is encouraged to offer such business to minority and/or women-owned businesses. Names of firms may be available from the buyer and/or from the Division of Purchases and Supply. When such business has been subcontracted to these firms and upon completion of the contract, the contractor agrees to furnish the purchasing office the following information: name of firm, phone number, total dollar amount subcontracted, and type of product/service provided.

R. **PRIME CONTRACTOR RESPONSIBILITIES:** The Contractor shall be responsible for completely supervising and directing the work under this contract and all subcontractors that he may utilize, using his best skill and attention. Subcontractors who perform work under this contract shall be responsible to the prime contractor. The contractor agrees that he is as fully responsible for the acts and omissions of his subcontractors and of persons employed by them as he is for the acts and omissions of his own employees.

S. **WORK ESTIMATES (TIME AND MATERIAL CONTRACTS):** Under this time and material contract, the contractor shall furnish the agency with a binding written estimate of the total costs to complete the work required. The estimate must include the labor category(ies), the contractor’s hourly rates specified in the contract, and the total material cost. If the agency determines that the estimated price is not fair and reasonable, the agency has the right to ask the contractor to reevaluate the estimate. If the revised estimate is determined to be not fair and reasonable, the agency reserves the right to obtain additional quotes from other vendors. A purchase order will be issued to the contractor, as the authority to proceed with the work, which will incorporate the contractor’s estimate and the terms and conditions of the contract. The contractor and his/her personnel shall log in with the designated contract administrator each day before and after work to confirm labor hours.

T. **SAFETY STANDARDS:** All personnel shall, at all times, wear approved clothing, hard hats, safety vest, and any other equipment required to meet OSHA standards. They will obey all safety rules and regulations and will not create hazardous conditions within the operation. The Contractor must meet motor carrier safety regulations (Federal and State), as applicable. It is the Contractor’s responsibility to ensure the OSHA regulations are met in all applicable areas for all exposures encountered during the term of the contract.

U. **SUBCONTRACTS:** No portion of the work shall be subcontracted without prior written consent of RRHA. In the event that the contractor desires to subcontract some part of the work specified herein, the contractor shall furnish RRHA the names, qualifications and experience of their proposed subcontractors. The contractor shall, however, remain fully liable and responsible for the work to be done by its subcontractor(s) and shall assure compliance with all requirements of the contract.
V. SUBMISSION OF SMALL BUSINESS SUBCONTRACTING PLAN, EVIDENCE OF COMPLIANCE WITH SMALL BUSINESS SUBCONTRACTING PLAN, AND SUBCONTRACTOR REPORTING:

A. Submission of Small Business Subcontracting Plan: It is the Agency goal of the Richmond Redevelopment and Housing Authority that 30% of its purchases be made from small businesses certified by DSBSD. This includes discretionary spending in prime contracts and subcontracts. All bidders/offerees are required to submit a Small Business Subcontracting Plan. The contractor is encouraged to offer such subcontracting opportunities to DSBSD-certified small businesses. This shall include DSBSD-certified women-owned and minority-owned businesses and businesses with DSBSD service disabled veteran-owned status when they have also received DSBSD small business certification. Where it is not practicable for any portion of the goods/services to be subcontracted to other suppliers, the bidder/offeree shall note such on the Small Business Subcontracting Plan. No bidder/offeree or subcontractor shall be considered a small business unless certified as such by the Department of Small Business and Supplier Diversity (DSBSD) by the due date for receipt of bids or proposals.

B. Evidence of Compliance with Small Business Subcontracting Plan: Each prime contractor who wins an award in which provision of a small business subcontracting plan is a condition of the award, shall deliver to the contracting agency or institution timely reports substantiating compliance in accordance with the small business subcontracting plan. If a variance exists, the contractor shall provide a written explanation. A subcontractor shall be considered a Small Business for purposes of a contract if and only if the subcontractor holds a certification as such by the DSBSD. Payment(s) may be withheld until the purchasing agency confirms that the contractor has certified compliance with the contractor’s submitted Small Business Subcontracting Plan or is in receipt of a written explanation of the variance. The agency or institution reserves the right to pursue other appropriate remedies for non-compliance to include, but not be limited to, termination for default.

C. Prime Contractor Subcontractor Reporting:

1. Each prime contractor who wins an award greater than $100,000, shall deliver to the contracting agency or institution on a quarterly basis, information on use of subcontractors that are DSBSD-certified businesses or Employment Services Organizations (ESOs). The contractor agrees to furnish the purchasing office at a minimum the following information: name of firm, phone number, total dollar amount subcontracted, category type (Businesses that are DSBSD-certified small, women-owned, minority-owned, businesses with DSBSD Service Disabled Veteran-owned status, or Employment Services Organization) and type of product/service provided, at the frequency required.

W. BID BOND: A bid bond will be required for this project. Each bid shall be accompanied by a bid bond from a Surety company satisfactory to RRHA or a Certified or Cashier’s Check, made payable to: Richmond Redevelopment and Housing Authority in an amount equal to five (5) percent of the total bid price. Attorneys-in-fact who sign Bid Bonds must file with each bond a certified and effective dated copy of their power of attorney. Each Bid Bond and the accompanying power of attorney should bear the same date. In case of the failure of the bidder to execute the contract within the prescribed time, RRHA may, at its option consider the bidder in default, in which case the bid bond accompanying the bid shall become the property of RRHA.
An acceptable Surety (bonding) company is one that is authorized to do business in the State where the project is located and acceptable to HUD and RRHA. The Surety must be listed on the most recently published U.S. Treasury Circular 570 (often referred to as the T-List). Individual Sureties are not permitted. The T-List may also be accessed on the Internet at: http://www.fms.treas.gov/c570/index.html.

X. PERFORMANCE AND PAYMENT BONDS: The successful bidder shall deliver to the purchasing office executed Commonwealth of Virginia Standard Performance and Labor and Material Payment Bonds, each in the sum of the contract amount, with RRHA as obligee. The surety shall be a surety company or companies approved by the State Corporation Commission to transact business in the Commonwealth of Virginia. No payment shall be due and payable to the contractor, even if the contract has been performed in whole or in part, until the bonds have been delivered to and approved by the purchasing office.

VI. METHOD OF PAYMENT: The Contractor shall submit invoices to Accounts Payable upon work order completion by the 10th day of the month following the month in which the required Goods and Services were rendered. RRHA may take a 2% discount from an invoice if payment can be made within ten (10) days from receipt of a valid invoice. Otherwise, RRHA shall pay such invoices net thirty (30) days following receipt. All invoices shall clearly describe the work performed. RRHA shall not be subject to payment of late fees or finance charges to the Contractor for its failure to timely pay invoices submitted by the Contractor hereunder. Invoices shall be sent to the following address:

Richmond Redevelopment and Housing Authority  
Accounts Payable  
P.O. Box 26229  
Richmond, Virginia 23261

VII. PRICING SCHEDULE: The Contractor, having been familiarized with local conditions affecting the cost of the work, and with the Specifications, including Invitation For Bids, Instructions to Bidders, this Pricing Schedule, the form of Non-Collusive Affidavit, the form of Statement of Bidder's Qualifications, the General Conditions, the Special Conditions, and Addenda, if any thereto, hereby proposes to furnish all labor, materials, equipment and service required to fully complete the work as required by the above all in accordance therewith and at the prices stated on Attachment I Bid Form.

VIII. ATTACHMENTS:

A. Specifications and Project Manual (Drawings)  
B. Statement of Bidder’s Qualifications  
C. Non-Collusive Affidavit  
D. Certificate of Non-Segregated Facilities  
E. Section 3 Certificate of Compliance  
F. HUD 5370 – General Terms and Conditions For Construction Contracts  
G. HUD 5369 – Instructions to Bidders for Contracts  
H. General Decision Number VA190049 – Heavy  
I. Bid Form
ATTACHMENT A

Specifications and Project Manual (Drawings)
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RRHA GILPIN COURT UNDERGROUND PIPING REPLACEMENT
PROJECT NO. 19049 (TG JN: 43883)

SECTION 01 0200 – GENERAL SITWORK REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SITWORK LAYOUT
   A. Monuments and Benchmarks
      1. Maintain all monuments, property corners, benchmarks and other reference points.
      2. If these are disturbed or destroyed during construction operations, have them replaced by a surveyor
         licensed in the Commonwealth of Virginia. This replacement shall be at no additional expense to the
         Contract.
   B. Laying out the Work.
      1. Locate all existing benchmarks and other reference points.
      2. Protect these points throughout construction.
      3. Layout work utilizing these reference points.
   C. Record Drawings
      1. Maintain a record of the horizontal and vertical locations of all underground utilities and piping, both
         newly installed and existing encountered.
      2. Maintain a record of any variations of the work.
      3. Record Drawings shall be certified by an Engineer or Land Surveyor registered in the Commonwealth of
         Virginia.
      4. Maintain record drawings throughout construction, recording information as work is performed. Record
         Drawings shall be available for periodic inspection during the course of the project.
      5. Submit final, complete record drawings at Substantial Completion.

1.3 MAINTENANCE OF TRAFFIC
   A. Maintain vehicular and pedestrian traffic as indicated on the plans. Comply with all applicable safety
      requirements.
   B. Maintain pedestrian access to units which will be occupied during construction.

