McCONNELLS WASTE COLLECTION CENTER

PUBLIC WORKS, YORK COUNTY GOVERNMENT
YORK COUNTY, SC

PROJECT MANUAL
CONSTRUCTION DOCUMENTS

CGD Project No. 24036

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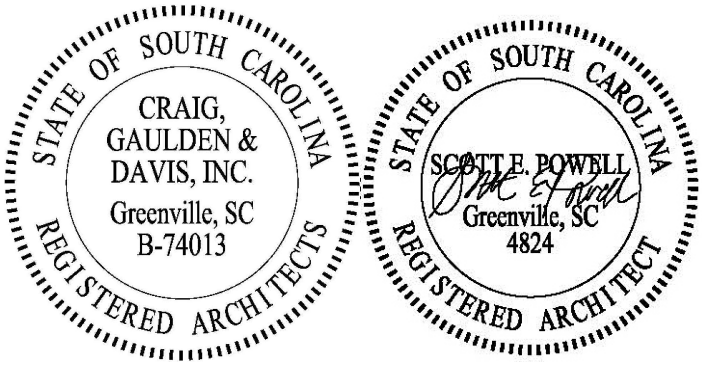
MAY 15, 2025

CRAIG GAULDEN DAVIS | PBK

SECTION 00 00 07

SEALS PAGE



McCONNELLS WASTE COLLECTION CENTER
PUBLIC WORKS, YORK COUNTY GOVERNMENT
YORK COUNTY, SOUTH CAROLINA

ARCHITECT'S PROJECT NO. 24036

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PROCUREMENT DEPARTMENT

Teria G. Sheffield
Procurement Director

SOLICITATION TYPE: Invitation for Bid **DATE:** June 11,2025

ID Number: XXXX **Title:** XXXXXXXXXXXXXXXXXXXXXXX

Due Date/Time: XXXX, 2025 at XX:XX x.m.

LATE SUBMITTALS WILL NOT BE ACCEPTED

Opening Location:

Government Center Building

Room 3401

6 S. Congress St., York, SC 29745

Point of Contact: Bryant Cook, Procurement Manager

Questions Deadline: No later than XXXX, 2025 at XX:XX x.m.

Tentative Date of Council Approval: XXXXXXX XX , 20XX

INFORMATION TO BIDDERS

1. PROJECT DESCRIPTION

1.1. The Work of this project consists of furnishing all labor, materials, equipment, tools, transportation, services and incidentals; and of performing all work necessary to complete all specified work in accordance with the Contract Documents prepared therefore and entitled XXXXX

1.2. Completion time for the project will be 120 calendar days as set forth in the Agreement.

2. DEFINED TERMS

2.1. Terms used in the Information to Bidders are defined and have the meanings assigned to them in the General Conditions.

3. COPIES OF BIDDING DOCUMENTS

3.1. Only complete sets of Bidding Documents will be issued and shall be used in preparing Bids. Neither the OWNER nor the ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.2. Complete sets of Bidding Documents may be obtained in the manner and at the location stated in the Invitation for Bids.

4. QUALIFICATIONS OF BIDDERS

4.1. Each Bid must contain evidence of the Bidder's qualifications to do business in the area where the project is located.

4.2. To demonstrate qualifications to perform the Work, each Bidder must be prepared to submit, within five days of OWNER’s request, a Statement of Qualifications providing written evidence as to the financial status; previous successful contractual and technical experience in similar work including references, description and volume of present commitments, evidence of possession of valid state, county, and local licenses; Certificates of Competency covering all operations and all areas of political jurisdiction involved in the work of this project; and such other data as may be requested by the OWNER.

4.3. Statement of Bidders Qualifications

If requested by the OWNER, Bidder must submit a Statement of Qualifications (the Qualifications) to include the following information. Bidder must provide all requested information in the Qualifications, and the data given must be clear and comprehensive. This statement shall be notarized and furnished to the OWNER, within five days of OWNER’s request. If necessary, the Qualifications questions may be answered on separate, attached sheets. The Bidder may submit any additional information the Bidder desires.

4.3.1. Name of Bidder.

4.3.2. Name(s), address(es), & social security number(s) of company principal(s).

4.3.3. Permanent main office address.

4.3.4. When organized.

4.3.5. If a corporation or company, list the State where incorporated or registered, year incorporated or registered, and the location of the principal place of business.

4.3.6. How many years has your organization been engaged in the contracting business under your present firm or trade name?

4.3.7. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion).

4.3.8. Under what other and former names has your organization operated?

4.3.9. General character of work performed by your company.

4.3.10. Has your company ever failed to complete any work awarded to you?

4.3.11. Have you ever defaulted on a contract?

4.3.12. List the more important projects completed by your company in the last five (5) years, the approximate cost for each project, and the month and year completed.

4.3.13. List your major equipment available for this contract.

4.3.14. Experience in construction work similar in importance to this project.

4.3.15. Background and experience of the principal members of your organization, including officers.

4.3.16. Credit available: $.

4.3.17. Give bank references: .

4.3.18. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the OWNER?

The following statement shall appear on the submitted Statement of Bidder Qualifications: “The undersigned hereby certifies that information furnished is true and accurate and further authorizes and requests all persons, firms, and corporations to furnish all information requested by the OWNER to allow verification of the information requested in this Statement of Bidder’s Qualifications.”

5. DISQUALIFICATION OF BIDDERS

5.1. One Bid: Only one Bid from an individual firm, partnership, company, or corporation under the same or under different names will be considered. If OWNER believes that a Bidder submitted more than one Bid for the work involved, all Bids submitted by that Bidder will be rejected.

5.2. Collusion Among Bidders: If OWNER believes that collusion exists among the Bidders, the Bids of all participants in such collusion will be rejected, and no participants in such collusion will be considered in future Bids for the same work.

6. EXAMINATION OF SITE CONDITIONS

6.1. Each Bidder, by and through the submission of a Bid, agrees to have examined the site, the location of all proposed work, and is satisfied through personal knowledge and experience or professional advice as to the character and location of the site, surface and subsurface conditions, elevations, locations of underground utilities and structures, and any other conditions and obstructions affecting the work, the nature of any existing construction, and other physical characteristics of the job, in order that the prices which the Bidder bids include all costs required for satisfactory completion of the work, including the removal, relocation, or replacement of any objects or obstructions which may be encountered in doing the proposed work.

6.2. Reports and records of obstructions and subsurface investigations shown on the Drawings or included in the Bid Documents were made solely for design purposes. The OWNER and ENGINEER do not warrant, guarantee or represent that said data is accurate or complete with respect to actual subsurface conditions throughout the site. Therefore, the Bidder, by and through the submission of a Bid, affirms satisfaction in respect to such site conditions, and, should the Bidder be awarded the Contract, the Bidder agrees to make no claims against the OWNER or ENGINEER if, in carrying out the work, the Bidder finds that the actual conditions do not conform to those indicated. The OWNER will, upon request, provide each Bidder with reasonable access to the site to conduct such tests and investigations as each Bidder deems necessary for submission of a Bid. If a Bidder obtains such access, the Bidder shall restore the site to the condition existing prior to conducting said tests and investigations.

6.2.1. In reference to those reports of explorations and tests of subsurface conditions at the site which have been utilized by ENGINEER in preparation of the Contract Documents, Bidder may rely upon the accuracy of the technical data contained in such reports but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for the purpose of bidding or construction.

6.2.2. In reference to those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site which has been utilized by ENGINEER in preparation of the Contract Documents, Bidder may rely upon the accuracy of the technical data contained in such drawings, but not upon the completeness for the purpose of bidding or construction.

Copies of such reports and drawings will be made available by OWNER to any Bidder upon request. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which Bidder is entitled to rely as provided in Paragraphs 6.2.1 and 6.2.2 are incorporated into the Contract Documents by reference.

6.3. Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities or others, and OWNER does not assume responsibility for the accuracy or completeness thereof.

6.4. Should a Bidder find that any subsurface conditions, Underground Facilities or other physical conditions at or contiguous to the site is of such a nature as to require a change in the Contract Documents due to differing conditions, Bidder shall at once notify the ENGINEER in writing.

6.5. The land upon which the work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by OWNER in performing the Work are identified in the Bid Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the successful Bidder. Easements for permanent structures or permanent changes in existing structures are to be obtained and/or paid for by OWNER unless otherwise provided in the Contract Documents.

7. EXAMINATION OF CONTRACT DOCUMENTS

7.1. Each Bidder shall carefully examine the Contract Documents and become thoroughly informed regarding any and all conditions and requirements that may in any manner affect cost, progress or performance of the Work to be performed under the Contract. Ignorance on the part of the Bidder will in no way relieve the Bidder of the obligations and responsibilities assumed under the Contract.

7.2. Should a Bidder find discrepancies, ambiguities, or omissions in the Bid Documents or Contract Documents or doubt as their meaning, the Bidder shall at once notify the ENGINEER in writing.

7.3. The Submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of Articles 6 and 7; without exception the Bid is premised upon performing and furnishing the Work required by the Contract Document; and such means, methods, techniques, sequences, or procedures of construction as may be indicated in or required by the Contract Documents; and the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

8. INTERPRETATIONS, CLARIFICATIONS AND ADDENDA

8.1. All questions about the meaning or intent of the Contract Documents or about the bid process must be written. No oral interpretations will be made to any Bidder as to the meaning of the Contract Documents or the bid process. Any inquiry or request for interpretation received five (5) or more days prior to the date fixed for opening of Bids will be given consideration unless otherwise specified on cover page. Any changes or interpretations will be made in writing in the form of an addendum and, if issued, posted on the County's website www.yorkcountygov.com and notification will be sent by available means to all known prospective Bidders prior to the established bid opening date. Each Bidder shall acknowledge receipt of such addenda in the space provided on the Bid Form. In case any Bidder fails to acknowledge receipt of such addenda, submission of the bid constitutes acknowledgement of the receipt of all addenda. All addenda are a part of the Contract Documents and each Bidder will be bound by such addenda, whether or not received by the Bidder. It is the responsibility of each Bidder to verify that the Bidder has received all addenda issued before Bids are opened. Questions received less than five (5) Calendar days prior to the date for opening of Bids may not be answered unless otherwise

specified on cover page. Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will have no legal effect.

8.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by OWNER or ENGINEER.

8.3 Inquiries regarding interpretation or additional information concerning the County's requirements or stipulations concerning this request can be made via email as listed below.

8.4 Send questions regarding the project via the Q&A icon found through the link to the solicitation on the county website.

9. INTERPRETATION OF QUANTITIES

9.1. The quantities of work to be performed and materials to be furnished under unit price items, as given in the Bid Form, shall be considered as approximate only and will be used solely for the comparison of Bids received. The OWNER and/or ENGINEER do not expressly or by implication represent that the actual quantities involved will correspond exactly with the quantities on the Bid Form. The Bidder may not plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the work. Payment to the CONTRACTOR under unit price items will be made only for the actual measured quantities of work performed and materials furnished in accordance with the Contract Documents, and it is understood that the quantities may be increased or decreased at the OWNER's option, as provided in the General Conditions, without in any way invalidating any of the unit or lump sum prices Bid.

10. ALTERNATES

10.1. When certain items of equipment or materials are specified or described as the product of a particular manufacturer - together with any required additional information such as model number, size or catalog number - only such specific items may be used in preparing the Bid, except as hereinafter provided.

10.2. A Bidder proposing to seek approval for the use of alternate, substitute, or "equal" items must do so in accordance with the provisions of Section 12 of the General Conditions and must determine that such proposed equipment is of comparable character and quality to that specified. The OWNER or the ENGINEER will not discuss, approve, or disapprove any alternate or substitution of equipment or materials before execution of the Contract. The cost of changes in related work and additional drawings, which may be required to illustrate or define the alternate or substitute equipment and its relation to the other parts or portions of the work, shall be paid by the Bidder. Substitution of equipment or materials will cause no change in the Contract Time or in the amount of liquidated damages in the Contract Documents.

11. GOVERNING LAWS AND REGULATIONS

11.1. Upon award of a contract under this request the successful Bidder must comply with the laws of South Carolina including obtaining authorization or licensure to do business with this State if required.

11.2. Notwithstanding the fact that applicable statutes may exempt or exclude the successful Bidder from authorization or licensure requirements, by submission of this signed Bid, the Bidder agrees to be subject to the jurisdiction and process of the courts of the State of South Carolina as to all matters and disputes arising under the Contract Documents and the performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

11.3. The Bidder is required to be familiar with and shall be responsible for complying with all federal, State and local laws, ordinances, rules, and regulations that in any manner affect the work.

11.4. The bid prices shall include all sales, consumer, use, and other taxes required to be paid in accordance with the law of the place of the project.

12. PREPARATION OF BIDS

12.1. Signature of the Bidder: Each Bidder shall sign the Bid Form in the space provided for the signature. If the Bidder is an individual, the words "doing business as", or "Sole Owner" must appear beneath such signature. In the case of a partnership, the signature of at least one of the partners must follow the firm name and the words "Member of the Firm" should be written beneath such signature. If the Bidder is company, either a member or the managing member must sign the Bid on behalf of the company and provide evidence of the authority to sign the bid. If the Bidder is a corporation, the title of the officer signing the Bid on behalf of the corporation must be stated and evidence of the Bidders authority to sign the Bid must be submitted. Bids not signed may be automatically rejected.

12.2. The Bidder shall show valid South Carolina Contractor's License Number on the Bid Form. Failure to show this required information in the proper place may cause the Bid to be automatically rejected. All Bidders shall hold a valid and current South Carolina General Contractor's License, with the appropriate classifications and limitations to satisfy the proposed scope of work and bid amount.

12.3. Basis for Bidding: The price bid for each item shall be on a lump sum or unit price basis as specified in the Bid Form. The bid prices shall remain unchanged for the duration of the Contract and no claims for cost escalation during the progress of the work will be considered. All blanks on the Bid Form must be completed in black ink or typewritten.

12.4. Price Bid: The total price bid for the work shall be the aggregate of the lump sum prices bid and unit prices multiplied by the appropriate estimated quantities for the individual items and shall be stated in figures in the appropriate place on the Bid Form. In the event that there is a discrepancy on the Bid Form due to unit price extensions or additions, the corrected extensions and additions shall be used to determine the project bid amount. Written values (in words) shall supersede numerical values, when discrepancies exist.