1.4 CORRELATION OF CONSTRUCTION DOCUMENTS
   A. Review construction documents thoroughly prior to the start of construction.
   B. Report any conflict or discrepancy discovered in the Construction Documents to the Architect prior to the start
      of construction.
   C. Report any conflict or discrepancy discovered between the Construction Documents and state and local
      governmental regulations to the Architect prior to the start of construction.
1.5 PROJECT CONDITIONS
   A. The conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to natural occurrences prior to the start of work.
   B. The location of existing underground utilities indicated is approximate only. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated. Call “Miss Utility” prior to the start of work for assistance in the location of existing underground utilities.
   C. Should charted, uncharted or incorrectly charted utilities be encountered during construction, contact the Architect immediately for instructions. Cooperate with Owner and utility companies to keep services and facilities in operation.

1.6 SCHEDULING
   A. Coordinate acceptable work days and hours and any required interruptions of service with the Owner.
   B. Notify the city in advance of any necessary work in public streets or private street closures.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

3.1 PROJECT CLEAN UP
   A. Clean site as construction progresses. Do not allow trash or other waste materials to accumulate.
   B. Prior to requesting the punch-list inspection, clean the site to the following requirements:
      1. Power wash all walks and pavements in the area of work.
      2. The remainder of the site shall be broom clean.
      3. Remove all trash and debris.

3.2 EXISTING FACILITIES
   A. Preserve existing signs, markers, guardrails, fences and other amenities in their original condition unless written permission is obtained for their removal and replacement.
   B. Replace damaged items at no additional cost to the Contract.
   C. Coordinate with Owner, resident, and utility company if private utilities need to be temporarily disturbed including but not limited to satellite dishes & cables. Replace all temporarily moved items to their original condition at no additional cost to the Contract.

END OF SECTION 01 0200
SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

1.2 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

1.3 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.4 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

   a. Indicate functional and spatial relationships of components of Engineer/Owner, structural, civil, mechanical, and electrical systems.
   b. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Engineer/Owner indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.5 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Engineer/Owner will return without response those RFIs submitted to Engineer/Owner by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Owner name.
2. Owner's Project number.
3. Name of Engineer/Owner.
4. Engineer/Owner's Project number.
5. Date.
6. Name of Contractor.
7. RFI number, numbered sequentially.
8. RFI subject.
9. Specification Section number and title and related paragraphs, as appropriate.
10. Drawing number and detail references, as appropriate.
11. Field dimensions and conditions, as appropriate.
12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
13. Contractor's signature.
14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.


D. Engineer/Owner's Action: Engineer/Owner will review each RFI, determine action required, and respond. Allow days for Engineer/Owner's response for each RFI. RFIs received by Engineer/Owner after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:
   a. Requests for approval of submittals.
   b. Requests for approval of substitutions.
   c. Requests for approval of Contractor's means and methods.
   d. Requests for coordination information already indicated in the Contract Documents.
   e. Requests for adjustments in the Contract Time or the Contract Sum.
   f. Requests for interpretation of Engineer/Owner's actions on submittals.
   g. Incomplete RFIs or inaccurately prepared RFIs.

2. Engineer/Owner's action may include a request for additional information, in which case Engineer/Owner's time for response will date from time of receipt by Engineer/Owner of additional information.

3. Engineer/Owner's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
   a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer/Owner in writing within five days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Engineer/Owner.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Engineer/Owner's response was received.

F. On receipt of Engineer/Owner's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer/Owner within seven days if Contractor disagrees with response.
1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Engineer/Owner's Digital Data Files: Digital data files of Engineer/Owner's BIM model will be provided by Engineer/Owner for Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
2. Engineer/Owner makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
4. A charge may be required to obtain CAD drawings from Engineer.

B. PDF Document Preparation: Where PDFs are required to be submitted to Engineer/Owner, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.7 PROJECT MEETINGS

A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.

B. Preconstruction Conference: Engineer/Owner will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer/Owner, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner Engineer/Owner, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Discuss items of significance that could affect progress, including the following:

   a. Responsibilities and personnel assignments.
   b. Tentative construction schedule.
   c. Phasing.
   d. Critical work sequencing and long lead items.
   e. Designation of key personnel and their duties.
   f. Lines of communications.
   g. Use of web-based Project software.
   h. Procedures for processing field decisions and Change Orders.
   i. Procedures for RFI.
   j. Procedures for testing and inspecting.
   k. Procedures for processing Applications for Payment.
   l. Distribution of the Contract Documents.
m. Submittal procedures.

n. Sustainable design requirements.

o. Preparation of Record Documents.

p. Use of the premises and existing building.

q. Work restrictions.

r. Working hours.

s. Owner's occupancy requirements.

t. Responsibility for temporary facilities and controls.

u. Procedures for moisture and mold control.

v. Procedures for disruptions and shutdowns.

w. Construction waste management and recycling.

x. Parking availability.

y. Office, work, and storage areas.

z. Equipment deliveries and priorities.

aa. First aid.


cc. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer/Owner, Construction Manager of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:


b. Options.

c. Related RFIs.

d. Related Change Orders.

e. Purchases.

f. Deliveries.

g. Submittals.

h. Sustainable design requirements.

i. Review of mockups.

j. Possible conflicts.

k. Compatibility requirements.

l. Time schedules.

m. Weather limitations.

n. Manufacturer's written instructions.

o. Warranty requirements.


q. Acceptability of substrates.

r. Temporary facilities and controls.

s. Space and access limitations.
RRHA GILPIN COURT UNDERGROUND PIPING REPLACEMENT
PROJECT NO. 19049

1. Regulations of authorities having jurisdiction.
2. Testing and inspecting requirements.
3. Installation procedures.
4. Coordination with other work.
5. Required performance results.
6. Protection of adjacent work.
7. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Conduct progress meetings at weekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Engineer/Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

   1) Review schedule for next period.

   b. Review present and future needs of each entity present, including the following:

   1) Interface requirements.
   2) Sequence of operations.
   3) Resolution of BIM component conflicts.
   4) Status of submittals.
   5) Status of sustainable design documentation.
   6) Deliveries.
   7) Off-site fabrication.
   8) Access.
   9) Site use.
   10) Temporary facilities and controls.
   11) Progress cleaning.
   12) Quality and work standards.
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13) Status of correction of deficient items.
14) Field observations.
15) Status of RFI's.
16) Status of Proposal Requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100
1.1 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
2. PDF file.
3. Two paper copies, of sufficient size to display entire period or schedule, as required.

B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
   1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
   1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
   2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.

E. Construction Schedule Updating Reports: Submit with Applications for Payment.

F. Daily Construction Reports: Submit at [weekly] [monthly] intervals.

G. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
   1. Secure time commitments for performing critical elements of the Work from entities involved.
   2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
   1. Use Microsoft Project (or other approved software by Owner), for current Windows operating system.
B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer/Owner.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Commissioning Time: Include no fewer than 15 days for commissioning.
6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer/Owner's administrative procedures necessary for certification of Substantial Completion.
7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
3. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use-of-premises restrictions.
   g. Seasonal variations.
   h. Environmental control.
4. Other Constraints: Maximum down time allowed for utility shut-downs

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion[.]

CONSTRUCTION PROGRESS DOCUMENTATION
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F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

I. Distribution: Distribute copies of approved schedule to Engineer/Owner Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 CPM SCHEDULE REQUIREMENTS

A. Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.
a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

   a. Preparation and processing of submittals.
   b. Mobilization and demobilization.
   c. Purchase of materials.
   d. Delivery.
   e. Fabrication.
   f. Utility interruptions.
   g. Installation.
   h. Work by Owner that may affect or be affected by Contractor's activities.
   i. Testing and inspection.
   j. Commissioning.
   k. Punch list and final completion.
   l. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

   a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
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1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
5. Changes in the critical path.
6. Changes in total float or slack time.

1.7 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
8. Accidents.
9. Meetings and significant decisions.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Work Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for
Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200
SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.

2. Requirements for Contractor to provide quality-assurance and quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall have the same meaning as testing agency.

H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Engineer.

1.3 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Engineer regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Engineer for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.
1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

2. Statement that products at Project site comply with requirements.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.
C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Statement that equipment complies with requirements.
2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
3. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

F. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

H. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   d. When testing is complete, remove test specimens and test assemblies; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.8 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.

2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Engage a qualified testing agency to perform quality-control services.

   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
D. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.
1.9 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
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B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000
SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.2 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Engineer, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use with metering. Provide connections and extensions of services and metering as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use with metering. Provide connections and extensions of services and metering as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

1.4 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.


1.5 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Engineer, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of [10] <Insert number> individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack and marker boards.
3. Drinking water and private toilet.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
2.2 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to private system indicated as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

TEMPORARY FACILITIES AND CONTROLS
F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service [overhead] [underground] unless otherwise indicated.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install [WiFi cell phone access equipment] [and] [one] <Insert number> land-based telephone line(s) for each field office.

I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Engineer and Owner.

J. Project Computer: Provide a desktop computer in the primary field office adequate for use by Engineer and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i5 or i7.
2. Memory: [16] <Insert number> gigabyte.
4. Display: 24-inch (610-mm) LCD monitor with 256-Mb dedicated video RAM.
5. Full-size keyboard and mouse.
6. Network Connectivity: [10/100BaseT Ethernet] [Gigabit].
8. Productivity Software:
   a. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook.
   b. Adobe Reader DC.
   c. WinZip 10.0 or higher.
9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
10. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum [10.0] <Insert number> -Mbps upload and [15] <Insert number> -Mbps download speeds at each computer.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:
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1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.

2. Utilize designated area within existing building for temporary field offices.

3. Maintain support facilities until Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas [as indicated] [within construction limits indicated] on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.

2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

E. Storage and Staging: Use designated areas of Project site for storage and staging needs.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.

2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

   a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."


   Comply with progress cleaning requirements in Section 017300 "Execution."

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

   1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing."

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

F. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

G. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

H. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

   1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
   2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.

I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
J. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

K. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

   1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

   1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

   1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
   2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000
SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number.
5. Submit testing, adjusting, and balancing records.
6. Submit sustainable design submittals not previously submitted.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.
1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1.6 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Submit list of incomplete items in the following format:

a. MS Excel Electronic File: Engineer will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Engineer.

D. Warranties in Paper Form:
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste-disposal requirements

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700
SECTION 02 4113 - SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Demolition and removal of existing asphalt and/or concrete pavement, concrete and/or asphalt walks, curbs and gutters, and other exterior site items indicated or not indicated which interfere with the Work.

1.3 DEFINITIONS
   A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
   B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
   C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.
   D. Existing to Remain: Protect items indicated to remain against damage and soiling. When permitted by the Architect, items may be removed to a suitable, protected storage location and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP
   A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, remove demolished materials from the site with further disposition at the Contractor's option.
   B. Disposal, storage, or sale of removed items or materials on-site will not be permitted.
   C. Historical items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be encountered, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

1.5 SUBMITTALS
   A. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the Work.
   B. Record drawings at Project closeout.
      1. Provide detailed record drawings of installed products, location, sizes, etc.
      2. Document any approved changes to the construction plans.
3. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

C. Schedule of selective demolition activities indicating the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
   2. Interruption of utility services.
   3. Coordination for shutoff, capping, and continuation of utility services.
   4. Detailed sequence of selective demolition and removal work to ensure uninterrupted access to occupied housing units.
   5. Coordination of resident's continued occupancy of existing buildings.

D. Inventory of items to be removed and salvaged or turned over to Owner.

E. Landfill records indicating receipt and acceptance of any hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE
   A. Regulatory Requirements: All work shall comply with Federal, State and Local laws and regulations concerning hauling and disposal of demolition debris.
   B. Notify the proper agencies prior to the start of work and obtain all necessary permits for this work.

1.7 PROJECT CONDITIONS
   A. Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to Owner's removal and salvage operations prior to the start of demolition work.
   B. The location of existing underground utilities indicated is approximate only. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated. Call "Miss Utility" prior to the start of demolition work for assistance in the location of existing underground utilities.
   C. Should charted, uncharted or incorrectly charted utilities be encountered during demolition, contact the Architect immediately for instructions. Cooperate with Owner and utility companies to keep services and facilities in operation.
   D. Do not interrupt existing utilities serving facilities occupied and used by the Owner and others, except when permitted in writing by the Owner. Provide acceptable temporary utility service as required to maintain Owner's operations.

1.8 SCHEDULING
   A. Residents will occupy portions of the buildings immediately adjacent to the Work. Conduct selective demolition so that the residents will not be disrupted. Provide not less than 72 hours notice to Owner of activities that will affect resident's access to buildings.
   B. Arrange selective demolition schedule so as not to interfere with residents access to buildings.
   C. Notify and coordinate any required relocation and/or removal of existing underground utilities, poles, meters, satellite dishes, or other above ground appurtenances with the appropriate utility company (i.e. power, telephone, cable and natural gas/propane) prior to the start of selective demolition work.
1.9 USE OF EXPLOSIVES
   A. Do not use explosives to perform selective site demolition work.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Call “Miss Utility” prior to the start of demolition work for assistance in the location of existing underground utilities. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated.
   B. Should uncharted or incorrectly charted existing utilities be identified, contact the Architect immediately for instructions. Provide a scale drawing with the location of the uncharted or incorrectly charted utilities for use by the Architect in preparing additional direction.
   C. Verify that utilities indicated as removed, abandoned and/or relocated have been disconnected and capped.
   D. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
   E. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged and turned over to the Owner.

3.2 PROTECTION OF PERSONS AND PROPERTY
   A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
   B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks and other adjacent occupied and used facilities.
      1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
   C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
      1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
      2. Protect existing site improvements, appurtenances, and landscaping to remain.
   D. Provide safety fencing to barricade areas of demolition & construction occurring as part of this work.
   E. Protect structures, buildings, utilities, walks, pavements, existing vegetation and other facilities to remain from damage caused by settlement, lateral movement, undermining, washout and other hazards created by demolition operations.
3.3 POLLUTION CONTROLS
A. Perform all work in accordance with the requirements of the latest edition of the Virginia Erosion and Sediment Control Handbook and those of the local Erosion Control official.
B. Clean adjacent structures and improvements of dust, dirt, and debris caused by the Work. Return adjacent areas to condition existing before start of selective demolition.

3.4 DEMOLITION OF EXISTING FACILITIES
A. Utilities
   1. Coordinate the removal and/or relocation of existing utilities with the appropriate utility companies,
   2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and to local jurisdictional codes.
   3. Provide adequate means of support and protection during demolition and other construction operations for existing utilities that are to remain in place. Repair utilities damaged by construction operations to the satisfaction of the utility owner.
B. Asphalt Pavement
   1. Remove asphalt concrete pavement by sawcutting to the full depth of the pavement. Provide neat sawcuts at the limits of pavement removal indicated.
C. Concrete Pavement, Walks and Curbs
   1. Remove concrete pavement and walks to the nearest joint. Sawcut concrete if joints are not present adjacent to the area of demolition.
   2. Sawcut concrete along straight lines to a depth of not less than 2 inches. Break out remainder of concrete, provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or sawcut entirely through concrete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS
A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
B. Do not burn demolished materials or debris.
C. Transport and legally dispose of demolished materials off of Owner's property.

3.6 CLEANUP AND REPAIR
A. Upon completion of demolition work remove all tools, equipment and demolition materials from site. Remove demolition work area protection and leave areas clean.
B. Repair any demolition performed in excess of that required. Return elements of construction and surfaces to remain to the condition existing prior to the start of construction. Repair adjacent construction or surfaces soiled or damaged by demolition work.

END OF SECTION 02 4113
SECTION 221113 - FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for water service.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.

2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.

3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Comply with ASTM F645 for selection, design, and installation of thermoplastic water piping.

D. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

E. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
F. NSF Compliance:
   1. Comply with NSF 61 Annex G for materials for water-service piping and specialties for
domestic water.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities
occupied by Owner or others unless permitted under the following conditions and then only
after arranging to provide temporary water-distribution service according to requirements
indicated:

   1. Notify Owner no fewer than two days in advance of proposed interruption of service.
   2. Do not proceed with interruption of water-distribution service without Owner's written
   permission.

1.7 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

   1. See drawings

2.2 JOINING MATERIALS

   1. See drawings

2.3 PIPING SPECIALTIES

A. Transition Fittings: Manufactured fitting or coupling same size as, with pressure rating at least
equal to and ends compatible with, piping to be joined.

B. Tubular-Sleeve Pipe Couplings:

   1. Description: Metal, bolted, sleeve-type, reducing or transition coupling, with center
   sleeve, gaskets, end rings, and bolt fasteners and with ends of same sizes as piping to be
   joined.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to civil drawings for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Flanges, unions, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

E. Underground water-service piping NPS 3/4 to NPS 3 (DN 20 to DN 80) shall be
   1. See drawings

F. Underground water-service piping NPS 4 and larger shall be the following:
   1. See drawings

G. Aboveground Water-Service Piping NPS 3/4 to NPS 3 (DN 20 to DN 80) shall be
   1. See drawings

H. Retain "any of" option in paragraph below to allow Contractor to select piping materials from those retained.

I. Aboveground water-service piping NPS 4 and NPS 6 (DN 100 and DN 150) shall be the following:
   1. See drawings

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 (DN 80) and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FGM, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 (DN 50) and smaller installation.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
1. Use the following for valves in vaults and aboveground:
   a. Ball Valves, NPS 2 (DN 50) and Smaller: Bronze.
   b. Butterfly Valves, NPS 3 (DN 80) and Larger.

3.4 PIPING INSTALLATION

A. Bury piping with depth of cover over top at least 30 inches (750 mm), with top at least 12 inches (300 mm) below level of maximum frost penetration.

B. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

B. Comply with requirements for hangers, supports, and anchor devices specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

C. Install the following pipe attachments:
   1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
   2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
   3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
   4. Spring hangers to support vertical runs.
   5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

D. Install hangers for copper tubing with maximum spacing and minimum rod diameters to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

E. Support horizontal piping within 12 inches (300 mm) of each fitting and coupling.

F. Support vertical runs of copper tubing to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 JOINT CONSTRUCTION

A. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.

B. Make pipe joints according to the following:
4. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
5. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D2774 or ASTM D3139 and pipe manufacturer's written instructions.
6. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

3.7 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:
   1. Concrete thrust blocks.
   2. Locking mechanical joints.
   4. Bolted flanged joints.
   5. Heat-fused joints.
   6. Pipe clamps and tie rods.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:
   2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.8 CONNECTIONS

A. Connect water-distribution piping to existing water main.

B. Connect water-distribution piping to interior domestic water piping.

3.9 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig (350-kPa) increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig (0 kPa). Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts (1.89 L) per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

3.10 IDENTIFICATION

A. Install continuous underground detectable warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in civil drawings.

B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel.

3.11 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.