13. SUBMISSION OF BIDS

13.1 Online submittal: Electronic submittals shall be uploaded in PDF format via the Getall portal which can be accessed at https://www.yorkcountygov.com/217/Procurement under Active Bids. To ensure that an electronic submittal is received by the due date and time, it is recommended that submittals are uploaded allowing sufficient time prior to deadline. An email confirmation of submittal will be received after clicking on the Confirm Bid button in the GetAll system. If confirmation email is not received, contact GetAll support at support@getall.com to confirm submittal was successful. The Offeror shall be responsible for confirming that submittal is received by the deadline. Any submittal received after the closing date and time deadline will not be considered.

For step by step instructions on how to submit a response select Help and then Quick Reference in the Getall portal:

13.2. Each bid shall be submitted on the Bid Form as furnished, together with a suitable bid security as herein described.

13.3. The Bid, accompanied by bid security, as described in Section 14, and other required documents, shall be submitted

13.4. If requested by the OWNER, Bidder shall submit, within five days of OWNER's request, a list of the names and addresses of the major subcontractors together with the services they will supply. These subcontractors will be subject to review as to their competency by the OWNER prior to award of Contract and shall be one of the considerations in determining the successful Bidder. After award of Contract, no change in subcontractors shall be made unless approved by the OWNER after a request for such a change, including the reasons therefore, has been submitted in writing by the CONTRACTOR.

13.5 CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION: The Bidder certifies, by submission of this document or acceptance of a contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any State, Federal department, or agency. It further agrees by submitting this qualification statement that it will include this clause without modification in all lower tier transactions, solicitations, Bids, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, it shall attach an explanation to the Bid Form.

14. BID SECURITY

14.1. Each Bid must be accompanied by a cashier's check or Bid Bond made payable to the OWNER in an amount not less than five percent (5%) of the total amount of the Bid if the total amount of the bid exceeds $30,000. Generally, the bid security of all Bidders, including the three (3) lowest responsible Bidders, will be returned within ten (10) days after the OWNER and the accepted Bidder have executed the written Contract and the accepted Bidder has filed acceptable Performance and Indemnity and Payment Bonds. Upon request and no earlier than thirty (30) days after the formal opening of bids, the County will return the bid security of any Bidder.

14.2. Attorneys in Fact who sign Bid Bonds shall file with such bonds a certified copy of their Power of Attorney to sign said Bonds.

14.3. Failure of the accepted Bidder to execute a Contract and file acceptable bonds within ten (10) days after a written Notice of Award has been given shall be just cause for the annulment of the award and the forfeiture of the bid security to the OWNER as liquidated damages for damages sustained by OWNER. Award may then be made to the next lowest responsible Bidder or all Bids may be rejected.

15. WITHDRAWAL OF BID

15.1. Any Bid may be withdrawn prior to the time scheduled in Invitation for Bids for the receipt thereof. A Bid may also be withdrawn within twenty-four (24) hours after the date of the receipt of the Bids, provided that the Bidder files a duly signed, written notice with OWNER and promptly there after demonstrates, to the reasonable satisfaction of OWNER, that there was a material and substantial mistake in the preparation of its Bid. The Bid security will be returned and the Bidder will be disqualified from further bidding on the work to be provided under the Contract Documents.

16. MODIFICATION OF BIDS

16.1. York County does not allow modification of bids after deadline for submittal.

17. RECEIPT AND OPENING OF BIDS

17.1. Bids will be received until the designated time and will be publicly opened and (unless non-responsive) read aloud at the appointed time and place stated in the Invitation for Bids. The person whose duty it is to open the Bids will decide when the specified time has arrived and no Bids received thereafter will be considered. No responsibility will be attached to anyone for the premature opening of a Bid not properly addressed and identified. Bidders or their authorized agents are invited to be present. An abstract of the amounts of the base Bids and major alternates (if any) will be available to Bidders after the opening of Bids.

18. DETERMINATION OF SUCCESSFUL BIDDER

18.1. For the purpose of award, the correct summation of the lump sum prices and/or of the products of the estimated quantities shown in the Bid and the unit prices will be considered the Bid. Until the final award of the Contract, the OWNER is not bound to accept the minimum Bid stated herein but reserves the right to reject any and all Bids and to waive technical errors and irregularities as may be deemed best for the interests of the OWNER. Bids containing modifications that are incomplete, unbalanced, conditional, and obscure; containing additions not requested or irregularities of any kind; not complying in every respect with the Information to Bidders and the Bid Documents, may be rejected at the option of the OWNER.

18.2. In evaluating Bids, OWNER will consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, alternates (if any), unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

18.3. OWNER may conduct such investigations as OWNER deems necessary to assist in the evaluation of any Bid and to establish the qualifications to perform and furnish the Work in accordance with the Contract Documents to OWNER's satisfaction within the prescribed time.

18.4. The Bids of the three (3) lowest responsible Bidders will remain subject to acceptance for a maximum of one hundred twenty (120) days after the day of the Bid opening, but OWNER may, at its sole discretion, release any Bid and return the bid security prior to that date.

19. AWARD OF CONTRACT

19.1. The OWNER reserves the right to reject any or all Bids or any part of any Bid, to waive any informality in any Bid, or to re-advertise for all or part of the work contemplated. If Bids are found to be acceptable by the OWNER, written Notice of Award will be given to the lowest responsible Bidder of the acceptance of the Bid and of the award of the Contract.

19.2. If a Bidder to whom a Contract is awarded forfeits the bid security and the award of the Contract is annulled, the OWNER may either award the Contract to the next lowest responsible Bidder or re-advertise the work.

19.3. The Contract will be awarded to the lowest responsible Bidder complying with the applicable conditions of the Contract Documents.

19.4. The ability of a Bidder to obtain Performance and Indemnity and Payment Bonds shall not be regarded as the sole test of such Bidder's competence or responsibility.

19.5. The OWNER also reserves the right to reject the Bid of a Bidder who has previously failed to perform properly or to complete Contracts of a similar nature on time.

20. EXECUTION OF CONTRACT

20.1. The Bidder to whom a Contract is awarded will be required to return to the OWNER a minimum of three (3) executed counterparts of the prescribed Contract or Agreement together with the required Performance and Indemnity and Payment Bonds and the required Certificates of Insurance within ten (10) days from the date of Notice of Award. Within ten (10) days thereafter, OWNER shall deliver one fully signed counterpart to CONTRACTOR. Each counterpart is to be accompanied by a complete set of Drawings with appropriate identification.

21. PERFORMANCE AND PAYMENT BONDS

21.1. Simultaneously with delivery of the executed Contract to the OWNER, a Bidder to whom a Contract has been awarded must deliver to the OWNER executed Performance and Indemnity and Payment Bonds on the prescribed forms each in an amount equal to one hundred percent (100%) of the total amount of the Contract Amount, as security for the faithful performance of the

Contract and for the payment of all persons performing labor or furnishing materials in connection therewith. The Performance and Indemnity and Payment Bonds shall have as the surety thereon only such surety company or companies as are authorized to write bonds of such character and amount under the laws of the State of South Carolina and with a resident agent in the county in which the project is located. The Attorney in Fact or other officer who signs the Performance and Indemnity and Payment Bonds for a surety company must file with such bonds a certified copy of the Power of Attorney authorizing the Bidder to do so.

21.2. The Performance and Indemnity and Payment Bonds shall remain in force for two (2) year from the date of final payment of the Work as a protection to the OWNER against losses resulting from latent defects in materials or improper performance of work under the Contract, which may appear or be discovered during the one (1) year warranty period.

21.3. Qualification of Sureties shall be as described in the General Conditions.

22. GENERAL REQUIREMENTS

22.1 All Bidders including the employees of the Bidder must comply with all applicable Federal, State, and County laws pertaining to contracts entered into by governmental agencies, including non-discrimination employment. Contracts entered into on the basis of submitted Bid responses are revocable if contrary to law. Contracts for work resulting from this request will obligate the Bidder to not discriminate on the basis of race, color, creed, religion, handicap, or national origin in their employment practices.

23. TITLE VI OF CIVIL RIGHTS ACT OF 1964

23.1 Bidders shall comply with Title VI of the Civil Rights Act of 1964. York County strongly encourages the use of and involvement of Disadvantaged Business Enterprises (DBE) on this project.

24. CONFLICT OF INTEREST

24.1 The successful Bidder shall not knowingly employ, during the period of a contract, or any extensions to it, any professional personnel who are also in the employ of York County and who are providing services involving this request or services similar in nature to the scope of this request to the County. Furthermore, the Bidder shall not knowingly employ, during the period of a contract or any extensions to it, any York County employee who has participated in the making of a contract until at least two years after the termination of employment of that individual with York County.

25. INDEMNIFICATION AND HOLD HARMLESS

25.1 The successful firm shall agree to protect, defend, indemnify, and forever hold harmless, the County, its agents, officers, and employees, from and against any and all claims, liabilities, damages, costs, actions, proceedings, of any nature whatsoever, however alleged or termed, or

in any lawsuits, arising in any manner out of any action or failure to act, by the firm, its officers, agents, and employees, or relating to or arising out of the performance or failure to perform, by the firm, its officers, agents, and employees, any obligations arising under its agreement with the County, or any other type claim/lawsuit whatsoever, however alleged or termed, which may arise at any time as a result of or related to the provision of service(s) for the County by the successful firm, without regard to the source, nature, or validity of the claim/lawsuit. Losses, liabilities, expenses and claims for damages shall include, but not be limited to, civil and criminal fines and penalties, loss of use and/or services, claims for injury, damage, disability, property damage, or death, injury to real or personal property, and attorneys' fees, costs, and expenses incurred by the County or any of its agents, officers, and employees. The County shall not be precluded from receiving the benefits of any insurance the firm may carry which provides for indemnification for any loss or damage to property in the firm's custody and control, where such loss or destruction is to County property. The firm shall do nothing to prejudice the County's right to recover against third parties for any loss, destruction or damage to County property.

26. DRUG-FREE WORKPLACE

26.1 During the performance of this request, the firm agrees to provide a drug-free workplace for employees of that firm; post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the workplace and specify the actions that will be taken against employees for violations of such prohibition; and state in all solicitations or advertisements for employees placed by or on behalf of the firm that the firm maintains a drug-free workplace. 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/firm in accordance with this chapter, 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 request.

27. APPLICABILITY/JURISDICTION OF SOUTH CAROLINA LAW AND COURTS

27.1 Upon award of a contract under this request the person, partnership, association or corporation to whom the award is made must comply with the laws of South Carolina which require such person or entity to be authorized and/or licensed to do business with this State. Notwithstanding the fact that applicable statutes may exempt or exclude the successful firm from requirements that it be authorized and/or licensed to do business in this State, by submission of this signed Bid, the firm agrees to subject itself to the jurisdiction and process of the courts of the State of South Carolina as to all matters and disputes arising or to arise under the contract and the performance thereof, including any questions as to the liability for taxes, licenses, or fees levied by the State.

28. CERTIFICATE OF INSURANCE

28.1 Once selected, the successful firm will be required to provide proof of insurance to include professional liability; workers compensation, employer's liability and general liability prior to commencing work.

29. ASSIGNMENT

29.1 No contract or its provisions may be assigned, sublet, or transferred without the written consent of the County.

30. OWNERSHIP OF MATERIAL

30.1 All Bids and supporting materials (including all data, material, and documentation) originated and prepared for York County pursuant to this SOLICITATION and including correspondences relating to this SOLICITATION shall, belong exclusively to York County.

31. PRIME RESPONSIBILITIES

31.1 The successful firm will be required to assume sole responsibility for the complete effort as required by this solicitation. York County will consider the successful firm to be the sole point of contact with regard to contractual matters.

32. SUBCONTRACTING

32.1 If any part of the work covered by this solicitation is to be subcontracted, the successful firm shall identify the subcontracting organization and the contractual arrangements made therewith. All subcontractors must be approved by York County. The successful firm will also furnish the corporate or company name.

33. RECORDS RETENTION AND RIGHT TO AUDIT

33.1 The County shall have the right to audit books and records of the successful firm as they pertain to this contract. Such books and records shall be maintained for a period of three (3) years from the date of final payment under the contract. The County may conduct, or have conducted, performance audits of the successful firm. The County may conduct, or have conducted, audits of specific requirements of this solicitation as determined necessary by the County. Pertaining to all audits, successful firm shall make available to the County access to its computer files containing the history of contract performance and all other documents related to the audit. Additionally, any software used by the successful firm shall be made available for auditing purposes at no cost to the County.

34. PUBLIC ACCESS TO PROCUREMENT INFORMATION

34.1 Subject to the requirements of the Freedom of Information Act, commercial or financial information obtained in response to this SOLICITATION which is deemed privileged and confidential by the Bidder, will not be disclosed. Such privileged and confidential information should be clearly marked as such and includes information which if disclosed, might cause harm to the competitive position of the Bidder supplying the information. All Bidders, therefore, must visibly mark as "CONFIDENTIAL" each specific part of their Bid which such Bidders consider to contain proprietary or other privileged information. Additionally, all Bidders shall be solely responsible for identifying as exempt from the Freedom of Information Act and for visibly marking as "EXEMPT FROM FREEDOM OF INFORMATION ACT" each specific part of their Bid which Bidders deem to be so exempt and shall further be solely responsible for any consequences that might arise from the nondisclosure of any information that is subsequently determined not to have such an exemption. York County hereby disclaims any responsibility for not disclosing information identified by any Bidder as exempt from the Freedom of Information Act and further hereby disclaims any responsibility for any information which is disclosed as a result of Bidder's failure to visibly mark it as "CONFIDENTIAL" or to improperly mark it as “confidential”. Bidder must identify specific parts of the Bid package as confidential. Failure to do so or to mark the entire Bid package as confidential may result in disclosure of that information.

35. NON-COLLUSION BIDDING CERTIFICATION AND DISQUALIFICATION

35.1 By submission of a bid, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid each party certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief.

35.2 The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other proposer or with any competitor.

35.3 Unless otherwise required by law, the prices which have been quoted in this bid have not knowingly been disclosed by the Bidder and will not knowingly be disclosed prior to the bid opening, directly or indirectly, to any other Bidder or to any competitor.

35.4 No attempt has been or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition

35.5 One Bid: Only one Bid from an individual firm, partnership, company, or corporation under the same or under different names will be considered. If OWNER believes that a Bidder submitted more than one Bid for the work involved, all Bids submitted by that Bidder will be rejected.

36. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION

36.1 The Bidder certifies, by submission of this document or acceptance of a contract, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any State, Federal department, or agency. It further agrees by submitting this qualification statement (if applicable)

that it will include this clause without modification in all lower tier transactions, solicitations, Bids, contracts, and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, it must attach an explanation to this solicitation/bid.