3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

   a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.

   b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.

   c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.

   d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 221113
SECTION 232113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes pipe and fitting materials and joining methods for the following:

1. Steel pipe and fittings.
2. Joining materials.
3. Transition fittings.
4. Dielectric fittings.
5. Bypass chemical feeder.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Pipe.
2. Fittings.
4. Bypass chemical feeder.

B. Delegated-Design Submittal:

1. Design calculations and detailed fabrication and assembly of pipe anchors and alignment guides, hangers and supports for multiple pipes, expansion joints and loops, and attachments of the same to the building structure.
2. Locations of pipe anchors and alignment guides and expansion joints and loops.
3. Locations of and details for penetrations, including sleeves and sleeve seals for exterior walls, floors, basement, and foundation walls.
4. Locations of and details for penetration and firestopping for fire- and smoke-rated wall and floor and ceiling assemblies.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 QUALITY ASSURANCE

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:

1. Hot-Water Heating Piping: 100 psig (689 kPa) at 200 deg F (93 deg C).

2.2 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel with plain ends; welded and seamless, Grade B, and wall thickness as indicated in "Piping Applications" Article.

2.3 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless otherwise indicated.
   a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:
   1. Description:
      b. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
      c. End Connections: Solder-joint copper alloy and threaded ferrous.

2.5 BYPASS CHEMICAL FEEDER

A. Description: Welded steel construction; 125-psig (860-kPa) working pressure; 5-gal. (19-L) capacity; with fill funnel and inlet, outlet, and drain valves.
1. Chemicals: Specially formulated, based on analysis of makeup water, to prevent accumulation of scale and corrosion in piping and connected equipment.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

A. Hot-water heating piping, aboveground, NPS 2 (DN 50) and smaller, shall be the following:
   1. See drawings

B. Hot-water heating piping, aboveground, NPS 2-1/2 (DN 65) and larger, shall be the following:
   1. See drawings

C. Air-Vent Piping:
   1. Inlet: Same as service where installed with metal-to-plastic transition fittings for plastic piping systems according to piping manufacturer's written instructions.
   2. Outlet: Type K (Type A), annealed-temper copper tubing with soldered or flared joints.

D. Safety-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed with metal-to-plastic transition fittings for plastic piping systems according to piping manufacturer's written instructions.

3.2 PIPING INSTALLATIONS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.
J. Select system components with pressure rating equal to or greater than system operating pressure.

K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

L. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.

P. Install valves according to the following:
   1. "Ball Valves for HVAC Piping."
   2. "Butterfly Valves for HVAC Piping."

Q. Install unions in piping, NPS 2 (DN 50) and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

R. Install flanges in piping, NPS 2-1/2 (DN 65) and larger, at final connections of equipment and elsewhere as indicated.

S. Install shutoff valve immediately upstream of each dielectric fitting.

T. Comply with requirements in "Expansion Fittings and Loops for HVAC Piping" for installation of expansion loops, expansion joints, anchors, and pipe alignment guides.

U. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified.

V. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified.

W. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified.

3.3 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric unions.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flanges.

D. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.
3.4 HANGERS AND SUPPORTS

A. Comply with requirements for seismic-restraint devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

B. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.

C. Install the following pipe attachments:
   1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
   2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
   3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
   4. Spring hangers to support vertical runs.
   5. Provide copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

D. Install hangers for steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

E. Support vertical runs of steel piping to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

F. Support horizontal piping within 12 inches (300 mm) of each fitting and coupling

3.5 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
E. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end-pipe couplings.

3.6 CHEMICAL TREATMENT

A. Fill system with fresh water and add liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products from piping. Circulate solution for a minimum of 24 hours, drain, clean strainer screens, and refill with fresh water.

B. Add initial chemical treatment and maintain water quality in ranges noted above for the first year of operation.

3.7 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9, "Building Services Piping."
5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

C. Perform the following before operating the system:

1. Open manual valves fully.
2. Inspect pumps for proper rotation.
3. Set makeup pressure-reducing valves for required system pressure.
4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
7. Verify lubrication of motors and bearings.

END OF SECTION 232113
SECTION 232513 - WATER TREATMENT FOR CLOSED-LOOP HYDRONIC SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes water treatment for closed-loop hydronic systems.

1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Pretreatment and chemical-treatment equipment, showing tanks, maintenance space required, and piping connections to hydronic systems.

1.3 INFORMATIONAL SUBMITTALS
A. Seismic Qualification Certificates: For components, from manufacturer.
B. Water-Analysis Provider Qualifications: Verification of experience and capability of HVAC water-treatment service provider.
C. Field quality-control reports.
D. Water-Treatment Program: Written sequence of operation on an annual basis for the application equipment required to achieve water quality defined in "Performance Requirements" Article.
E. Water Analysis: Illustrate water quality available at Project site.

1.4 CLOSEOUT SUBMITTALS
A. Operation and maintenance data.

1.5 QUALITY ASSURANCE
A. HVAC Water-Treatment Service Provider Qualifications: An experienced HVAC water-treatment service provider, capable of analyzing water qualities, installing water-treatment equipment, and applying water treatment as specified in this Section.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide all hardware, chemicals, and other material necessary to maintain HVAC water quality in all systems, as indicated in this Specification. Water quality for hydronic systems shall minimize corrosion, scale buildup, and biological growth for optimum efficiency of hydronic equipment without creating a hazard to operating personnel or the environment.

B. Base HVAC water treatment on quality of water available at Project site, hydronic system equipment material characteristics and functional performance characteristics, operating personnel capabilities, and requirements and guidelines of authorities having jurisdiction.

2.2 MANUAL CHEMICAL-FEED EQUIPMENT

A. Bypass Feeders: Provide steel feeders with corrosion-resistant exterior coating, minimum 3-1/2-inch (89-mm) fill opening in the top, and NPS 3/4 (DN 20) bottom inlet and top side outlet. Provide quarter turn or threaded fill cap with gasket seal and diaphragm to lock the top on the feeder when exposed to system pressure in the vessel.


2.3 CHEMICALS

A. Chemicals shall be as recommended by water-treatment system manufacturer, compatible with piping system components and connected equipment, and able to attain water quality specified in "Performance Requirements" Article.

PART 3 - EXECUTION

3.1 WATER ANALYSIS

A. Perform an analysis of supply water to determine quality of water available at Project site.

3.2 INSTALLATION

A. Install chemical-application equipment on concrete bases, level and plumb. Maintain manufacturer's recommended clearances. Arrange units, so controls and devices that require servicing are accessible. Anchor chemical tanks and floor-mounting accessories to substrate. Install all chemical application equipment within a spill-containment area without floor drain.

B. Install seismic restraints for equipment and floor-mounting accessories, and anchor to building structure. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC" for seismic restraints.
C. Install interconnecting control wiring for chemical-treatment controls and sensors.

D. Mount sensors and injectors in piping circuits.

E. Bypass Feeders: Install in closed hydronic systems, including hot-water heating, and equip with the following:
   1. Install bypass feeder in a bypass circuit around circulating pumps unless indicated otherwise on Drawings.
   2. Install water meter in makeup-water supply.
   3. Install a gate or full-port ball isolation valves on inlet, outlet, and drain below the feeder inlet.
   4. Install a swing check on the inlet after the isolation valve.

3.3 PIPING CONNECTIONS

A. Piping installation requirement are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to equipment, allow space for service and maintenance.

C. Make piping connections between HVAC water-treatment equipment and dissimilar-metal piping with dielectric fittings. Dielectric fittings are specified in Section 232113 "Hydronic Piping."

D. Install shutoff valves on HVAC water-treatment equipment inlet and outlet. Metal general-duty valves are specified in Section 230523.11 "Globe Valves for HVAC Piping," Section 230523.12 "Ball Valves for HVAC Piping," Section 230523.13 "Butterfly Valves for HVAC Piping," and Section 230523.15 "Gate Valves for HVAC Piping."

E. Comply with requirements in Section 221119 "Domestic Water Piping Specialties" for backflow preventers required in makeup-water connections to potable-water systems.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

D. Perform tests and inspections with the assistance of a factory-authorized service representative.

E. Tests and Inspections:
   1. Inspect field-assembled components and equipment installation, including piping and electrical connections.
2. Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, and filled with water, and are fully operational before introducing chemicals for water-treatment system.
3. Place HVAC water-treatment system into operation and calibrate controls during the preliminary phase of hydronic systems' startup procedures.
4. Do not enclose, cover, or put piping into operation until it is tested and satisfactory test results are achieved.
5. Test for leaks and defects. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
6. Leave uncovered and unconcealed new, altered, extended, and replaced water piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved.
7. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow test pressure to stand for four hours. Leaks and loss in test pressure constitute defects.
8. Repair leaks and defects with new materials, and retest piping until no leaks exist.

F. Equipment will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

H. At six-week intervals following Substantial Completion, perform separate water analyses on hydronic systems to show that automatic chemical-feed systems are maintaining water quality within performance requirements specified in this Section. Submit written reports of water analysis, advising Owner of changes necessary to adhere to "Performance Requirements" Article.

I. Comply with ASTM D3370 and with the following standards:


3.5 MAINTENANCE SERVICE

A. Scope of Maintenance Service: Provide chemicals and service program to maintain water conditions required above, to inhibit corrosion and scale formation for hydronic piping and equipment. Services and chemicals shall be provided for a period of one year from date of Substantial Completion and shall include the following:

1. Initial water analysis and HVAC water-treatment recommendations.
2. Startup assistance for Contractor to flush the systems, clean with detergents, and initially fill systems with required chemical treatment prior to operation.
3. Periodic field service and consultation.
5. Laboratory technical analysis.
6. Analyses and reports of all chemical items concerning safety and compliance with government regulations.
3.6 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain HVAC water-treatment systems and equipment.

END OF SECTION 232513
SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Protection of existing trees.
      2. Clearing and grubbing
      3. Removal of trees and other vegetation.
      4. Topsoil stripping

1.3 DEFINITIONS
   A. Remove: Remove and legally dispose of items indicated. Removal includes digging out and off-site disposing of stumps and roots or grinding below ground surface.
   B. Tree Protection Zone: The area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.
   C. Topsoil: Friable, clay loam surface soil, found in varying depths.

1.4 MATERIALS OWNERSHIP
   A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS
   A. Photographs or videotape, sufficiently detailed, of existing conditions of trees, plantings and other improvements adjoining the construction that might be misconstrued as damage caused by the Work.

1.6 PROJECT CONDITIONS
   A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.
   B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
      1. Protect existing improvements on adjoining properties and on Owner's property.
      2. Restore existing improvements damaged by clearing operations to their original condition.
   C. The conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to natural occurrences prior to the start of work.

SITE CLEARING  31 1000 - 1
D. Do not commence site-clearing operations until erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS

2.1 TREE PROTECTION FENCING
   A. Tree protection fencing shall conform to standard and specification 3.38-2 (plastic fence) of the Virginia Erosion and Sediment Control Handbook.

PART 3 – EXECUTION

3.1 PROTECTION OF EXISTING TREES AND VEGETATION
   A. Install tree protection fencing as indicated. Erect and maintain a temporary fence around the drip line of individual trees or around the perimeter drip line of groups of trees to remain.
      1. Do not store construction materials, debris, topsoil or other excavated material within the tree protection zone.
      2. Do not permit vehicles or other equipment within the tree protection zone.
      3. Maintain tree protection zones free of weeds and trash.
   B. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line.
   C. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
   D. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect.

3.2 SITE CLEARING
   A. General: Remove only indicated trees, shrubs, grass and other vegetation required to permit installation of the Work. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of the Work.
   B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

3.3 TOPSOIL STRIPPING
   A. Remove heavy growths of grass from areas before stripping.
   B. Strip topsoil to whatever depths are encountered, but to a minimum of at least 4 inches.
   C. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other material.
      1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
   D. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.
E. Temporarily stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
   1. Do not stockpile topsoil within tree protection zones.
F. Dispose of unsuitable or excess topsoil in a legal manner off-site.

3.4 DISPOSAL OF WASTE MATERIALS
A. Burning on Owner's Property: Burning is prohibited.
B. Removal from Owner's Property: Remove waste materials generated by clearing operations from Owner's property and dispose of in a legal manner off-site.
   1. Remove waste materials and debris from the site in a manner to prevent spillage. Pavements and the area adjacent to the site shall remain free from mud, dirt and debris at all times.
   2. Clean up debris resulting from site clearing operations continuously with the progress of the work.

END OF SECTION 31 1000
RRHA GILPIN COURT UNDERGROUND PIPING REPLACEMENT
PROJECT NO. 19049 (TG-JN: 43883)

SECTION 31 2000 - EARTHWORK

PART I - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Excavation, filling, backfilling, and grading indicated and necessary for proper completion of the work.
      2. Preparing of subgrade for walks and pavements.
      3. Excavating and backfilling of trenches.
      4. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.

1.3 SUBMITTALS
   A. VDOT approved Job Mix for stone.
   B. Imported fill (if required): Submit location of borrow pit and a sample of the soil for approval to the Owner’s Geotechnical Engineer a minimum of fourteen (14) working days prior to use

1.4 DEFINITIONS
   A. Excavation: Removal of all material (except for rock) encountered to design subgrade elevations indicated for cut areas and to subsoil elevations in fill areas. Excavation also includes subsequent respreading, moisture conditioning, compaction, and grading of satisfactory materials removed.
   B. Unauthorized Excavation: Removal of materials beyond the limits indicated in the definition of “Excavation” without specific direction of Architect.
   C. Additional Excavation: Removal, disposal and replacement of materials beyond the limits indicated in the definition of “Excavation” at the direction of the Architect. Refer to Part 3 of this Section for requirements of Additional Excavation.
   D. Subgrade: The undisturbed earth (in cut) or the compacted soil layer (in fill) immediately below granular subbase, drainage fill, or topsoil materials.
   E. Subsoil: The undisturbed earth immediately below the existing topsoil layer.
   F. Building Pad: The area extending 10 feet beyond the exterior limits of the building/column footings and down to undisturbed soils at a one horizontal to one vertical slope.
   G. Structures: The area extending a minimum of ten (10) feet beyond the edge of foundations, slabs, curbs, underground tanks, piping or other man-made stationary features occurring above or below ground surface.
   H. Pavements: The area extending 10 feet beyond the exterior limits of paved areas and down to undisturbed soils at a one horizontal to one vertical slope. The area extending 3 feet beyond the exterior limits of walks and down to undisturbed soils at a one horizontal to one vertical slope
   I. Subbase Material: Artificially graded mixture of crushed gravel or crushed stone meeting VDOT specifications. Material type is indicated on the drawings.
J. Drainage/Porous Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncruished gravel meeting the requirements of VDOT No. 57 Stone.

K. Rock: Hard bed rock, boulders or similar material requiring the use of rock drills and/or explosives for removal. The criteria for classification of general excavation as rock is any material which cannot be dislodged by a Caterpillar D-8 Tractor, or equivalent, equipped with a single tooth hydraulically operated power ripper. The criteria for trench rock shall be that a Caterpillar 345 Backhoe, or equivalent, with a proper width bucket cannot remove the material.

1.5 ADDITIONAL WORK

A. Paragraph 4.3.4 of General Conditions refers to certain conditions that may require additional excavation work. This paragraph is further defined herein and, where there are conflicts, is superseded by this section.

B. Claims for concealed, unknown, or unanticipated subsurface conditions are limited to those circumstances where:

1. Additional excavation work is required below the contract limits indicated to provide acceptable bearing for structures or pavements.

2. Additional excavation work below the utility trench design elevations, for utilities outside the limits of the building, as required to provide acceptable bearing for the utility.

3. Rock is encountered between existing grade and design subgrade.

C. The risks of concealed, unknown, or unanticipated subsurface conditions (except for rock) from existing ground surface to the design subgrade elevations in cut areas and to subsoil elevations in fill areas shall be included in the Contract Amount and shall not be considered as grounds for additional costs to the Contract. The risks of concealed, unknown, or unanticipated subsurface conditions below the elevations stated above shall be considered as Additional Excavation.

D. During construction, if outside the building limits, additional depth of utility trench excavation below the design subgrade or subsoil elevations is required, immediately notify the Architect upon discovery of such condition prior to disturbing the material encountered.

E. Payment for additional Work

1. Additional excavation shall be counted toward the unit price allowances established in the Bid Form. The Owner reserves the right to negotiate said unit price allowances prior to the Award of Contract.

2. Rock removal, if required, shall be counted toward the unit price allowances established in the Bid Form. All rock removal required to complete work other than trenching shall be paid for at the unit price for mass rock removal. Rock payment lines are limited to the following:

   a) Two feet outside of concrete work for which forms are required, except footings.

   b) In pipe trenches, 6 inches below invert elevation of pipe and 2 feet wider than outside diameter of pipe, but not less than 3 feet minimum trench width.

   c) Outside dimensions of concrete work where no forms are required.

   d) Under slabs on grade, 6 inches below bottom of concrete slab.

3. No payment will be made for unauthorized excavation.

4. The expense of surveying quantities of rock removal and additional excavation shall be included in the unit price allowances.
1.6 EARTHWORK BALANCE ADJUSTMENTS

A. It is anticipated that some material (utility spoils) will be required to be exported to achieve the finish grades indicated on the Drawings (original site grades). Excavation and disposal of the required material off-site in a legal manner shall be a Contract responsibility. No additional payment will be made for the export and disposal of this material.

1.7 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Environmental Compliance:
   2. Comply with the permit conditions for all work performed within wetlands.

C. Testing and Inspection Service: Owner may employ and pay for an independent Geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations. Cooperate with Owner’s Geotechnical Engineer as required for testing and inspection of work. These services do not relieve the responsibility for compliance with Contract Document requirements.

1.8 PROJECT CONDITIONS

A. Bidders and interested parties (prior to receipt of bids) are encouraged to conduct their own soil and subsurface investigations, examinations, tests, and exploratory borings to determine the nature of the soil conditions underlying the project site. Contact the Owner's office to make an appointment to enter the site for the purpose of conducting your own investigation prior to bid.

B. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner of others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.
   1. Notify Architect not less than 48 hours in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without receiving Architect’s written permission.
   3. Existing utilities across or along the line of work are indicated only in an approximate location. Locate all underground lines and structures. Call “Miss Utility” at 1-800-552-7001 prior to construction. If utilities are marked that are not shown on the plans, locate utility vertically and horizontally and provide information to architect. Repair and correct any damage to underground lines and structures.