37. CERTIFICATION REGARDING IMMIGRATION REFORM AND CONTROL

37.1 The Bidder certifies, by submission of this document or acceptance of a contract, that all Contractors are expected to comply with the Immigration and Reform Control Act of 1986 (IRCA), as may be amended from time to time. This Act, with certain limitations, requires the verification of the employment status of all individuals who were hired on or after November 6, 1986, by the Contractor as well as any subcontractor or sub-subcontractor. The usual method of verification is through the Employment Verification (I-9) Form. With the submission of this bid, the Contractor hereby certifies without exception that Contractor has complied with all federal and state laws relating to immigration and reform. Any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and, at the State's option, may subject the contract to termination and any applicable damages. The Contractor certifies that, should it be awarded a contract by the County, the Contractor will comply with all applicable federal and state laws, standards, orders and regulations affecting a person's participation and eligibility in any program or activity undertaken by the Contractor pursuant to this contract. The Contractor further certifies that it will remain in compliance throughout the term of the contract. At the County's request, the Contractor is expected to produce to the County any documentation or other such evidence to verify the Contractor's compliance with any provision, duty, certification, or the like under the contract. The Contractor agrees to include this Certification in contracts between itself and any subcontractors in connection with the services performed under this contract.

38. CHAIN OF COMMUNICATION

38.1 To ensure the integrity of the competitive process, a strict chain of communication shall apply to each Invitation for Bids, Request for Proposals, Request for Qualifications, or any other competitive solicitation during the period between publication of the solicitation and final award. Bidders or its agents may not communicate by any means, directly or indirectly, with York County public officials, employees, its agents, or representatives or any person not otherwise listed on this document, regarding any aspect of this procurement activity. All communications must be solely with the Procurement Officer. In the sole determination of the Procurement Officer and/or York County, violation of these restrictions may result in disqualification of your offer, suspension or debarment, and may constitute a violation of law.

39. PROHIBITION OF DONATIONS AND GRATUITIES

39.1 Bidders are restricted from making donations to any York County governmental entity with whom they have or seek to have a contract. The Bidder represents that an offer discloses any gifts made, directly or through an intermediary, by the Bidder or the Bidder's named subcontractors or subconsultants to or for the benefit of York County, its agents, or representatives during the period beginning eighteen months prior to the Opening Date. No

Bidder, or any person, firm, or corporation employed by the Bidder in the performance of this request, may offer or give any gift, money or anything of value or any promise for future reward or compensation to any York County employee.

40. YORK COUNTY RESERVES THE RIGHT TO REJECT ANY AND/OR ALL BIDS AND TO WAIVE ANY AND ALL TECHNICALITIES

_____

Signature, Title of CONTRACTOR

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Project schedule and key dates.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and Drawing conventions.

1.3 PROJECT INFORMATION

A. Project Identification: McConnells Waste Collection Center

1. The project consists of the demolition the existing retaining walls, dumpster area and asphalt drive and reconstruction of each along with the removal of numerous trees.

B. PROJECT SCHEDULE AND KEY DATES

Project advertised for bids on May 22, 2025.

Due to the simple nature of the project there will not be a formal Pre-Bid Meeting, however, a site visit is scheduled for June 10, 2025 at 2:00 PM and all interested parties are encouraged to attend. McConnells Highway, McConnells, South Carolina 29726.

Bid Questions due by 4 p.m. on June 18, 2025.

Last Addendum issued by 11 a.m. on Friday, June 20, 2025.

Bids due by 3:00 PM June 25, 2025, online or at the Government Center Building, Room 3401, 6 S. Congress Street, York, South Carolina 29745.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Demolition of the existing drives, retaining wall and concrete pad for the dumpster. Also removal of numerous trees. Construction of new retaining walls, a larger pad for the dumpsters, a new electrical line (reuse of electrical panel) as described in words, drawings and other instruments and other Work indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated on the Drawings. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

1.6 ACCESS TO SITE

A. General: Contractor shall have use of entire site during the construction period. The designated area will be sufficient for storage of materials, equipment, trailer and storage containers, and parking. The County shall be given access to the office at the north end of the site.

B. Use of Site: Limit use of Project site to areas within the Contract limits negotiated prior to construction. Do not disturb portions of Project site beyond this area.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations such as noise limitations, work hours, and with other requirements of authorities having jurisdiction.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 10:00 p.m., Monday through Friday, unless otherwise indicated.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.

D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit PDF of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. **Substitution Request Form**: Use facsimile of form provided in Project Manual.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.

c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
b. Requested substitution does not require extensive revisions to the Contract Documents.
c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
d. Substitution request is fully documented and properly submitted.
e. Requested substitution will not adversely affect Contractor's construction schedule.
f. Requested substitution has received necessary approvals of authorities having jurisdiction.
g. Requested substitution is compatible with other portions of the Work.
h. Requested substitution has been coordinated with other portions of the Work.
i. Requested substitution provides specified warranty.
j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

3.1 Proposed Substitution Request Form: for Contractor's use follows this Section.

A. Substitution Requests during the bid period must be submitted to the Architect through a bidding General Contractor.

END OF SECTION 012500

PROPOSED SUBSTITUTION REQUEST FORM
Form must be signed by a General Contractor bidding the work.

To:_____
(General Contractor's name)

We hereby submit for your consideration the following product in lieu of the specified item for the above project:

DRAWING NO.	SPECIFICATION SECTION	PARAGRAPH	ITEM SPECIFIED
_____	_____	_____	_____

Proposed Substitution:_____

Manufacturer:_____

Attach complete information on proposed changes and/or to Drawings and/or Specifications which the proposed substitution will require for its proper installation.

Provide the length of time the manufacturer has been in business in the manufacturer of this product.

Submit with request all necessary samples, manufacturer's substantiating data, performance and test reports to prove equal quality and performance to the product that is specified. Clearly mark manufacturer's literature to indicate equality in performance to assist in the evaluation of the substitution by the Architect. Provide a written description of the proposed substitution and provide as an attachment to this request form.

The following supporting data is attached to this substitution:

☐ Drawings	☐ Performance & Test Reports	☐ Written Description
☐ Product Samples	☐ Samples	☐ Other

Complete the following:

1. Does the proposed substitution affect dimensions and or details shown on the Drawings? Yes ☐ No ☐
   If yes, clearly indicate the changes below or on an attached sheet.

   _____

2. Will the undersigned pay for any and all changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes ☐ No ☐
   If no, fully explain:

   _____

3. Does the proposed substitution have any affect on other Contracts or other Trades? Yes ☐ No ☐
   If yes, fully explain:_____

   _____

4. Does the proposed substitution affect the construction schedule? Yes ☐ No ☐
   If yes, fully explain:_____

   _____

5. The differences between the warranties of the proposed substitution and specified items are:

   Same _____ Different _____ (Explain on attachment.)

6. State the reason for the proposed substitution request:_____

   _____

PROPOSED SUBSTITUTION REQUEST FORM
Form must be signed by a General Contractor bidding the work.

7. Itemize the comparison of specified item(s) with the proposed substitution; list all variations:_____

_____

8. Provide cost comparison between the proposed substitution and the product specified._____

_____

9. Provide a detail explanation as to why this substitution is a benefit to the Owner._____

_____

10. Will service and maintenance parts be readily available after installation is complete?_____

_____

11. If it is determined that this proposed substitution does not comply with the contract documents after approval, will the undersigned agree to pay for the removal and reinstallation of one of the specified products.
    - ❑ Yes
    - ❑ No If no, explain : _____

12. Years the manufacturer been in business producing this product? _____

The undersigned certifies that the proposed substitution has been fully investigated and the function, appearance and quality are equivalent or superior to the specified item. **Form must be signed by a General Contractor bidding the work.**

Submitted By:

_____
Name of GC representative (Signature)

_____
Name (Printed)

_____
Title

_____
Firm

_____
Address

_____
Telephone *Date*

_____
Email Address:

The person signing this substitution request form shall have authority to legally bind his firm to the terms listed above. The failure to provide a legally binding signature will result in the Architect's rejection of this proposed substitution.

Architect's Response:

If the proposed substitution is approved by the Architect during the bidding phase the proposed product will be listed in an addendum stating the product is approved.

Approval of the substitution in an addendum does not relieve the Contractor's of his responsibility for meeting the requirements of the contract documents and the information provided and certified on this Proposed Substitution Request Form.

Should this form be used to make a substitution request after the bidding phase, the approval of a substitution will be documented by Change Order.

CRAIG GAULDEN DAVIS 864.242.0761
www.cgdarch.com

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 01 29 00 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Architect.
    c. Architect's Project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

a. Differentiate between items stored on-site and items stored off-site. If required, provide evidence of insurance.

5. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
6. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

D. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

E. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Sustainable design action plans, including preliminary project materials cost data.
7. Schedule of unit prices.
8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.

G. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

H. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 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.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in built facility. Keep list current at all times.

1.5 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. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors 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.

1.6 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.

1.7 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. Architect will return without response those RFIs submitted to Architect 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. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: AIA Document G716 Software-generated form with substantially the same content as indicated above, acceptable to Architect.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect 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 Architect's actions on Submittals.
    g. Requests for confirmation of information already contained in the contract documents or previously provided or requesting confirmation to questions previously answered or clarification previously given.
    h. Repetitive RFI's, i.e., RFI's, wherein the same information is requested more than once, even if phrased in another format or asked in a different manner. Confirming & Repetitive RFI's are considered frivolous and may constitute a claim from the Owner Representatives (Architect/Engineer) against the Contractor.

2. The Contractor shall not retain or suppress RFI's for group submissions. Each individual RFI is to be submitted expeditiously upon occurrence. Numerous RFI's submitted in a short time period will not be considered reasonable and will result in review times being extended accordingly.
3. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
4. Architect'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 Architect in writing within 10 days of receipt of the RFI response.

5. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to:

    a. Incomplete, illegitimate, or frivolous Contractor's requests for information and requests for information that are not prepared in accordance with the Contract Documents.
    b. Contractor requests for information where the requested information is available to the Contractor from a careful study and comparison of the contract documents, field conditions, contractor-prepared coordination drawings, other Owner/Architect provided information or prior project correspondence or documentation.
    c. Contractor-proposed alternative arrangements or installations for the convenience of the contractor which, upon acceptance, requires the Architect to revise the contract documents.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect 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. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Contractor shall execute a data licensing agreement in the form of AIA Document C106 Digital Data Licensing Agreement or an Agreement form acceptable to Owner and Architect.

    a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of AIA Document C106 or Agreement acceptable to Owner and Architect.

B. PDF Document Preparation: Where PDFs are required to be submitted to Architect, 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.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

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

1. Attendees: Authorized representatives of Owner Architect, 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. Critical work sequencing and long lead items.
d. Designation of key personnel and their duties.
e. Lines of communications.
f. Procedures for processing field decisions and Change Orders.
g. Procedures for RFIs.
h. Procedures for testing and inspecting.
i. Procedures for processing Applications for Payment.
j. Distribution of the Contract Documents.
k. Submittal procedures.
l. Preparation of Record Documents.
m. Use of the premises.
n. Work restrictions.
o. Working hours.
p. Owner's occupancy requirements.
q. Responsibility for temporary facilities and controls.
r. Procedures for moisture and mold control.
s. Procedures for disruptions and shutdowns.
t. Construction waste management and recycling.
u. Parking availability.
v. Office, work, and storage areas.
w. Equipment deliveries and priorities.
x. First aid.
y. Security.

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

C. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of Record Documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Procedures for completing and archiving web-based Project software site data files.
    d. Submittal of written warranties.
    e. Requirements for preparing operations and maintenance data.
    f. Requirements for delivery of material samples, attic stock, and spare parts.
    g. Requirements for demonstration and training.
    h. Preparation of Contractor's punch list.
    i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    j. Submittal procedures.
    k. Owner's partial occupancy requirements.
    l. Installation of Owner's furniture, fixtures, and equipment.
    m. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

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 Architect, 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) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site use.

8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.
12) Field observations.
13) Status of RFIs.
14) Status of Proposal Requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) 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

SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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.

1.3 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.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

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

1.5 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, 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.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice of Award 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.

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

1. 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.
2. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
4. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

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

D. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule 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.

E. 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.

F. Distribution: Distribute copies of approved schedule to Architect 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.

1.7 CPM SCHEDULE REQUIREMENTS

A. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. 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.

B. 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.

C. 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.

D. 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:

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.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

E. 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.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Submittal purpose and description.
9. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
10. Drawing number and detail references, as appropriate.
11. Indication of full or partial submittal.
12. Location(s) where product is to be installed, as appropriate.
13. Other necessary identification.
14. Remarks.
15. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Paper Submittals:

1. Provide a space approximately 3 by 4 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
2. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using AIA Document G810 transmittal form or similar format.

E. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

F. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.

2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
3. Paper: Prepare submittals in paper form, and deliver to Architect.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches , but no larger than 30 by 42 inches full-size drawing sheets used for Construction Documents.

    a. Two opaque (bond) copies of each submittal. Architect will return one copy(ies).

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

    a. Project name and submittal number.
    b. Generic description of Sample.
    c. Product name and name of manufacturer.
    d. Sample source.
    e. Number and title of applicable Specification Section.
    f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
4. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
5. Paper Transmittal: Include paper transmittal including complete submittal information indicated.

6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.

B. Informational Submittals: Architect will review each submittal and will not return it,or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will discard submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. 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.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of [five] <Insert number> 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: 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 trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

E. 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.

F. 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.

G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

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

I. 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.

J. 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 Architect.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction 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 Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, 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.

1.6 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:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

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. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

D. Reports: Prepare and submit certified written reports and documents as specified.

E. 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.

1.7 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.
7. Identification of product and Specification Section.
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.

1.8 QUALITY ASSURANCE

A. General: 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. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. 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.

G. Testing 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 E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. 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.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.9 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. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. 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.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. 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 Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect 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. Associated Contractor 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.

F. 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.

1.10 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 Architect 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 Architect 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.
6. Retesting and reinspecting corrected work.

B. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested.

1. Complete Contractor's Statement of Responsibility on provided form. Submit completed form to Architect.
2. Compile Fabricator's Certificates of Compliance on provided form. Submit completed forms to Architect.

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 Architect.
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 Architect'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."

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.

3.3 IBC 2021 REQUIRED SPECIAL INSPECTIONS

A. Schedule of Special Inspections Services: following this Section enumerates required special inspections.

B. Contractors Statement of Responsibility: form provided shall be completed and submitted to Architect by each contractor as required.

END OF SECTION 014000

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

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

1.3 USE CHARGES

A. General: Installation and removal of 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, Architect, testing agencies, and authorities having jurisdiction.

B. Water Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

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.

C. Accessible Temporary Egress: Comply with applicable provisions in ICC/ANSI A117.1.

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 MATERIALS

A. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

B. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum 36 by 60 inches.

2.2 TEMPORARY FACILITIES

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

B. Field Office: Of sufficient size to accommodate needs for construction activities. Projects meetings including the owner and architect and their respective personnel specified in other Division 01 Sections will be accommodated in the Activities Center. Keep office clean and orderly.

2.3 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.

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.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

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. Sanitary Facilities: Provide temporary toilets, wash 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.

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

D. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect 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. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site features to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

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

1. Identification Signs: Provide Project identification signs as required to direct construction activities, areas available to the public, and all signs required for life safety.
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.

D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

E. 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.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. 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. Furnish one set of keys to Owner.

D. 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.

E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

F. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

G. 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.

END OF SECTION 015000

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Protection of installed construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

1.5 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

3. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

F. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

I. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

END OF SECTION 017300

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 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. Final cleaning.
4. Repair of the Work.

1.3 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.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 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 testing, adjusting, and balancing records.

C. 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, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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 Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 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 according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

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, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect 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. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

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. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Include the following information at the top of each page:

    a. Project name.

b. Date.
c. Name of Architect.
d. Name of Contractor.
e. Page number.

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

a. MS Excel electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect 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. 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 paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: 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.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Clean exposed exterior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
f. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

END OF SECTION 017700

SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Final Submittal:

1) Submit record digital data files and three set(s) of record digital data file plots.
2) Plot each drawing file, whether or not changes and additional information were recorded.

B. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

    a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    b. Accurately record information in an acceptable drawing technique.
    c. Record data as soon as possible after obtaining it.
    d. Record and check the markup before enclosing concealed installations.
    e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

    a. Dimensional changes to Drawings.
    b. Revisions to details shown on Drawings.
    c. Depths of foundations.
    d. Changes made by Change Order or Construction Change Directive.
    e. Changes made following Architect's written orders.
    f. Details not on the original Contract Drawings.
    g. Field records for variable and concealed conditions.
    h. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.
4. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

    a. See Section 013100 "Project Management and Coordination" for requirements related to use of Architect's digital data files.
    b. Architect will provide data file layer information. Record markups in separate layers.

C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file[with comment function enabled].
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

4. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

1.5 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.6 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.7 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017839

SECTION 024113 - SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the demolition and removal of site features as indicated on the drawings, as specified herein and as otherwise required to accomplish other work associated with the contract.

B. Related Sections:

1. Division 31 Section “Earth Moving” for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.
2. Division 31 Section “Flowable Fill” for backfilling utility piping that are to be abandoned in place.

1.2 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all labor, materials, and equipment necessary to properly demolish and dispose of off-site all facilities shown to be removed on the construction plans and as specified herein including any testing, construction supervision and all other work required for satisfactory completion of site demolition operations.

B. Base bids on the following criteria:

1. Structures to be relocated will be vacated prior to the start of the work.
2. The Owner assumes no responsibility for the condition of the structures to be relocated.
3. Items of salvageable value to the Owner shall be stockpiled on site.
4. Explosives shall not be brought to the site.
5. Burning will not be allowed.
6. Contractor is responsible for permits, fees and licenses.

1.3 UNIT PRICES

A. None in this Section.

1.4 SUBMITTALS

A. None this section.

1.5 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local demolition, hauling and disposal regulations.

1.6 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience with similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Demolish structures completely, safely, and remove from the site using methods required by governing regulations. Small structures may be removed intact when acceptable to the Owner and Authorities Having Jurisdiction (AHJ).

B. Proceed with demolition in a systematic manner.

C. Demolish concrete and masonry in small sections. Break up and remove concrete slabs-on-grade unless otherwise shown to remain.

D. Demolish and remove below grade construction and concrete slabs on grade completely.

E. Provide full depth sawcuts through all pavements to be removed. Sawcuts shall be neat, straight, and vertical.

F. Demolish and remove below grade utilities completely unless indicated otherwise.

1. Utility structures indicated to be abandoned in place shall be removed to a depth of 2 feet below grade, the bottom broken, and the structure filled with controlled fill or flowable fill.
2. Utility pipes indicated to be abandoned in place shall be filled with flowable fill.
3. The volume of flowable fill required to completely fill the pipe and/or structure shall be calculated prior to placement. The volume of flowable fill discharged shall be equal to the volume required.
4. Refer to Division 31 Section “Flowable Fill”.

3.2 FILLING BASEMENTS AND VOIDS

A. Completely fill below grade areas and voids resulting from demolition or removal of structures (underground fuel storage tanks, wells, cisterns, etc.) using approved fill materials as specified in Division 31 Section “Earth Moving”.

B. Ensure that areas to be filled are free of standing water, frost, frozen material, trash, and debris prior to fill placement.

C. Place and compact fill materials as specified by Division 31 Section “Earth Moving”.

D. Grade surface to match adjacent grades and to provide flow to surface drainage structures after fill placements and compaction.

3.3 DISPOSAL OF DEMOLISHED MATERIALS

A. Dispose of demolished materials in accordance with current Federal, State, and local regulations. All cost in connection with disposing of demolished materials will be the responsibility of the Contractor.

B. Do not burn any material, debris, or trash on site.

3.4 PROTECTIONS

A. Ensure safe passage of persons around all areas.

B. Conduct operations to prevent damage to adjacent buildings, structures, or other facilities, trees, vegetation, or injury to persons, etc.

C. Promptly repair damage caused to adjacent facilities by demolition operations at no additional cost to the Owner.

D. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition and/or relocation operations.

E. Prevent interruption of existing utilities serving occupied or used facilities, except when authorized in writing by AHJ.

F. Provide temporary services during interruptions to existing utilities as acceptable to Owner and AHJ.

G. Before initiating demolition, make arrangements for relocating, disconnecting, rerouting, abandoning, or similar action as may be required relative to utilities and other underground piping, to permit work to proceed without delay. Arrangements shall be made in accordance with the regulations of authorities of utilities concerned, including, but not limited to overhead and underground power and telephone lines and equipment, gas piping, storm sewers, sanitary sewers, or water piping. The Contractor shall not use water when it may create hazardous or objectionable conditions, such as ice, flooding, and/or pollution.

H. e hazardous or objectionable conditions, such as ice, flooding, and/or pollution.

I. ectionable conditions, such as ice, flooding, and/or pollution.

J. Use water sprinkling and other suitable methods to limit dust and dirt rising and scattering into the air to lowest practical level.

K. Comply with governing regulations pertaining to environmental protection.

3.5 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.6 ACCEPTANCE

A. Final acceptance will be based on a satisfactory demolition as approved by the Owner and/or Engineer.

B. Demolition work shall be re-worked to the satisfaction of the Owner and/or Engineer until specified requirements are met. All additional work which is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 024113

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

    a. Contractor's superintendent.
    b. Independent testing agency responsible for concrete design mixtures.
    c. Ready-mix concrete manufacturer.
    d. Concrete Subcontractor.
    e. Special concrete finish Subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, concrete repair procedures, and concrete protection.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.

2. Admixtures.

3. Form materials and form-release agents.

4. Steel reinforcement and accessories.

5. Fiber reinforcement.

6. Curing compounds.

7. Bonding agents.

8. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Aggregates.

D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

E. Field quality-control reports.

F. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

B. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1.10 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.

2. ACI 117.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

   a. High-density overlay, Class 1 or better.
   b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
   c. Structural 1, B-B or better; mill oiled and edge sealed.
   d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

3. Overlaid Finnish birch plywood.

B. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

C. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.

2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I/II, gray.

2. Fly Ash: ASTM C 618, Class F or C.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: ¾" elsewhere nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. Retarding Admixture: ASTM C 494/C 494M, Type B.

3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. Water: ASTM C 94/C 94M and potable.

2.6 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating; to not interfere with flooring adhesion.

1. Euclid Kurez DR VOX or Kurez RC.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.8 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.9 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Combined Fly Ash and Pozzolan: 20 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.

2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, and concrete required to be watertight, and concrete with a w/c ratio below 0.50.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Slabs-on-Grade, steps and walls: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.

2. Maximum W/C Ratio: 0.52.

3. Minimum Cementitious Materials Content: 520 lb/cu. yd..

4. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

5. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.

2.11 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Not allowed.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.

2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.5 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints in slabs on grade: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Provide PNA diamond dowels at 18 inch spacing. Thickness of dowels to be ¼”.

C. Construction Joints in Elevated Slabs: Detail to be as indicated. Location to be determined by contractor after approval by engineer.

D. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.

2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

2. Maintain reinforcement in position on chairs during concrete placement.

3. Screed slab surfaces with a straightedge and strike off to correct elevations.

4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process. Apply finish to exposed slab edges, and retaining walls.

B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue

final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish.

C. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch.

3.9 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.
b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

    a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

    1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

    2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.

    3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.

2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.

4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.12 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

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

END OF SECTION

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Steel railings.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Manufacturer's product lines of mechanically connected railings.
2. Fasteners.
3. Post-installed anchors.
4. Metal finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For delegated-design professional engineer.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

C. Product Test Reports: For tests on railings performed by a qualified testing agency, in accordance with ASTM E894 and ASTM E935.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect mechanical finishes on exposed surfaces of railings from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.

B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

2.3 STEEL RAILINGS

A. Pipe: ASTM A53/A53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.

1. Provide galvanized finish for exterior installations and where indicated.

B. Plates, Shapes, and Bars: ASTM A36/A36M.

2.4 FASTENERS

A. Fastener Materials:
1. Hot-Dip Galvanized Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/F2329M for zinc coating.
2. Finish exposed fasteners to match appearance, including color and texture, of railings.

B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for metal alloy welded.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint, complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout, complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations.

1. Clearly mark units for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately.

1. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated.
2. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that are exposed to weather in a manner that excludes water.

1. Provide weep holes where water may accumulate.
2. Locate weep holes in inconspicuous locations.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Finish #1 welds; ornamental quality with no evidence of a welded joint

I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.

1. Fabricate splice joints for field connection, using an epoxy structural adhesive, if this is manufacturer's standard splicing method.

J. Form changes in direction as follows:

1. As detailed.
2. By bending or by inserting prefabricated elbow fittings.
3. By bending to smallest radius that will not result in distortion of railing member.

K. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

L. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.

M. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

N. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

O. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work.

1. Fabricate anchorage devices capable of withstanding loads imposed by railings.
2. Coordinate anchorage devices with supporting structure.

P. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.7 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior steel railings, including hardware, after fabrication.
2. Comply with ASTM A123/A123M for hot-dip galvanized railings.
3. Comply with ASTM A153/A153M for hot-dip galvanized hardware.
4. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
5. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner and as follows.

1. Comply with SSPC-SP 16.

D. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1 for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Do not apply primer to galvanized surfaces.

E. High-Performance Coating: Apply epoxy intermediate and polyurethane topcoats to prime-coated surfaces. Comply with coating manufacturer's written instructions and with requirements in SSPC-PA 1 for shop painting. Apply at spreading rates recommended by coating manufacturer.

1. Color: Sherwin Williams SW4084, Safety Yellow.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.

2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
4. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
5. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws, using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article, whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post.

3.5 REPAIR

A. Touchup Painting:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

3.6 CLEANING

A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780/A780M.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

B. Restore finishes damaged during installation and construction period, so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 055213

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Field-Adhesion Test Reports: For each sealant application tested.

E. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 790 NS Parking Structure Sealant.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. Pecora Corporation; 301 NS 311 NS 890 890FTS890NST.
d. Tremco Incorporated; Spectrem 1.

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin)Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Other nonporous joint substrates.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Control and expansion joints in brick pavers.
b. Isolation and contraction joints in cast-in-place concrete slabs.
c. Joints between plant-precast architectural concrete paving units.
d. Joints in stone paving units, including steps.
e. Tile control and expansion joints.
f. Joints between different materials listed above.
g. Other joints as indicated.

2. Silicone Joint Sealant: Single component, pourable, traffic grade, neutral curing.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the removal of trees and vegetation and the disposal of such material.

1.2 DEFINITIONS

A. Clearing: The felling, trimming, cutting and disposal of trees and other vegetation to include brush.

B. Grubbing: The removal and disposal of roots, matted roots, stumps, organic and metallic debris, and refuse to a depth not less than 18 inches.

C. Saleable Timber: Felled trees which could be used as saw logs, pulpwood, posts, poles, ties, or fuel wood.

D. Non-Saleable timber: Timber, scrub, vegetation, and other debris considered non-saleable.

E. Tree: Any living, self-supporting, woody perennial plant.

1. Diameter Breast Height (DBH): The diameter of a tree measured at breast height (4.5 feet above ground).

F. Protective Barricade: A physical structure not less than 4 feet in height, limiting access to a tree.

1.3 LUMP SUM PRICE

A. The items listed in the bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all material, equipment, labor, testing, construction supervision and all other work required for satisfactory completion of site clearing.

1.4 UNIT PRICES

A. None this Section.

1.5 SUBMITTALS

A. None this Section.

1.6 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Environmental Services (SCDES) and/or the MS4.

C. Burning shall not be allowed.

1.7 QUALITY ASSURANCE

A. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

B. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLEARING

A. Clearing shall consist of the felling and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring within the area to be cleared. Trees, stumps roots, brush, and other vegetation in areas to be cleared shall be removed completely from the site to an area designated by the Owner, except such trees and vegetation as may be indicated or directed to be left standing.

B. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1.5 inches or more in diameter. Limbs and branches to be trimmed shall be neatly cut close to the hole of the tree or main branches. Cuts more than 1.5 inches in diameter thus made shall be painted with a tree wound paint.

C. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations, by erection of timber barriers or by such other means as circumstances require. Such barriers must be placed and be approved by the Engineer before construction activities can proceed.

D. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

E. Clearing operations shall be conducted to prevent damage by falling trees to trees left standing, to existing structures and installation, and to those under construction, and so as to provide for the safety of employees and others.

3.2 GRUBBING

A. Grubbing shall consist of the removal and disposal of stumps, roots larger than 0.25 inches in diameter, and matted roots from the designated grubbing areas. This material, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be excavated and removed to a depth of not less than 18 inches below the original surface level of the ground in embankment areas and not less than 24 inches below the finished earth surface in excavated areas.

B. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground at no additional cost to the Owner.