1.9 SAFETY

A. Protection of Persons and Property: Provide safety fence to barricade open excavations occurring as part of this work and post with warning lights if required by authorities having jurisdiction.
   1. Operate warning lights as recommended by authorities having jurisdiction and governing regulations and standards.
   2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Work within the road right-of-way shall meet all requirements of the latest edition of the Virginia Department of Transportation Work Area Protection Manual.
PART 2 - PRODUCTS

2.1 SOIL MATERIALS
A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CL, GC, SC, GW, GP, GM, SM, SW, and SP.
B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CH, OL, OH, MH, ML and PT.
C. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 4 inches in any dimension (2 inches for material used in trench backfill), debris, waste, frozen materials, organics, vegetation and other deleterious matter.
D. Imported material for structural fill shall comply with ASTM D2487 soil classification groups CL, GC, SC, GW, GP, GM, SM, SW, and SP.

2.2 ACCESSORIES
A. Non-woven Geotextile Fabric (for drainage): Mirafi 140N, or equivalent.
B. Woven Geotextile Fabric (for reinforcement): PROPEX 2002, or equivalent.

PART 3 – EXECUTION

3.1 PREPARATION
A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Section 311000 "Site Clearing."
C. Protect and maintain erosion and sedimentation controls during earthwork operations.

3.2 DEWATERING
A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.
   1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrade and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
B. Should any springs or running water be encountered in the excavation, notify the Architect and provide discharge by trenches (or other acceptable means) and drain to an appropriate point of disposal. Provide temporary drainage facilities to minimize the flow of rainwater onto adjacent property. Repair any damage to property or to subgrade as a result of construction and/or dewatering (or lack thereof) operations at no additional cost to the Contract. If permanent provision must be made for disposal of water other than as indicated, the Contract price shall be adjusted.
3.3 EXPLOSIVES
   A. Blasting is prohibited.

3.4 EXCAVATION
   A. Excavation consists of removal, placement and disposal of material encountered when establishing required subgrade or finish grade elevations.
      1. Excavation includes removal and disposal of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.
   B. Rock Excavation: If Rock is encountered the Owner’s Geotechnical Engineer will verify that the material qualifies for classification as rock excavation.
      1. If rock is encountered, remove to depths as follows:
         a) Under surfaced areas, to 6” under the respective subgrade for such areas.
         b) Under grass and planted areas - 12” below finished grade.
         c) Under trenches – 6” below bottom of trench.
      2. The above are considered pay limits.
      3. Contractor shall employ a surveyor licensed in the Commonwealth of Virginia to calculate the quantity of material removed as Rock Excavation. The quantity of rock calculated shall not exceed the volume determined by the payment limits. The Owner’s Project Representative shall review the quantity calculated within 48 hours of receiving the survey notes.

3.5 EXCAVATION FOR STRUCTURES
   A. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, other construction and for review. Do not disturb bottom of excavations intended for bearing surface.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS
   A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.7 EXCAVATION FOR UTILITY TRENCHES
   A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit.
   B. Excavate trenches to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
      1. Where rock is encountered, carry excavation to required elevations and backfill with VDOT #57 crushed stone prior to installation of pipe.
      2. For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.
      3. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each
3.8 EXCAVATION STABILITY
A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.
B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.
C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

3.9 SUBGRADE INSPECTION
A. Notify Architect when excavations have reached required subgrade. The Architect will arrange for an inspection of conditions by the Owner’s Geotechnical Engineer. Alternative procedures for arranging this review may be implemented at the Owner’s written option.
B. If the Owner’s Geotechnical Engineer determines that the subgrade bearing conditions are unacceptable, the Architect will authorize additional excavation until suitable bearing conditions are encountered.
C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 ADDITIONAL EXCAVATION
A. Additional Excavation in Trenches: Remove excavated materials and dispose of off-site as directed by the Architect. Replace this excavated material with stone.
B. The quantity of material removed as Additional Excavation shall be calculated (on an in-situ basis) by a surveyor licensed in the Commonwealth of Virginia and employed by the Contractor. The Owner’s Project Representative shall review the quantity calculated within 48 hours of receiving the survey notes.
C. Protect the subgrade during construction. During wet conditions, the subgrade soils may become saturated and soften, possibly resulting in damage to the subgrade if disturbed by equipment. Correct subgrade damaged in this manner. No additional payment will be made to correct subgrade damaged in this manner.

3.11 UNAUTHORIZED EXCAVATION
A. Correct Unauthorized Excavation as follows:
   1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to Architect.
   2. Elsewhere, backfill and compact unauthorized excavations as indicated for authorized excavations of same classification unless otherwise directed by Architect.

3.12 STORAGE OF EXCAVATED MATERIALS
A. Temporarily stockpile excavated materials acceptable for use as backfill and fill in a location acceptable to the Owner. Place, grade, and shape stockpiles for proper drainage. Cover to prevent windblown dust.
3.13 BACKFILL AND FILL

A. Backfill excavations as promptly as work permits, but not until completion of the following:
   1. Acceptance by Architect and local authority having jurisdiction of construction below finished grade.
   2. Review, approval, and recording of the locations of underground utilities.
   4. Removal of shoring and bracing (including backfilling of voids with satisfactory materials).
   5. Removal of trash and debris from excavation.
   6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow or ice.

C. Ground Surface Preparation: Remove vegetation, debris, obstructions, and deleterious materials from ground surface prior to placement of fills.

D. Bench sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material. Plow, scarify, bench or break up sloped surfaces flatter than 1 vertical to 4 horizontal so fill material will bond with existing material.

E. Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials indicated in Part 2 of this Section.
   1. Under grassed areas, use satisfactory excavated or borrow material.
   2. Under walks, curbs, and pavements, use satisfactory excavated or borrow material.

3.14 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit or as indicated on the Mechanical Drawings.
   1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

D. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

E. Place and compact final backfill of satisfactory soil to final subgrade elevation.

F. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

G. Do not backfill trenches until any required testing and inspections have been completed and Architect authorizes backfilling. Backfill carefully to avoid damage or displacement of pipe systems.

H. Under piping and conduit and equipment, use crushed stone where required over rock bearing surface and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.

I. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.
3.15 SOIL MOISTURE CONTROL
   A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percentage points of optimum moisture content.
      1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
      2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percentage points and is too wet to compact to specified dry unit weight.
   B. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations. Maintain the moisture content of the structural fill materials to within 2 percentage points of the optimum moisture content until permanently covered.
   C. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to required density.
      1. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.
      2. Work wet materials as directed by the Owner’s Geotechnical Engineer. Base bids on working material daily for a maximum of five days of acceptable weather.
      3. No additional payment will be made for these operations.

3.16 COMPACTION OF SOIL BACKFILL AND FILLS
   A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
   B. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   C. Control soil and fill compaction, providing minimum percentage of density indicated for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Architect if soil density tests indicate inadequate compaction.
   D. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density at a moisture content within 2 percentage points of optimum in accordance with ASTM D698:
      1. Under structures and pavements, compact each layer of backfill or fill material at 95 percent maximum density. This includes ground under future expansion areas.
      2. Under grass or unpaved areas, compact each layer of backfill or fill material at 90 percent maximum density.
   E. Seal all fill areas at the end of each working day, utilizing a smooth drum roller.

3.17 PAVEMENT SUBBASE COURSE:
   A. General: Place subbase material, in layers of indicated thickness, over subgrade surface to support a pavement base course.
   B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least at 12" width of shoulder simultaneously with compacting and rolling each layer of subbase course.

D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

E. When a compacted subbase course is 6" thick or less, place material in a single layer. When more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

F. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

G. On prepared subgrade, place subbase and base course under pavements and walks as follows:
   1. Place base course material over subbase course under hot-mix asphalt pavement.
   2. Shape subbase and base course to required crown elevations and cross-slope grades.
   3. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
   4. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
   5. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

H. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.18 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.
   1. If in the opinion of the Architect, based on testing service reports and inspection, subgrade or fills have been placed that are below required density, perform additional compaction and testing until required density is obtained.

B. The Owner may engage, and pay for, the services of a Geotechnical Engineer whose function shall be to afford complete engineering control by testing of the conditions of all subgrades, the placement of all structural fills under structures, and pavement areas, and all compaction where required.

C. The Owner’s Geotechnical Engineer will be present as deemed necessary during all phases of the Work requiring filling, compaction operations or testing. The Geotechnical Engineer will provide the Architect with written certification that fill and compaction was completed with accepted materials in accordance with the Documents, and give a professional opinion regarding shrinkage or settlement of fill and safe load bearing capacity of fill.

D. Site Preparation: The Owner’s Geotechnical Engineer will determine if any additional excavation or in-place densification is necessary to prepare a subgrade for fill placement for slab or pavement support.

E. Fill Placement and Compaction: The Owner’s Geotechnical Engineer will witness all fill operations and take sufficient in-place density tests to verify that the indicated degree of fill compaction is achieved. The Owner’s Geotechnical Engineer will observe and approve borrow materials used and shall determine if their existing moisture contents are suitable/acceptable.
F. The Owner’s Geotechnical Engineer will submit two (2) copies each of his reports, recommendations and/or opinions to the Architect/Engineer and the Owner. Pertinent information will be provided to the Contractor as required.

3.19 EROSION CONTROL:

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction, the Virginia Erosion and Sediment Control Handbook, and as indicated in the Contract Documents.

3.20 PROTECTION

A. Repair and reestablish grades in settled, eroded, and rutted areas to indicated tolerances.

B. Reconditioning Compacted Areas: Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, reshape, and compact to required density prior to further construction.

C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

D. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.21 DISPOSAL OF WASTE MATERIALS

A. Removal from Owner’s Property: Remove excess and/or waste materials, including trash and debris, and dispose of it off Owner’s property in a legal manner.