3.3 TREE REMOVAL

A. Where indicated or directed, trees and stumps shall be removed from areas outside those areas designated for clearing and grubbing. The work shall include felling of such trees and the removal of their stumps and roots. Trees shall be disposed of as specified.

3.4 DISPOSAL

A. Disposal of trees, branches, snags, brush, stumps, etc., resulting from the clearing and grubbing shall be the responsibility of the Contractor and shall be disposed of by removal from the site.

B. Disposal by hauling, if necessary, shall be at no additional cost to the Owner.

C. All liability of any nature resulting from the disposal of the cleared and grubbed material shall become the responsibility of the Contractor.

D. Disposal by burning shall not be allowed.

E. All costs in connection with disposing of the material will be at the Contractor’s expense.

3.5 EXISTING TREE PROTECTION

A. All trees on the site will be saved except those marked specifically for removal. No trees, either those marked for removal on the site or any other tree, may be removed from the site prior to the preconstruction conference.

B. All trees not to be removed will be protected from injury to their roots and to their top to a distance 3 feet beyond the drip line and no grading, trenching, pruning, or storage of materials may go in this area.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with stripping, subgrade preparation, filling, backfilling, compaction, and disposition of surplus soil materials.

B. Related Sections:

1. Division 31 Section “Site Clearing”.

1.2 DEFINITIONS

A. Subgrade: Existing, in-situ soil or other material that is remaining after stripping or excavation. The subgrade is always existing material on which fill, or new structures are to be placed.

B. Excavation: The removal of soil or material to obtain a specified depth or elevation.

C. Borrow: Material that must be transported to the site. A material that must be developed by others and transported to the site. Not available on site.

D. Fill: Soil or material placed above the subgrade to the point of new construction such as a sub-base, base course, pavement, foundation, footing, or building component.

E. Backfill: Fill material used in refilling a cut, trench, or other excavation.

F. Lift: A layer or course of material placed on top of a previously prepared or placed material.

G. Rock: Solid, homogeneous interlocking crystalline material with firmly cemented, laminated, or foliated masses or conglomerate deposits, neither of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of backhoe mounted pneumatic hole punchers or rock breakers; also, large boulders, buried masonry, or concrete other than pavement, exceeding 25 cubic yards in volume. Removal of hard material will not be considered rock excavation because of intermittent drilling and blasting that is performed merely to increase production.

H. Topsoil: In natural or undisturbed soil formations, the fine grained, weathered material on the surface or directly below any loose or partially decomposed organic matter. Topsoil may be dark-colored, fine, silty or sandy material with a high content of well-decomposed organic matter, often containing traces of the parent rock material. The material shall be representative of productive soils in the vicinity.

I. Unsuitable Material: Existing, in situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in fill or embankment without excessive consolidation or loss of stability. Materials classified as PT, OH, or OL by ASTM D 2487 are unsuitable. Unsuitable materials also include man-made fills, refuse, frozen material, uncompacted backfills from previous construction, unsound rock, or soil lenses, or other deleterious, organic or objectionable material.

J. Granular Material: Soils classified as GW, GP, SW or SP by ASTM D 2487. Materials classified as GM and SM will be identified as granular only when fines have a plasticity index of zero.

K. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D698 for general soil types or ASTM D 4253 or ASTM D 4254 for isolated cohesionless materials, abbreviated in this specification as “___ percent maximum density.”

1.3 LUMP SUM PRICE

A. The items listed in the bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the removing and replacing of topsoil and all excavating, filling, transporting of material, compaction, shaping, finishing, dressing, disposal of surplus material, testing, staking, construction supervision and all other work required for satisfactory completion of the grading operation. The building pad shall include all areas to 10 feet outside the building wall and the area under all footings including trench walls and bottom. Also included in this price shall be that necessary to complete the grubbing and root raking operation as required by this section and elsewhere.

B. Base bids on the following criteria:

1. Surface elevations as indicated.
2. No pipes or other man-made structures other than those indicated will be encountered. The utility locations shown are based on available information and are approximate and shall be field verified prior to beginning any work.
3. Borrow material in the quantities required are not available on site and must be developed and obtained by the Contractor.

1.4 UNIT PRICES

A. None in this section.

1.5 SUBMITTALS

A. Dewatering Plan: Submit plan that indicates the method proposed for removing collected water from open trenches and diverting surface water or piped flow away from work area. Include the following:

1. Equipment and procedures for installing and operating the dewatering system indicated.
2. Basic components of the proposed dewatering system and its planned method of operation.
3. Record of performance and effectiveness of method or system in use.
4. Comply with requirements identified in the paragraph entitled “Drainage and Dewatering”.

B. Shoring and Sheeting Plan: Submit plan that describes the materials of the shoring system to be used. Include the following:

1. Provide plans, sketches, or details along with calculations by a professional engineer.
2. Indicate sequence and method of installation and removal.
3. Indicate if components will remain after filling or backfilling.

C. Certifications

1. Independent Testing Laboratory
2. Manufacturer or supplier certifications of compliance indicating conformance to this specification or the referenced standard(s) for the following:

a. Topsoil
b. Gravel
c. Sand

D. Laboratory Testing: Submit test results as identified in the paragraph titled “Laboratory Testing” for any of the following materials to be used on the project. Obtain approval before any material is delivered to the site.

1. Subgrade
2. Common fill
3. Controlled fill
4. Granular fill

E. Field Testing: Submit field test results as identified in the paragraph titled “Field Testing” for the following:

1. Subgrade
2. Excavation
3. Fill and Backfill

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.7 REGULATORY REQUIREMENTS

A. Materials and workmanship specified herein with reference to SCDOT Standard Specifications for Highway Construction shall be in accordance with the referenced article or section of the standard except that contractual and payment provisions do not apply. Where the term “State” is used, it shall mean “Owner.”

B. Comply with Federal, State, and local regulations.

C. Comply with the requirements of the land disturbance permit and stamped approved plans issued for this project by South Carolina Department of Environmental Services (SCDES) and/or the MS4.

1.8 QUALITY ASSURANCE

A. Materials: The Contractor will furnish the Engineer and Owner a description of all materials before ordering. The Engineer will review the Contractor’s submittals and provide in writing an acceptance or rejection of material.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by

someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Testing Agencies: Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test. Agencies to be used shall be submitted to the Engineer for review prior to engagement.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Provide materials free from debris, roots, wood, scrap materials, vegetable matter, refuse or frozen material. Maximum particle size permitted is 3 inches. Use excavated material from the site for the work indicated when material falls within the requirements specified herein. When materials available on site do not meet the quantity required nor the requirements specified herein, the Contractor shall obtain borrowed materials from off-site.

1. Common Fill: Provide a soil material from the site or borrow that can be readily compacted to the specified densities. Materials shall be unclassified. Soft, spongy, highly plastic, or otherwise unsuitable material is prohibited. Material shall be unclassified but shall contain sufficient fines to ensure proper compaction.
2. Controlled Fill: Provide materials classified as GW, GP, GM, SW, SP, SM, SC, ML and CL, by ASTM D 2487 where indicated. The liquid limit of such material shall not exceed 50 percent when tested in accordance with ASTM D 4318. The plasticity index shall not be greater than 25 percent when tested in accordance with ASTM D 4318.
3. Controlled fill should exhibit a maximum dry density of at least 90 pcf as determined by a standard proctor compaction test (ASTM D-698).
4. Granular Fill: A dense, well graded aggregate mixture of sand, gravel or crushed stone mixed individually, in combination with each other, or with suitable binder soil. Granular fill may also consist of poorly graded sands or gravels.
5. Gravel: Clean, coarsely graded natural gravel, crushed stone or a combination thereof classified as GW or GP in accordance with ASTM D2487 as indicated. The maximum particle size shall not exceed 3 inches.
6. Sand: Clean, coarse-grained sand classified as SW or SP by ASTM D2487 as indicated.
7. Topsoil: Salvaged topsoil from stockpile created during stripping operations. Add necessary soil modifiers to bring material within the ranges specified in Table 1. Furnish additional topsoil meeting the requirements in Table 1 if stockpiled material is insufficient to complete the work indicated.
8. Soil materials shall be free of subsoil, stumps, roots larger than 0.75 inch in diameter (with maximum 3% retained on the 0.25-inch sieve, brush, weeds, toxic substances, and other material or substance detrimental to plant growth.

TABLE 1

DOA SSIR Soil Survey Investigation Report No. 1, Laboratory Test for	Acceptable Limits
Sand Content	20 - 45 percent by weight
Silty Content	25 - 50 percent by weight
Clay Content	10 - 30 percent by weight
Organic Material (Walkley-Block)	5 percent
Ph	5.0 to 7.6
Soluble Salts	600 ppm maximum
Absorption Rate	0.5 inch per hour minimum

PART 3 - EXECUTION

3.1 STRIPPING

A. Perform clearing and grubbing operations as specified in Division 31 Section “Site Clearing”.

B. Strip topsoil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil may be used for common fill provided that those requirements are met. Locate topsoil so that material can be used readily for the finished grading. Protect and store in segregated piles until needed.

3.2 EXCAVATIONS

A. Excavate to contours and dimensions indicated. Keep excavations free from water while construction is in progress. Notify the Engineer immediately in writing if it becomes necessary to remove rock, hard material, or other material defined as unsuitable to a depth greater than indicated. Refill excavations cut below the depths indicated with controlled fill and compact as specified herein. Excavate soil disturbed or weakened by construction operations or soils softened from exposure to weather. Refill with controlled fill or concrete and compact as specified herein.

B. Excavations for Structures and Spread Footings

1. Excavate to depth indicated. If excavation is deeper than indicated, then fill with concrete when the foundations or footings are placed or backfill with controlled fill material prior to placement of footings.

C. Pile Supported Foundations

1. Excavate to elevation of bottom of pile cap. Backfill and compact over excavations and changes in grade due to pile driving operations in accordance with the requirements for filling and backfilling for structures. Place and compact backfill adjacent to pile caps in a manner that prevents displacement of the pile cap.

D. Disposal of Excavated Material

1. Surplus or other soil material not required or suitable for filling, backfilling, or embankment shall be removed from the property. Comply with all Federal, State, and local laws regarding the transportation and disposal of such material.
2. Dispose of excavated material in such a manner that it will not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of facilities, or be detrimental to any property or work.

3.3 PREPARATION OF SUBGRADE

A. Subgrade Proof Rolling

1. Proof rolling shall be done in the presence of the Engineer. Notify the Engineer 72 hours prior to proof rolling.
2. After removal of topsoil or other overburden, proof roll the existing subgrade with six passes of a minimum 15 ton pneumatic-tired roller. Operate the roller in a systematic manner to assure the number of passes over all areas, and at speeds between 2.5 and 3.5 miles per hour.
3. When proof rolling under structures, one-half of the passes made with the roller shall be in a direction perpendicular to the other passes.
4. Rutting or pumping shall indicate unsuitable material and that material shall be undercut as directed by the Engineer, to a depth of 24 inches, and replaced with the appropriate fill

material. Unsuitable material removal shall be done in accordance with the paragraph titled "Excavations."

5. Perform proof rolling only when weather conditions permit. Do not proof roll wet or saturated subgrades. Materials degraded by proof rolling a wet or saturated subgrade shall be replaced by the Contractor as directed by the Engineer at no cost to the Owner.

B. Preparation of Subgrade

1. Scarify the underlying subgrade surface to a depth of 6 inches before the fill is started. Step, bench, or break up sloped surfaces steeper than one vertical to 4 horizontal so that the fill material will bond with or be securely keyed to the existing material. Scarify existing surface to a minimum depth of 6 inches if subgrade density is less than the degree of compaction specified and recompact.
2. When the subgrade is part fill and part excavation or natural ground, scarify the excavated or natural ground portion to a depth of 12 inches and recompact as specified for the adjacent or overlying fill. Compact with equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used.

C. Compaction of Subgrade

1. The subgrades shall be compacted to the following maximum densities:

Compaction of Subgrade Location	Percent Maximum Dry Density
Under sidewalks and grassed areas	95
Under building slabs, foundations, footings, pavements, and base courses (Greater than 12 inches below bottom of structure or pavement)	95
Under building slabs, foundations, footings, pavements, and base courses (Less than 12 inches below the bottom of structure or pavement)	100

2. Protect subgrade from excessive wheel loading during construction, including concrete trucks and dump trucks.
3. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of a material equal to or better than best subgrade material on site.
4. Surface of subgrade after compaction shall be hard, uniform, smooth, stable, and true to grade and cross section. Maintain subgrade for area to be paved and building pad subgrade, whether previously graded by others and accepted by Contractor or constructed by Contractor. Make adjustments that may be required in accordance with the Specifications at no additional expense to the Owner.

D. Tolerances

1. Grade to finished grades indicated within 0.10 foot. Grade area to drain water away from structures. Existing grades which are to remain but are disturbed by the Contractor's operations shall be restored to original condition.
2. Finish surface of subgrade to the elevation and cross section indicated. Finished surface shall be smooth and of uniform texture. Lightly scarify or blade the finished surface to bring the finished surface to within 0.10 foot of the indicated grade and to eliminate imprints made by compaction and shaping equipment. Surface shall show no deviations exceeding ½ inch when tested with a 10-foot straightedge.
3. Finished subgrade shall be verified to ensure proper elevation for construction above subgrade. Grading of building and pavement areas shall be checked by string line from grade stakes (blue tops) set at not more than 50' centers. Contractor is to provide engineering and field staking necessary for verification of lines, grades, and elevations.

3.4 FILL AND BACKFILL

A. Place required fill and backfill material adjacent to structures and compact in a manner that prevents wedging action or eccentric loading upon or against the structures.

B. Step or serrate slopes bounding or within areas to be filled or backfilled to prevent sliding of the fill.

C. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction and slopes with the equipment used. Do not place material on surfaces that are muddy, frozen, or contain frost.

D. Do not use equipment for filling or backfilling operations or for the formation of embankments against structures that will overload the structure. Filling or backfilling against structures will be done only after the structure has attained sufficient strength to withstand the loads anticipated during and after backfilling operations.

E. Fill and backfill operations shall be performed with the following materials:

1. Common Fill

a. Construct fill backfill and embankment at the locations and lines and grades indicated. Use only approved materials in constructing fill on the prepared subgrade. Place satisfactory material in horizontal lifts not exceeding 8 inches in loose depth. Do not place material on surfaces that are muddy, frozen, or contain frost. Compact with equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide moisture content that will readily facilitate obtaining the specified compaction and slopes with the equipment used. Compact each lift as specified before placing the overlaying lift.

2. Controlled Fill

a. Place controlled fill under footings, concrete slabs not pile supported, structures, pavements and where indicated in maximum loose lifts of 8 inches. Do not place material on surfaces that are muddy, frozen, or contain frost. Compact with equipment well suited to the soil being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction and slopes with the equipment used. Compact each lift as specified herein before placing the overlaying lift. Compaction shall be accomplished continuously over the entire area. Sufficient passes shall be made to ensure that specified density is obtained.

3. Granular Fill, Gravel, and Sand

a. Granular fill, gravel and sand shall be placed where indicated. Do not dump material, but place in maximum loose 12-inch lifts and compact as indicated.

F. Compaction of Fill and Backfill

1. Fill and backfill shall be compacted to the following maximum densities:

Compaction of Fill / Backfill Location	**Percent Maximum Dry Density**
Under sidewalks and grassed areas	**95**
Under building slabs, foundations, footings, pavements, and base courses (Greater than 12 inches below bottom of structure or pavement)	95
Under building slabs, foundations, footings, pavements, and base courses (Less than 12 inches below the bottom of structure or pavement)	100

2. Fill shall be placed at a moisture content within 2% of its optimum moisture content.

3. Protect compacted fill from excessive wheel loading during construction, including concrete trucks and dump trucks. Remove areas of compacted fill found to have insufficient compaction density to depth necessary and replace in a manner that will comply with compaction requirements by use of material meeting the specifications. Surface of compacted fill after compaction shall be hard, uniform, smooth, stable, and true to grade and cross section. Maintain compacted fill for area to be paved and building pad subgrade, whether previously graded by others and accepted by Contractor or constructed by Contractor. Make adjustments that may be required in accordance with the Specifications at no additional expense to the Owner.

G. Tolerances

1. Grade to finished grades indicated within 0.10 foot. Grade area to drain water away from structures. Existing grades which are to remain but are disturbed by the Contractor's operations shall be restored to original condition.
2. Finish surface of fill or backfill to the elevation and cross section indicated. Finished surface shall be smooth and of uniform texture. Lightly scarify or blade the finished surface to bring the finished surface to within 0.10 foot of the indicated grade and to eliminate imprints made by compaction and shaping equipment. Surface shall show no deviations in excess of ½ inch when tested with a 10-foot straightedge.

3.5 TOPSOIL

A. Clear areas to receive topsoil for the finished surface of materials that would interfere with planting and maintenance operations. Scarify subgrade to a depth of 2 inches. Do not place topsoil when the subgrade or fill is frozen, extremely wet, or dry, or in other conditions detrimental to seeding, planting, or grading. Spread topsoil to a uniform depth of 4 inches over the designated areas.

3.6 PROTECTION

A. Shoring and Sheeting

1. The Contractor is responsible for the design of all shoring and sheeting systems. Provide shoring, bracing, or sheeting where required. In addition to the requirements of Section 25 A and B of COE EM-385-1-1, and other requirements of this contract meet the following:

a. Prevent the undermining of pavements, foundations, and slabs.
b. Slope banks where space permits.
c. Where shoring and sheeting materials remain in place in completed work to prevent settlements or damage to adjacent structures as directed, backfill the excavation to 3 feet below the finished grade and remove the remaining portion of the shoring before completing the backfill.

B. Drainage and Dewatering

1. Plan for and provide structures, equipment and construction for the collection and disposal of surface and subsurface water encountered during construction.

a. Drainage

1) Dispose of surface water which may accumulate in open excavations, unfinished fills, or other low areas. Remove water by trenching where

approved, pumping, or other methods to prevent softening of exposed surfaces.

2) Surface dewatering plan shall include rerouting of any storm water runoff or natural drainage if necessary.

3) Collect and dispose of surface and subsurface water encountered in the course of construction.

b. Dewatering

1) Groundwater flowing toward or into excavations shall be controlled to prevent sloughing or excavation slopes and walls, boils, uplift, and heave in the excavation and to eliminate interference with orderly progress of construction.

2) French drains, sumps, ditches, or trenches will not be permitted within three feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made.

3) Control measures shall be taken by the time the excavation reaches the water level to maintain the integrity of the in-situ material. While the excavation is open, the water level shall be maintained continuously, at least one foot below the working level.

4) Operate the dewatering system continuously, 24 hours per day, 7 days per week until construction work below existing water levels is complete. Have a back-up pump and system available for immediate use.

C. Erosion Control

1. Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the contract drawings and as required to prevent sedimentation of downstream features.

D. Existing Utilities

1. All known utility facilities are shown schematically on the plans and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on plans will not relieve the Contractor of his responsibility under this requirement. “Existing Utilities Facilities” means any utility that exists on the project in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are not shown on the plans.
2. The Contractor shall contact all utility companies prior to beginning work and request accurate field location of their respective utility lines.
3. Movement of construction machinery and equipment over pipes during construction shall be at the Contractor’s risk. Repair or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

E. Structures and Surfaces

1. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.
2. Any repair or re-establishment of final grades shall be made prior to final acceptance.

3.7 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.8 TESTING

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections for earthwork activities.

1. The Engineer shall approve test locations.

B. Notify the Testing Laboratory, Engineer, and Owner a minimum of 72 hours prior to all tests.

C. Laboratory Testing

1. General

a. Independent Testing Laboratory shall operate in accordance with ASTM E329 (latest edition) and shall be submitted to the Engineer for approval.

2. Criteria

a. Maximum Density and Optimum Moisture Content: ASTM D698 for general soil types and ASTM D4253 or ASTM D4254 for isolated cohesionless materials.
b. Mechanical Analysis: ASTM D2487.
c. Plasticity Index: ASTM D4318.

3. Frequency

a. Native soil subgrade: One maximum density, optimum moisture content, mechanical analysis and plasticity index test for each material encountered that will serve as subgrade.
b. Fill and Backfill: One maximum density, optimum moisture content, mechanical analysis and plasticity index for each source and type of material to be used.

D. Field Testing

1. Density tests for in-place materials shall be performed in accordance with one of the following:

a. Sand Cone Method: ASTM D 1556
b. Balloon Method: ASTM D 2167
c. Nuclear Method: ASTM D 6938

2. Frequency of Field Testing

a. Subgrade

1) One test per 2,500 SF within building footprint; minimum of 3 tests.
2) One test per 5,000 SF of pavement; minimum of 3 tests.
3) One test per 250 LF of footing; minimum of 1 test on each face of building.
4) One test per 500 LF of utility trench; minimum of 1 test per run between utility structures.
5) One test per utility structure.

b. Fill and Backfill

1) One test per 2,500 SF per lift within building footprint; minimum of 4 tests per lift.
2) One test per 5,000 SF per lift of pavement; minimum of 3 tests per lift.
3) One test per 250 LF per lift of footing; minimum of 1 test on each face of building.
4) One test per 500 LF per lift of utility trench; minimum of 1 test per lift per run between utility structures.
5) One test per utility structure per lift.

E. Test Reports

1. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.
2. Test reports prepared by the Independent Testing Laboratory shall prepare indicate test location, elevation data, and test results.
3. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer, and Contractor.
4. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

3.9 ACCEPTANCE

A. If a tested material does not meet or exceed the specified requirements, the Contractor shall perform additional testing as directed by the Owner and/or Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Owner and/or Engineer until specified requirements are met.

B. All additional testing and work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 312000

SECTION 312523 - EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Installation of temporary and permanent erosion and sedimentation control systems.
2. Stormwater Pollution Prevention Plan (SWPPP) prepared by ADC Engineering, Inc, dated May 15, 2025, is appended to this Document.

B. Related Sections:

1. Division 33 Section “Site Storm Drainage Utilities” for closeout requirements.

1.2 REFERENCES

A. South Carolina NPDES General Permit for Stormwater Discharges from Construction Activities (SCR100000).

1.3 DEFINITIONS

A. *Comprehensive* Stormwater Pollution Prevention Plan (C-SWPPP) - A Stormwater Pollution Prevention Plan (SWPPP) which is prepared to obtain coverage under the NPDES Construction General Permit (CGP). The C-SWPPP must be submitted with the Notice of Intent (NOI) application and must include an Engineering Report (project design calculations). This document must be submitted and approved by SCDES, regulated MS4 entity, or an approved entity with Permitting Authority prior to obtaining coverage under this permit.

B. *On-Site* Stormwater Pollution Prevention Plan (OS-SWPPP) – The OS-SWPPP is a condensed version of the C-SWPPP and is stored on site. The OS-SWPPP does not include the Engineering Report (project design calculations). This document does not require submission or approval by the SCDES, regulated MS4 entity, or an approved entity with Permitting Authority prior to obtaining coverage under this permit.

C. Best Management Practices (BMPs) - Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to Surface Waters of the State. BMPs also include treatment requirements, operating procedures, and practices to control Site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. To effectively reduce erosion and sedimentation impacts, Best Management Practices (BMPs) must be designed, installed, and maintained during land disturbing activities.

1.4 COMPREHENSIVE SWPPP (C-SWPPP)

A. The project specific C-SWPPP is hereby incorporated as part of this specification and attached to this specification.

1.5 SUBMITTALS

A. Product Data

1. Certifications: All supplied BMPs.

B. Quality Assurance / Quality Control Submittals

1. Design Data
2. Field Test Reports
3. Certificates
4. Manufacturer's Instructions / Field Reports
5. Qualification Statements

C. Closeout Submittals

1. Stormwater As-Builts

1.6 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.
2. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

B. Regulatory Requirements

1. Comply with Federal, State, and local regulations.
2. Comply with the requirements of the stormwater / land disturbance permit and approved plans issued by South Carolina Department of Environmental Services (SCDES) – Bureau of Water (BOW).

C. Certifications

1. Provide product certifications for all manufactured BMPs.

1.7 PRE-CONSTRUCTION MEETING

A. Prior to performing construction activities at the site, all contractors who will engage in land disturbing activities must attend and document attendance at a pre-construction meeting.

B. The contractor shall invite the Owner, Engineer, and agencies as indicated in the C-SWPPP to the pre-construction meeting, a minimum of 7 days prior to conducting the meeting.

C. Approved / stamped plans issued from SCDES shall be made available to the Contractor at the SWPPP Pre-Construction Meeting.

D. The Contractor will be provided a copy of the OS-SWPPP at the SWPPP Pre-Construction Meeting or shortly thereafter.

1.8 DELIVERY, STORAGE, AND HANDLING

A. During all periods of shipment and storage, the filter fabric shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees F., mud, dirt, dust, and debris. The fabric shall be maintained, wrapped in a heavy-duty protective covering.

B. Delivery

1. Seed: Protect from drying out and from contamination during delivery, on-site storage, and handling.
2. Fertilizer Delivery: Deliver to site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer may be furnished in bulk with certificate indicating the above information.

C. Storage: Store Seed, Fertilizer & Mulch in cool, dry locations away from contaminants.

D. Handling: Do not drop or dump materials from vehicles.

1.9 MAINTENANCE

A. Maintain BMPs in accordance with OS-SWPPP and drawings.

PART 2 - PRODUCTS

2.1 SUMMARY

A. All products shall be provided and installed in accordance with the OS-SWPPP. All materials, construction methods, testing, and approvals shall be in accordance with this document.

2.2 MATERIALS

A. All erosion control products, sediment control devices and materials for non-stormwater BMPs as specified herein and on the Construction Drawings.

PART 3 - EXECUTION

3.1 SUMMARY

A. All work shall be performed in accordance with the OS-SWPPP. All materials, construction methods, testing, and approvals shall be in accordance with this document.

3.2 PREPARATION

A. Communicate SWPPP requirements, emphasizing construction sequence requirements, to Site Contractor, Erosion and Sediment Control Best Management Practice (BMP) installers, and all subcontractors working on-site.

B. Install initial BMPs according to the sequence of construction in the SWPPP. Disturb only those areas absolutely necessary to install the initial BMPs. No other earth disturbance is permitted until after the Stormwater Pre-construction meeting.

C. Inspect and certify the initial BMP installation with the AHJ and Engineer.

3.3 EROSION AND SEDIMENTATION CONTROL IMPLEMENTATION

A. Place erosion and sediment control systems in accordance with the drawings and SWPPP or as may be dictated by site conditions to maintain the intent of the specifications and permits.

B. The SWPPP and Construction Drawings shall be corrected, modified, or updated as site conditions change. Contractor must obtain approval from the Engineer prior to any modification or substitution of specified Best Management Practices. All BMP changes (and references to approvals) shall be noted in the SWPPP and posted on the drawings. Construction Drawings should be updated daily to track progress when any of the following activities occur: BMP installation or modification, major construction (paving, storm sewer installation, footing installation, etc.), clearing, grubbing or grading, or temporary or permanent stabilization.

C. Owner has authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations and to direct Contractor to provide immediate permanent or temporary pollution control measures.

D. Maintain erosion and sedimentation control systems as dictated by site conditions, indicated in the construction documents, or as directed by governing authorities or Owner to control sediment until final stabilization. Contractor shall respond to maintenance or additional work ordered by Owner or governing authorities immediately and in compliance with requirements of the applicable permit, and in no case may the initiation of a response exceed 24 hours. If governing authority requests changes to site BMPs or the SWPPP, ensure that changes are properly documented on the SWPPP Construction Drawings and notify the Engineer as to the request to determine if official SWPPP amendments are required.

E. If, during the course of construction at a Site, the temporary removal or alteration of a BMP is necessary to accomplish the construction or to protect health and safety, the Project Superintendent shall note such removal or alteration on the Weekly Inspection Report Form, including specific information regarding the changes made and the day and time such changes were made. During the period the specified BMP is removed due to construction, the contractor must implement appropriate alternate BMPs at the end of each workday to serve a similar function to those BMPs temporarily removed. Contractor shall restore the original specified BMP as soon as practicable but in no case later than 24 hours after the completion of the activity that required the change. Contractor shall take all reasonable measures to prevent discharges from the Site to the waters of the United States during the time that the BMP has been altered or removed, including, but not necessarily limited to timing the removal or alteration of the BMP so that it occurs when precipitation is not forecasted and installing new or alternate BMPs outside the affected area.

F. Contractor shall incorporate permanent erosion control features, paving, and vegetation establishment into project at earliest practicable time within approved sequence of construction to minimize need for temporary controls.