B. Dispose of excess material and materials not acceptable for use as backfill or fill legally offsite.

END OF SECTION 31 2000
SECTION 31 2500 - EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY
   A. This Section includes the installation, maintenance and removal of erosion control measures required for prevention of sediment leaving the project site.

1.3 EROSION AND SEDIMENT CONTROL PERMIT
   A. Prior to commencement of work, obtain a copy of the approved Erosion and Sediment Control Plan from the City of Richmond.
   B. If required, apply for the Land Disturbance Permit from the City of Richmond.
   C. If required, Post Erosion and Sediment Control Bond in the amount required by the City of Richmond.
   D. Schedule a pre-construction conference on-site with the Architect and City of Richmond Environmental Inspector (if applicable). Hold this meeting prior to the start of any construction activities.

1.4 SUBMITTALS
   A. Responsible Land Disturber registration information.
   B. Silt Fence
   C. Safety Fence

PART 2 - PRODUCTS

2.1 EROSION CONTROL PRODUCTS:
   A. Safety Fence
      1. Six foot high chain link or polyethylene plastic fence complying with the requirements of Standard and Specification 3.01 of the Virginia Erosion and Sediment Control Handbook.
      2. Post appropriate warning signs along the Safety Fence.
   B. Silt Fence
      2. Wooden stakes shall be 2" oak, a minimum length of five feet.
   C. Storm Drain Inlet Protection
2. Block and Gravel Curb Inlet Sediment Filter, complying with the requirements of Standard and Specification 3.07 of the Virginia Erosion and Sediment Control Handbook.

D. Dewatering Structure

E. Temporary Seeding
   1. Temporary vegetative cover for disturbed areas, complying with the requirements of Standard and Specification 3.31 of the Virginia Erosion and Sediment Control Handbook.

F. Permanent Seeding
   1. Refer to Section “Lawns and Grasses” for permanent seeding requirements.

G. Soil Stabilization Blanket
   2. In lieu of plastic netting use East Coast Erosion Blankets (biodegradable single straw) or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION OF EROSION CONTROL MEASURES
   A. Install all erosion and sediment control measures per the requirements of the Virginia Erosion and Sediment Control Handbook.
   B. Protect all points of construction ingress and egress to the site to prevent tracking of mud onto public streets. Provide temporary construction entrances at all points of access to the site.
   C. Follow the construction sequence and install erosion control measures as indicated on the Drawings and as directed by the City of Richmond Inspector.
   D. Install additional measures as necessary to prevent sediment from leaving the project site.

3.2 MAINTENANCE OF EROSION CONTROL MEASURES
   A. Maintain all erosion and sediment control measures per the requirements of the Virginia Erosion and Sediment Control Handbook.
   B. At a minimum, the following maintenance is required:
       1. Safety Fence
          a) Review fence regularly for damage. Repair any damage immediately.
          b) Secure the fence at the end of each working day. Repair or replace all locking devices as necessary.
       2. Silt Fence
          a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
          b) Make any required repairs immediately. Give special attention to damage resulting from end-runs and undercutting.
          c) Replace fabric that is decomposing or is otherwise ineffective.
          d) Clean out accumulated sediment following every storm event. Do not allow sediment to
accumulate higher than one-half the height of the barrier.

3. Storm Drain Inlet Protection
   a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
   b) Remove and clean or replace stone filters that have been clogged with sediment. Make any required repairs immediately.
   c) Remove accumulated sediment as required. Do not allow sediment to accumulate higher than one-half the height of the measure.

4. Dewatering Structure
   a) Repair or replace the filtering media to prevent sediment accumulation from affecting the filtering capacity of the structure.

5. Temporary Seeding
   a) Re-seed and mulch areas where cover is inadequate to protect against erosion until adequate cover is obtained.

C. Remove accumulated sediment as required and at appropriate intervals to maintain the effective function of all erosion control measures.

D. Inspect, repair and remove accumulated sediment from erosion control measures following significant (greater than 1/2") rainfall events.

E. If erosion control measures become clogged, causing the impoundment of water, restore the measures immediately. Ponded water poses a potential drowning hazard and shall be relieved immediately by either pumping (through an approved dewatering structure) or by removal of the blockage.

3.3 REMOVAL OF EROSION CONTROL MEASURES

A. Remove all temporary erosion control measures following the stabilization of the site. Do not remove erosion control measures until authorized by the City of Richmond Inspector.

B. Topsoil, permanently seed and stabilize areas occupied by erosion control measures.

END OF SECTION 31 2500
SECTION 32 1216 - ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Hot-mix asphalt paving over prepared subbase.
      2. Hot-mix asphalt patching.

1.3 SUBMITTALS
   A. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
   B. Material Certification: Certification signed by Contractor certifying that each material complies with requirements.
   C. Traffic maintenance and Work Area Protection Plan: Submit a plan indicating sequencing and measures to be used for the maintenance and protection of traffic during operations within or immediately adjacent to existing roadways open to vehicular traffic. The Owner and the City of Richmond must approve this plan prior to commencement of work within the roadway.

1.4 QUALITY ASSURANCE
   A. Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
   B. Asphalt paving materials and installation shall conform to the requirements of the latest edition of the Virginia Department of Transportation (VDOT) Road and Bridge Specifications and Road and Bridge Standards.

1.5 PROJECT CONDITIONS
   A. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:
      1. Prime and Tack Coats: Minimum ambient temperature of 50 deg F (10 deg C), and when temperature has not been below 35 deg F (1 deg C) for 12 hours immediately prior to application.
      2. Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
      3. Asphalt Surface Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
1.6 TESTING AND INSPECTION
   A. The Owner’s testing agency will observe the asphalt placement in the roadway areas.
   B. Testing to be performed by the Owner’s third-party testing firm.

PART 2 - PRODUCTS

2.1 ASPHALT-AGGREGATE MIXTURE
   A. General: Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with the requirements of the
      VDOT Road and Bridge Specifications and as recommended by local paving authorities to suit project
      conditions.

2.2 ASPHALT MATERIALS
   A. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting,
      factory diluted in water, of suitable grade and consistency for application.
   B. Prime Coat: Asphalt emulsion prime conforming to VDOT requirements.

2.3 AUXILIARY MATERIALS
   A. Paving Geotextile: Nonwoven polypropylene, specifically designed for paving applications, resistant to
      chemical attack, rot, and mildew.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.
   B. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these
      conditions have been satisfactorily corrected.

3.2 MAINTENANCE AND PROTECTION OF TRAFFIC
   A. Utilize flagmen, barricades, warning signs and warning lights as required by the Virginia Work Area

3.3 PATCHING AND REPAIRS
   A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Recompact
      new subgrade. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent
      sound pavement, unless otherwise indicated. Cut excavation faces vertically.
      1. Tack coat faces of excavation and allow to cure before paving.
      2. Fill excavation with dense-graded, hot-mix asphalt base mix and, while still hot, compact flush with
         adjacent surface.
   B. Leveling Course: Install and compact leveling course consisting of dense-graded, hot-mix asphalt surface
      course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.
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1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

C. Crack and Joint Filling: Remove existing filler material from cracks or joints to a depth of 1/4 inch (6 mm). Refill with asphalt joint-filling material to restore watertight condition. Remove excess filler that has accumulated near cracks or joints.

D. Tack Coat: Apply uniformly to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, hot-mix asphalt pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. of surface.
   1. Allow tack coat to cure undisturbed before paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillage and clean affected surfaces.

3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

C. Prime Coat: For asphalt sections less than 4" thick, apply uniformly over surface of compacted-aggregate base at a rate of 0.15 to 0.50 gal./sq. yd.. Apply enough material to penetrate and seal, but not flood surface. Allow prime coat to cure for 24 hours minimum.
   1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use just enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
   2. Protect primed substrate from damage until ready to receive paving.

3.5 GEOTEXTILE INSTALLATION (As directed by Geotechnical Engineer)

A. Apply bond coat, consisting of asphalt cement, uniformly to existing surfaces at a rate of 0.20 to 0.30 gal./sq. yd. (0.8 to 1.2 L/sq. m).

B. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches (100 mm) and transverse joints 6 inches (150 mm).
   1. Protect paving geotextile from traffic and other damage and place overlay paving the same day.

3.6 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt mix 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 hot-mix asphalt base course in number of lifts and thickness indicated.
   2. Spread mix at minimum temperature of 225 deg F (107 deg C).

B. Place paving in consecutive strips not less than 10 feet (3 m) wide, except where 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 asphalt base course for a section before placing intermediate or surface courses.
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.

3.7 JOINTS

A. Construct joints between old and new pavement, or between successive days work, to ensure 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.
2. Offset longitudinal joints in successive courses a minimum of 6 inches (150 mm).
3. Offset transverse joints in successive courses a minimum of 24 inches (600 mm).
4. Construct transverse joints as required by the VDOT Road and Bridge Specifications.
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

3.8 COMPACTION

A. General: 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 vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and rerolling to required elevations.

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

1. Average Density: 95 percent of reference laboratory density according to ASTM D 1559.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm. Surface course average density shall be 95 percent of reference laboratory density.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method. Edges adjacent to curbs and curb and gutter sections shall be flush with the edge of concrete.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch (13 mm).
2. Surface Course: Plus 1/4 inch (6 mm), no minus.
B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:
   1. Base Course: 1/4 inch (6 mm).
   2. Surface Course: 3/16 inch (3 mm).
   3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).
C. Check surface areas at intervals as directed by Architect.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
   1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.
B. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with requirements.
C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with requirements.