3.4 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

D. Inspections shall be in accordance with the OS-SWPPP and drawings.

END OF SECTION 312523

MCCONNELLS WASTE COLLECTION CENTER

McConnells, SC
York County

Comprehensive SWPPP

May 15th, 2025

Project Manager: Larry Barthelemy, P.E.
larryb@adcengineering.com
ADC Project No. 24488

25 WOODS LAKE ROAD
SUITE 210
GREENVILLE, SC 29607
864-751-9121
WWW.ADCENGINEERING.COM

ADC ENGINEERING

Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) For Construction Activities:

Project/Site Name:

McConnells Waste Collection Center

Project Address/Location:
100 Cemetery Street
McConnells, SC 29726
York County

Primary Permittee:

York County Government

Permittee/Owner Contact:
6 S Congress Street
York, SC 29745
803-628-3200
Eric Rekitt
eric.rekitt@yorkcountygov.com

SWPPP Preparer:

ADC Engineering, Inc.
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Greenville, South Carolina 29607
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Day-to-Day Operator:

C-SWPPP Preparation Date:

May 15th, 2025

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C-SWPPP is acronym for Comprehensive Storm Water Pollution Prevention Plan
****OS-SWPPP is acronym for On-Site Storm Water Pollution Prevention Plan***

CERTIFICATION STATEMENT:

I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of *Title 48, Chapter 14 of the Code of Laws of SC, 1976* as amended, pursuant to *Regulation 72-300* et seq. (if applicable), and in accordance with the terms and conditions of *SCR100000*.

(Signature and Seal)

Name: Larry Barthelemy, P.E.

Title: Senior Vice President

Date: May 15, 2025

SECTION 1 – PROJECT OVERVIEW

1.1. Narrative

A. Construction Activities and BMP Summary

This construction site includes the clearing and grubbing of existing land, grading of the existing contours, and the construction of new parking surface, a shed, and a new dumpster area.

Perimeter Control BMPs of an improved drive and dumpster pads will be installed prior to the initiation of the clearing/grubbing and grading of the site, and the silt fence will be the primary sediment control BMP used during the lifespan of all construction activities, until final stabilization is reached.

The construction activities at this site will be implemented in 1 distinct Erosion Prevention and Sediment Control Phase. This phase includes the initial installation of perimeter controls, sediment control BMPs, the construction entrance, grading, storm drainage installation, paving on site, and final stabilization of the site.

B. Pre-Development Conditions

This property is currently operating as a waste facility comprised of pavement, buildings, and vegetated areas.

C. Post-Development Conditions

The site improvements will include new pavement, improved storm drainage, and an improved retaining wall. The developed conditions will mimic existing conditions and sheet flow to the northeast of the site.

PRE-DEVELOPMENT CONDITIONS:	
	PRE BASIN
ACERAGE (AC)	83.40
IMPERVIOUS AREA (AC)	0.74
PERVIOUS AREA (AC)	82.66
STORMWATER RUNOFF	
POI	PRE BASIN
2-YR (CFS)	117.8
10-YR (CFS)	274.6
25-YR (CFS)	377.1
100-YR (CFS)	551.7
WEIGHTED CN	66
TC (MIN.)	6.0
SHEET FLOW	
N-VALUE	0.011
LENGTH (FT)	100
SLOPE %	5.0
SHALLOW FLOW	
LENGTH (FT)	250
SLOPE %	6.0
PAVED/UNPAVED	PAVED

POST-DEVELOPMENT CONDITIONS:	
	POST BASIN
ACERAGE (AC)	83.40
IMPERVIOUS AREA (AC)	0.77
PERVIOUS AREA (AC)	82.63
STORMWATER RUNOFF	
POI	POST BASIN
2-YR (CFS)	117.8
10-YR (CFS)	274.6
25-YR (CFS)	377.1
100-YR (CFS)	551.7
WEIGHTED CN	66
TC (MIN.)	6.0
SHEET FLOW	
N-VALUE	0.011
LENGTH (FT)	100
SLOPE %	5.0
SHALLOW FLOW	
LENGTH (FT)	250
SLOPE %	6.0
PAVED/UNPAVED	PAVED

Water Quantity Control

As seen above, the proposed stormwater management area will attenuate the stormwater runoff to pre-development runoff rates for the 2-, 10-, 25-, and 100-year storm events.

Water Quality Control

Stormwater runoff will sheet flow over forested areas, which will filter out contaminants prior to discharging offsite. The proposed project will have no significant adverse impact on the receiving natural waterway or downstream properties.

D. Flooding Issues

FEMA Panel 45091C0430E dated 09/26/2008 shows the site lies in Flood Zone 'X' outside of the 500 year flood zone.

1.2. Stormwater Management and Sediment Control

A. Erosion Prevention BMPs

The purpose of soil stabilization is to prevent soil from eroding and leaving the site. In the natural condition, soil is stabilized by native vegetation. The primary technique to be used at this project for stabilizing site soils will be to provide a protective cover of grass, pavement, or building structure.

Temporary Seeding or Stabilization – All denuded areas that will be inactive for 14 days or more, must be stabilized temporarily with the use of fast-germinating annual grass/grain varieties appropriate for site soil and climate conditions, straw/hay mulch, wood cellulose fibers, tackifiers, netting and/or blankets. Stockpiles and diversion ditches/berms must be stabilized to prevent erosion and dust issues.

Permanent Seeding, Sod or Mulching – All areas at final grade must be seeded, mulched or covered with sod within 14 days after completion of work in that area. Seed immediately after final grade is achieved and soils are prepared to take advantage of soil moisture and seed germination. At the completion of ground-disturbing activities the entire site must have permanent vegetative cover, meeting vegetative density requirements, or mulch per landscape plan, in all areas not covered by hardscape (pavement, buildings, etc.).

Energy Dissipaters – Energy Dissipaters reduce runoff velocities from concentrated conveyance systems (pipes and swales), enhance the potential for infiltration and protect the soil from the erosive force of concentrated flows. Energy dissipaters include riprap aprons, level spreaders and soil reinforcement (such as erosion control blankets and turf reinforcement mats).

B. Sediment Control BMPs

Silt Fence – Silt fence is a synthetic permeable woven or non-woven geotextile fabric incorporating metal support stakes at intervals sufficient to support the fence (5-feet maximum distance between posts), water, and sediment retained by the fence. The fence is designed to retain sediment-laden stormwater and allow settlement of suspended soils before the stormwater flows through the fabric and discharges from the site. Silt fence shall be located on the contour to capture overland, low-velocity sheet flows and is typically installed with a wire fence backing for additional support.

Install silt fence at a fairly level grade along the contour with the ends curved uphill to provide sufficient upstream storage volume for the anticipated runoff. Drainage areas shall not exceed ½ acre per 100 feet of wire-reinforced silt fence for slopes less than 2 percent.

Storm Sewer Inlet Protection – Drainage inlets are protected from the intrusion of sediment through a variety of measures as shown on the details included in the Construction drawings. The primary mechanism is to place controls in the path of flow sufficient to slow the sediment-laden water to allow

settlement of suspended soils before discharging into the storm sewer. It is possible that as construction progresses from storm sewer installation through to paving that the inlet protection devices will change.

C. Structural Control BMPs and Floodplain Placement

This site-specific SWPPP utilizes the following structural control BMPs: **permanent vegetated swales, and storm sewer systems**. These practices have been designed to either divert flows from exposed soils, to retain/detain flows, and to otherwise limit the runoff and the discharge of pollutants from disturbed areas of the construction site.

Throughout the lifespan of the construction project these BMPs will be installed and maintained, as required by the SWPPP and the construction site plans, until final stabilization has been achieved for the areas draining to each BMP. Upon final stabilization, each structural control BMP must be modified to the post-construction conditions shown within the approved construction site plans or removed, if the structural BMP was a temporary structure.

Any Structural Control BMPs that are being proposed within the 100-yr floodplains will require approval from the local regulating agency, since SC DES does not have the authority to regulate within the associated flood plains. Approvals from the local agency will be located in **Appendix C, Additional Approvals/Certifications** of this SWPPP. If the required approval is not located in this SWPPP, please contact the Primary Permittee listed on the title sheet of this SWPPP before performing work within the floodplain.

D. Construction Entrances and Dust Control

All access areas into and out of the limits of disturbance, as shown on the construction site plans, are required to be equipped with a construction entrance. The use of this BMP will limit the amount of sediment being transported by construction vehicles onto existing roadways or other impervious areas. Any tracked sediment, along with any attached pollutants, deposited on impervious areas could be washed downstream during the next rain event. Each construction entrance must be installed as shown in the details section of the construction site plans.

If a new entrance or exit is required, that is not shown on the plans, install the construction entrance as noted by the construction entrance detail, mark the location on the plans and make a record of this minor modification in the SWPPP's modification log, which is located within one of the appendices of the On-site SWPPP.

Each stabilized construction entrance should be used in conjunction with Street Sweeping measures if it becomes apparent that sediment is still being tracked onto adjacent impervious areas, even with the use of the construction entrance.

During extremely dry conditions, drought, and/or excessive winds, the construction site should be treated for dust control to prevent the suspension of fine sediment particles into the air, being carried offsite, and deposited on adjacent properties or surface waters. This practice may not be directly called out for on the construction site plans. A water tanker used to spray the soil down may be an effective way to prevent excessive dust at a construction site.

E. Water Quality BMPs During Construction

Storm Sewer Inlet Protection – Curb and grated inlets are protected from the intrusion of sediment through a variety of measures as shown on the details included in the Construction drawings. The primary mechanism is to place controls in the path of flow sufficient to slow the sediment-laden water to allow settlement of suspended soils before discharging into the storm sewer. It is possible that as

construction progresses from storm sewer installation through to paving that the inlet protection devices will change.

F. Post-Construction Water Quality

Energy Dissipaters – Energy Dissipaters reduce runoff velocities from concentrated conveyance systems (pipes and swales), enhance the potential for infiltration and protect the soil from the erosive force of concentrated flows. Energy dissipaters include riprap aprons, level spreaders and soil reinforcement (such as erosion control blankets and turf reinforcement mats).

Vegetated Filter Strips - Vegetated filter strips are zones of vegetation where pollutant-laden runoff is introduced as sheet flow. Vegetated filter strips may take the form of grass filters, grass filter strips, buffer strips, vegetated buffer zones, riparian vegetated buffer strips, and constructed filter strips. Vegetated filter strips are used to remove pollutants from overland sheet flow but are not effective in removing sediment from concentrated flows. Vegetated filter strip effectiveness fluctuates considerably depending on vegetation type, vegetation height and density, season of the year, eroded particle characteristics, size of drainage area, and site topography.

G. Other Stormwater Management Procedures

Stockpile Management - Stockpiles of soil shall be protected during construction. Silt fence shall be installed around the downstream side of the stockpile to prevent sedimentation. Additionally, stockpiles of soil shall be temporarily stabilized to control erosion. Stockpiles of construction debris, including soil, shall have all runoff directed to a sediment basin or trap.

Non-Stormwater Discharges / Dewatering – Non-stormwater components of site discharges must be clean water. Water used for construction which discharges from the site must originate from a public water supply or private well approved by the State Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site. It can be retained in the ponds until it infiltrates and evaporates. Other non-stormwater discharges would include ground water. Only uncontaminated ground water can be discharged from the site, as allowed by and in accordance with applicable local ground water dewatering permits/regulations. When non-stormwater is discharged from the site, it must be done in a manner such that it does not cause erosion of the soil during discharge.

Process water such as power washing and concrete cutting must be collected for treatment and disposal. It is not to be flushed into the site storm drain system. A groundwater dewatering permit is not required.

Verify discharges from dewatering activities are allowed non-stormwater discharges under the General Permit. Allowable non-stormwater discharges include:

1. Discharges from fire-fighting activities;
2. Fire hydrant flushings;
3. Waters used to wash vehicles where detergents are not used;
4. Water used to control dust in accordance with Section 3.2.2 (Stormwater Management and Sediment Control);
5. Potable water including uncontaminated water line flushings;
6. Routine external building wash down that does not use detergents;
7. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used;
8. Uncontaminated air conditioning or compressor condensate;

9. Uncontaminated ground water or spring water;
10. Foundation or footing drains where flows are not contaminated with process materials such as solvents;
11. Uncontaminated excavation dewatering;
12. Landscape irrigation; and
13. Dechlorinated swimming pool discharges.

Obtain a dewatering permit according to state and local regulations, if discharges from dewatering activities are not allowed under the General Permit. Discharges from dewatering operations must be directed through an appropriate pollution prevention/treatment measure, such as a pump discharge filter bag, sediment trap or sediment basin prior to being discharged from the site or into a water body of the State. Under no circumstances are discharges from dewatering operations to be discharged directly into streams, rivers, lakes or other areas beyond the permitted project area. Likewise, discharges into storm sewer systems that do not drain to a suitable on-site treatment facility, such as a basin, are also prohibited. Discharges from dewatering operations must also be conducted in a manner sufficient to prevent erosion from the discharge runoff.

Use best management practices when dewatering. Place intake hose on a flotation or similar device and do not pump directly from the bottom of the basin, trench, etc. Always pump through a sediment control BMP and dewater within the permitted limits of disturbance to ensure discharge criteria are achieved. Do not discharge on a slope greater than three percent or within 20' of a surface water body. Dewatering should not occur during or immediately after precipitation events, but exceptions will be evaluated on case by case basis.

Solid Waste Disposal - No solid materials, including building materials, are allowed to be discharged from the site with stormwater. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied when 95% full, or as necessary, by a certified trash disposal service and hauled away from the site. Covers for the containers will be provided as necessary to meet state and local requirements. Construct covers as practicable, or required, to prevent stormwater contact and pollutant discharges from solid waste receptacles. The location of solid waste receptacles shall be shown on the Drawings.

Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed of so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil. In this regard, potentially polluting substances should be handled in a manner consistent with the impact they represent.

Sanitary Facilities - All personnel involved with construction activities must comply with state and local sanitary system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a commercial operator. The location of sanitary facilities shall be shown on the Drawings. Portable toilets must be securely anchored and are not allowed within 30' of inlets or permitted limit of disturbance or within 50' of a water of the State.

Concrete Waste from Concrete Ready-Mix Trucks - Discharge of excess or waste concrete and/or wash water from concrete trucks will be allowed on the construction site, but only in approved aboveground portable concrete washout containers (preferred) or in specifically designated lined and diked areas prepared to prevent contact between the concrete and/or wash water and stormwater that

will be discharged from the site. The General Contractor shall eliminate or minimize the number of seams in the liner.

Alternatively, waste concrete can be placed into forms to make rip rap or other useful concrete products. The cured residue from the concrete washout diked areas shall be disposed in accordance with applicable state and federal regulations. This jobsite superintendent is responsible for assuring that these procedures are followed. The location of concrete washout areas shall be shown on the Drawings. Follow all applicable environmental regulations for concrete wash out pits.