END OF SECTION 32 1216
SECTION 32 1313 - SITE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 DESCRIPTION OF WORK:
   A. Extent of Portland cement concrete paving is shown on drawings, including:
      1. Curbs and gutters
      2. Walkways
      3. Concrete Alleys
      4. Retaining Walls

1.3 SUBMITTALS
   A. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
   B. Material Certification: Certification signed by Contractor certifying that each material complies with requirements.

1.4 JOB CONDITIONS
   A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
      1. Use flexible spring steel forms or laminated boards to form radius bends as required.
      2. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.
   C. Reinforcing Steel: ASTM A 615, Grade 60, deformed
   D. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.
   E. Expansion Joint Materials: Comply with requirements of applicable Division 7 sections for preformed expansion joint fillers and sealers.
   F. Antispalling Compound: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.
G. Liquid-Membrane Forming and Sealing Curing Compound: Comply with VDOT Road and Bridge Specifications.

2.2 CONCRETE MIX, DESIGN, AND TESTING

A. Comply with requirements of applicable Division 3 sections for concrete mix design, sampling and testing, and quality control or VDOT Road and Bridge Specifications whichever is more stringent.

B. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:
   1. Comply with the requirements of VDOT Std. Class A3 Concrete, unless otherwise indicated.
   2. Testing may be performed by the Owner’s third-party testing firm.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 FORM CONSTRUCTION

A. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork for grade and alignment to following tolerances:
   1. Top of forms not more than 1/8 inch in 10 feet.
   2. Vertical face on longitudinal axis, not more than 1/4 inches in 10 feet.

C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.3 REINFORCEMENT

A. Locate, place and support reinforcement as specified in Division 3 sections, unless otherwise indicated.

3.4 CONCRETE PLACEMENT

A. General: Comply with requirements of applicable Division 3 sections for mixing and placing concrete or VDOT Road and Bridge Specifications whichever is more stringent.

B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hard spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.

D. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

SITE CONCRETE

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E. Fabricated Bar Mats: Keep mats clean and free from excessive rust, and handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

F. Place concrete in 2 operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

G. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Architect.

3.5 JOINTS

A. General: Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

B. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into approximately 10’ areas or as shown on drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

2. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.

1. Construct joints as indicated or, if not indicated, use standard metal keyway-section forms.

D. Expansion Joints: Provide premolded joint filler for expansion joints abutting catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.

E. Locate expansion joints at 30’ o.c. minimum in sidewalk, curb, and curb and gutter unless otherwise indicated. Locate expansion joints at 50 feet o.c. for each pavement lane unless otherwise indicated.

F. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.

G. Provide joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

H. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

I. Fillers and Sealants: Comply with requirements of applicable Division 7 sections for preparation of joints, materials, installation, and performance.

3.6 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

1. Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.

3.7 CURING

A. Protect and cure finished concrete paving in compliance with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.

3.8 REPAIRS AND PROTECTIONS

A. Repair or replace cracked, broken or defective concrete curbs and curb and gutter, as directed by Architect.

B. Replace cracked, broken or defective concrete sidewalks.

C. Repair or replace cracked, broken or defective concrete pavement, as directed by Architect.

D. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

E. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

F. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 32 1313
SECTION 32 9200 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
   A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Fine grading and preparing lawn areas
      2. Topsoil Placement
      3. Fertilizers
      4. Lawn Seeding
      5. Lawn Restoration

1.3 DEFINITIONS
   A. Finish Grade: Elevation of finished surface of planting soil.
   B. Lawns: All areas disturbed by construction and not otherwise covered by paving, buildings or other structures.

1.4 SUBMITTALS
   A. Certification by product manufacturer that the following products supplied comply with requirements:
      1. Grass Seed
         a) Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and
            common name and percentage by weight of each species and variety, and percentage of purity,
            germination, and weed seed. Include the year of production and date of packaging.
         b) Certification letter from supplier that the seed is Blue Tag Certified.
      B. Sod
         1. Certification letter from the supplier that the seed is Gold Tag Certified.

1.5 DELIVERY, STORAGE, AND HANDLING
   A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

1.6 COORDINATION AND SCHEDULING
   A. Lawn Planting Season: Sow lawn seed during normal planting seasons for type of lawn work required.
      1. Spring Planting Season: March 15 through May 15
      2. Fall Planting Season: September 15 through November 15
   B. Lawn Seeding Schedule
1. If job completion schedule does not allow seeding within a normal planting season, provide interim temporary seeding necessary to stabilize site. Complete permanent seeding during the next planting season.

C. Planting Season - Sod: Sod during normal planting seasons for type of lawn work required.
   1. Spring Planting Season: March 15 - May 15
   2. Summer Planting Season: May 15 - September 15 with approved irrigation system.
   3. Fall Planting Season: September 15 through November 15

D. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work.

1.7 LIMITS OF SEEDING
   A. Seed all lawn areas not otherwise indicated as meadow or mulch beds.

PART 2 – PRODUCTS

2.1 TOPSOIL
   A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1” or larger in any dimension and other extraneous materials harmful to plant growth.
      1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
         a) Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.

2.2 FERTILIZER
   A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.
   B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
   C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
      1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in topsoil analysis reports from a qualified soil-testing agency.
      2. Minimum Composition: No less than 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

2.3 LAWN SEED
   A. All grass seed must be fresh, clean, and dry.
   B. Seed Species
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<table>
<thead>
<tr>
<th>Proportion by Weight</th>
<th>Grass Species</th>
<th>Min. % Germination</th>
<th>Min. % Pure Seed</th>
<th>Max. % Weed Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>Kentucky bluegrass (Poa pratensis)</td>
<td>80</td>
<td>85</td>
<td>0.50</td>
</tr>
<tr>
<td>90%</td>
<td>Tall Fescue (Festuca arundinacea)</td>
<td>85</td>
<td>98</td>
<td>0.50</td>
</tr>
</tbody>
</table>

A. Varieties shall be selected from the most recent list of recommended turfgrass varieties, published by Virginia Tech.

B. All seed shall be Blue Tag certified by the Oregon State Seed Laboratory. Tags must be attached to each bag delivered on site.

2.4 SOD

A. Sod: Certified sod, complying with TPI’s “Specifications for Turfgrass Sod Materials” in its “Guideline Specifications to Turfgrass Sodding”. Comply with ASPA specification for machine cut thickness, size, strength, moisture content and mowed height, and free of weeks and undesirable native grasses. Provide viable sod of uniform density, color and texture, stongly rooted, and capable of vigorous growth and development when planted provide the following turfgrass species.

1. 90 Percent Tall Fescue (festuca arundinacea). 10 Percent Kentucky Bluegrass (Poapratensis) mix.

B. All sod shall be Gold Tag certified by the Virginia Crop Improvement Association.

2.5 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Peat Mulch: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.

C. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:


D. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.6 EROSION-CONTROL MATERIALS

A. Erosion-Control Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 lb/sq. yd. with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.
PART 3 - EXECUTION

3.2 EXAMINATION
A. Examine areas to receive lawns and grass for compliance with requirements and for conditions affecting performance of the Work. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 PREPARATION
A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
C. Protect adjacent and adjoining areas from hydoseed overspraying.

3.4 TOPSOIL PLACEMENT FOR LAWNS
A. Limit subgrade preparation to areas that will be planted in the immediate future.
B. Loosen subgrade to a minimum depth of 4 inches. Remove stones, sticks and roots larger than 2 inches in any dimension from subgrade. Completely remove trash and other extraneous debris from subgrade.
C. Sift topsoil to remove stones and other objects larger than 1” in any dimension. Maximum object size for topsoil shall be achieved by sifting not by hand removal or raking following placement of topsoil.
D. Spread topsoil to a minimum depth of four inches (4”).

3.5 SEEDING LAWNS
A. Sow seed with a spreader or a seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.
B. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
C. Sow seed at the following rates:
   1. Seeding Rate: 200 lbs./acre.
D. Rake seed lightly into top 1/4 inch of topsoil, roll lightly, and water with fine spray.
E. Protect seeded areas 3:1 slope/grade or steeper against erosion by providing erosion-control blankets installed and stapled according to manufacturer's recommendations.
F. Protect seeded areas less than 3:1 slope/grade against erosion by spreading straw mulch after completion of seeding operations. Spread uniformly at a minimum rate of 2 tons per acre to form a continuous blanket 1-1/2 inches (38 mm) loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

3.6 LAWN RESTORATION
A. Restore existing lawn damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
   1. Reestablish lawn where settlement or washouts occur or where minor regrading is required.
B. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
C. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
D. Apply seed and protect with straw mulch as required for new lawns.
E. Water newly planted areas and keep moist until new lawn is established.

3.7 SATISFACTORY LAWN
A. Seeded lawns shall be considered satisfactory/acceptable provided requirements have been met and a healthy, uniform, close stand of grass is established, free of weeds, bare spots exceeding 5 by 5 inches and surface irregularities.
B. Replant lawns that do not meet requirements until lawns are satisfactory/acceptable.
C. Substantial Completion of the building and the remainder of the project may be achieved (pending prior Architect and Owner approval) before achieving a satisfactory/acceptable lawn. Continue to replant and maintain unsatisfactory/unsatisfactory lawn areas until acceptance is obtained.

3.8 CLEANUP AND PROTECTION
A. Promptly remove soil and debris created by lawn work from sidewalks and paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, walks, or other paved areas.
B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

END OF SECTION 32 9200