SCDES requires all concrete waste areas to be a minimum of 50 feet away from any inlet or other conveyance system.

Masons' Area - Contractor shall identify masons' area on the site and indicate location on the Drawing. To the extent practical, all masonry tools, material, including sand and sacked cement or mortar materials, and equipment shall be located within the area identified. Runoff control, such as berms or diversion ditches, silt fence, straw wattles, or other means of containment shall be provided to prevent the migration of stormwater pollutants in runoff from the masons' area. Receptacles for debris and trash disposal shall also be provided.

Fuel Tanks - Temporary on-site fuel tanks for construction vehicles shall meet all state and federal regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations. From NFPA 30: All tanks shall be provided with secondary containment (i.e. containment external to and separate from primary containment). Secondary containment shall be constructed of materials of sufficient thickness, density, and composition so as not to be structurally weakened as a result of contact with the fuel stored and capable of containing discharged fuel for a period of time equal to or longer than the maximum anticipated time sufficient to allow recovery of discharged fuel. It shall be capable of containing 110% of the volume of the primary tank if a single tank is used, or in the case of multiple tanks, 150% of the largest tank or 10% of the aggregate, whichever is larger.

The tanks shall be in sound condition free of rust or other damage which might compromise containment. Fuel storage areas will meet all EPA, OSHA and other regulatory requirements for signage, fire extinguisher, etc. Hoses, valves, fittings, caps, filler nozzles, and associated hardware shall be maintained in proper working condition at all times. The location of fuel tanks shall be shown on the Drawings and shall be located to minimize exposure to weather and surface water drainage features.

A Spill Prevention, Control and Countermeasure (SPCC) Plan must be developed if aboveground oil storage *capacity* at the construction site exceeds 1,320-gallons or as specified by SCDES. Containers with a storage capacity of 55-gallons or less are not included when calculating site storage capacity. The General Contractor shall work with the CEC to develop and implement a SPCC Plan in accordance with the Oil Pollution Prevention regulation at Title 40 of the Code of Federal Regulations, Part 112, (40 CFR 112).

Hazardous Material Management and Spill Reporting Plan - Any hazardous or potentially hazardous material that is brought onto the construction site will be handled properly in order to reduce the potential for stormwater pollution. All materials used on this construction site will be properly stored, handled, dispensed and disposed of following all applicable label directions. Flammable and combustible liquids will be stored and handled according to 29 CFR 1926.152. Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.

Material Safety Data Sheets (MSDS) information will be kept on site for any and all applicable materials.

In the event of an accidental spill, immediate action will be undertaken by the General Contractor to contain and remove the spilled material. All hazardous materials, including contaminated soil and liquid concrete waste, will be disposed of by the Contractor in the manner specified by federal, state and local regulations and by the manufacturer of such products. As soon as possible, the spill will be reported to the appropriate agencies. As required under the provisions of the Clean Water Act, any spill or discharge entering waters of the United States will be properly reported. The General Contractor will prepare a written record of any spill and associated clean-up activities of petroleum products or hazardous materials in excess of 1 gallon or reportable quantities, whichever is less. The General Contractor will provide notice to Owner, via the SWCT Hotline, immediately upon identification of a reportable spill. A spill report form is located in Appendix H.

Any spills of petroleum products or hazardous materials in excess of Reportable Quantities as defined by EPA or the state or local agency regulations, shall be immediately reported to the EPA National Response Center (1-800-424-8802) and SCDES (1-888-481-0125).

- The State reportable quantity for petroleum products is 25 gallons.

The reportable quantity for hazardous materials can be found in 40 CFR 302 and South Carolina Code of Regulations 61-79 (www.scstatehouse.gov/coderegs/C061d.htm).

In order to minimize the potential for a spill of petroleum product or hazardous materials to come in contact with stormwater, the following steps will be implemented:

a) All materials with hazardous properties (such as pesticides, petroleum products, fertilizers, detergents, construction chemicals, acids, paints, paint solvents, additives for soil stabilization, concrete, curing compounds and additives, etc.) will be stored in a secure location, under cover and in appropriate, tightly sealed containers when not in use.
b) The minimum practical quantity of all such materials will be kept on the job site and scheduled for delivery as close to time of use as practical.
c) A spill control and containment kit (containing for example, absorbent material such as kitty litter or sawdust, acid neutralizing agent, brooms, dust pans, mops, rags, gloves, goggles, plastic and metal trash containers, etc.) will be provided on the construction site and location(s) shown on Drawings.
d) All of the product in a container will be used before the container is disposed of. All such containers will be triple rinsed, with water prior to disposal. The rinse water used in these containers will be disposed of in a manner in compliance with state and federal regulations and will not be allowed to mix with stormwater discharges.
e) All products will be stored in and used from the original container with the original product label.
f) All products will be used in strict compliance with instructions on the product label.
g) The disposal of excess or used products will be in strict compliance with instructions on the products label.

1.3. Sequence of Construction

The construction sequence for this project has been provided on the construction site plans. Each item/step of that construction sequence has been listed is the sequence that they should be implemented. For additional information or questions on the sequencing please contact the SWPPP Preparer or the Permittee referenced on the cover of this SWPPP.

1.4. Non-Numeric Effluent Limits

A. Stormwater Volume and Velocity Control

During the implementation of construction activities, all parties performing work at this construction site whose work may affect the implementation of the SWPPP must be informed of and directed on how to comply with this Non-Numeric Effluent Limit, which requires the management of stormwater runoff **within** the construction site and at **each outfall**. The purpose of this requirement is to control the stormwater volume and velocity at these locations to minimize erosion.

Specifically, each responsible party should be made aware of the practices that have been or should be implemented at the construction site to accomplish these particular stormwater management practices. Below is a list of practices that may be utilized within the disturbed area and at each outfall at construction sites to control stormwater volume and velocity:

Volume Control

- Limiting the amount of disturbed area and exposed soils
- Staging and/or Phasing of the Construction Sequence;
- Sediment Basins and Sediment Traps
- Diverting off-site flow around the construction site;
- Controlling the Drainage Patterns within the Construction Site;
- Temporary Stabilization of Disturbed Areas.

Velocity Control

- Surface Roughening and/or other Slope Stabilization Practices;
- Level Spreaders, Riprap Plunge Pools and/or other Velocity Dissipation BMPS located at the Construction Site's and Sediment Basin Outfalls.
- Use of Rock Checks, Sediment Tubes, Etc. in Temporary Diversions Swales and Ditches.
- Use of Erosion Control Blankets, Turf Reinforcement Mats, and other Non-Vegetative BMPs that can be used to Quickly Stabilize Disturbed Areas.

The SWPPP Preparer/Engineer should approve any modifications (Additional BMPs or Changes to Existing BMPs) to address the management of stormwater volume and velocity prior to implementation. All approved SWPPPs that were issued coverage under the CGP should include ample BMPs and other control measures to address this specific Non-Numeric Effluent Limit.

B. Soil Exposure, Compaction and Preservation

Throughout construction activities, **the amount of soil exposed during construction should be kept to a minimum**. This may be accomplished by minimizing the amount the disturbed area within the permitted Limits of Disturbance (shown on the approved construction site plans) to only that which is necessary to complete the proposed work. For areas that have already been disturbed and where construction activities will not begin for a period of 14 days or more, temporary stabilization techniques must be implemented.

Prior to implementation of any major grading activities, **topsoil is to be preserved** by placing it in areas designated for stockpiling until final grades are reached. Each stockpile must be equipped with proper sediment and erosion controls to preserve the topsoil and protect adjacent areas from impacts. Once final grades have been reached, the preserved topsoil should be utilized to apply to areas identified for stabilization. Topsoil contains nutrients and organisms that aid in the growth of vegetation.

The **Compaction of Soil** should also be minimized to the degree practicable during grading activities. This is especially important during the replacement of topsoil to aid in a quick establishment of vegetative cover. Compaction of soil may also reduce rainfall's ability to infiltrate into the soil, increasing the amount of stormwater runoff.

C. Soil Stabilization

Throughout construction activities, soil stabilization techniques are to be initiated as soon as practicable whenever any clearing, grading, excavating, or other land-disturbing activities have permanently or temporarily ceased on any portion of the construction site and will not resume for a period exceeding 14 calendar days. For areas where initiating stabilization measures is infeasible, (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization), initiate vegetative or non-vegetative stabilization measures as soon as practicable.

D. Steep Slopes (Slopes of 30% grade or greater)

All disturbed steep slopes (30% grade, ~3H:1V, or greater), and steep slopes to be created through grading activities must be managed in a fashion that limits the potential of erosion along the slopes. All parties whose work is/was responsible for the creation/disturbance of steep slopes must comply with the following items:

- **Minimize the Disturbance** of all steep slopes, when possible.
- **Divert Concentrated or Channelized Flows** of stormwater away from and around steep slope disturbances.
- **Use Specialized BMP Controls** including temporary and permanent seeding with soil binders, erosion control blankets, surface roughening, reducing continuous slope length with terracing or diversions, gradient terraces, interceptor dikes and swales, grass-lined channels, pipe slope drains, subsurface drains, level spreaders, check dams, seep berms, and triangular silt dikes to minimize erosion.
- **Initiate Stabilization Measures** as soon as practicable on any disturbed steep slope areas where construction activities have permanently or temporarily ceased, and will not resume for a period exceeding 7 calendar days.
- **A Vegetative and/or Non-Vegetative Cover** must be established within 3 working days from the time that stabilization measures were initiated.

  Stabilization of steep slopes should be a priority for those performing work at the construction site. At the very least, runoff control BMPs should be implemented to transport stormwater runoff from the top of the slope to the toe of the slope. An example of this is to install diversion swales along the top of slope and direct the runoff towards pipe slopes drains to transports the runoff to the toe of the slope. All pipe slope drain outlets are to be equipped proper outlet protection.

E. Sediment Discharge Minimization

Permittees, Contractors, and all other parties responsible for conducting land-disturbing activities are required to install and maintain all erosion and sediment BMPs that are identified on the approved construction site plans. These BMPs have been designed and approved to address such factors as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soils particle sizes expected to be present on the construction site. **Proper installation, inspection, and maintenance will allow these BMPs to operate at maximum efficiencies in order to minimize sediment discharges to the maximum extent practical.**

F. Pollutant Discharge Minimization

Permittees, Contractors, and all other parties responsible for conducting land-disturbing activities are required to install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, the following items must be implemented:

- **Minimize the discharge of pollutants from dewatering trenches and excavations** by managing runoff with the appropriate controls. Otherwise these discharges are prohibited;
- **Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters**. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- **Minimize the exposure of building materials, building products, construction wastes, trash,** landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater; and
- **Minimize the discharge of pollutants from spills and leaks** and implement chemical spill and leak prevention and response procedures.

G. Prohibited Discharges

Permittees, Contractors, and all other responsible parties for conducting land-disturbing activities are prohibited to discharges, from the construction site, the following items:

- **Wastewater from washout of concrete**, unless managed by an appropriate control;
- **Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials**;
- **Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance**; and
- **Soaps or solvents used in vehicle and equipment washing**.

1.5. Buffer Zone Management

Not Applicable

SECTION 2– SITE FEATURES AND SENSITIVE AREAS

2.1. Sources of Pollution

Throughout construction activities, each permittee, contractor, and person responsible for conducting work will need to ensure that sources of pollution are managed to prevent their discharge from the construction site. Expected pollution sources during construction have been identified in **Table 2.1-A**, but due to the nature of construction activities, it is often tough to predict all pollution sources that may appear throughout the life of a construction project. For that reason, the following table has also been provided to help all those performing work at this construction site identify possible sources of pollution

Stormwater runoff subjected to the identified pollution sources must be treated by the appropriate BMPs as directed by this SWPPP.

In the event that any additional sources of pollution are identified during construction, the person(s) with day-to-day operational control at the site is to add the new source(s) to **Table 2.1-A** and consult with the SWPPP Preparer to properly address this source and to prevent the discharge of it's pollutant through stormwater runoff.

Table 2.1-A: Potential Sources of Pollution

Source	Material or Chemical	Location*	Appropriate Control Measures
Loose soil exposed/disturbed during clearing, grubbing and grading activities	Sediment	All areas within the Limits of Disturbance	As directed by the construction Plans. This includes Silt Fence, sediment tubes, sediment basins, and sediment traps.
Areas where construction equipment are cleaned, a.k.a. concrete washout	Heavy Metals & pH	Located adjacent to each construction entrance	Concrete Washout Basin as shown on the plans.
Water encountered during trenching	Nutrients & Sediment	In and around any trenching activities.	Direct water into impoundments such as basins or traps to allow for the sedimentation of the listed pollutants.
Paving Operations	Sediment & Trash	All areas to be paved.	Inlet protection.
Material Delivery and Storage Areas	Nutrients, pH, Sediment, Heavy Metals, oils & grease	All areas used as storage areas	Silt fence and/or sediment dikes
Equipment fueling and maintenance areas	Metals, hydrocarbons, oils and greases	Areas surrounding fuel tanks	Provide secondary containments, locate in upland areas. Repair leaking and broken hoses.
Paints	Metal oxides, stoddard solvent, talc, calcium-carbonate, arsenic	Throughout site, primarily in areas of building construction	Washwater should be contained and is prohibited from being discharged

***Area where material/chemical is used on site.**

2.2. Surface Waters

Stormwater runoff from the proposed construction sites discharges from 1 location to an unnamed tributary to Little Turkey Creek, which is north of the site. The outfall is located in the northeast corner of the site where it sheet flows to the unnamed tributary, which discharges into Little Turkey Creek.

2.3. Impairments and TMDLs

Some Waters of the State (WoS) have been identified as not meeting the State's water quality standards for recreational swimming, fish consumption, aquatic life use, and/or shellfish harvesting for one or more pollutants even after controls for point and nonpoint source pollution have been put in place. These waterbodies have been classified as "impaired." Once these waterbodies have been identified they are listed on the State's 303(d) List of Impaired Waterbodies. South Carolina lists impairments as "stations" where samples were taken along a waterbody.

The most recently-approved 303(d) list can be found at the following link:

https://des.sc.gov/programs/bureau-water/south-carolina-303d-list-impaired-waters-tmdls

After a pre-determined period of time, DES is obliged to develop a Total Maximum Daily Load (TMDL) for the pollutant of concern for each impaired station listed on the 303(d) List. A TMDL is the amount of a single pollutant (such as bacteria, nutrients, metals) that can enter a waterbody on daily basis and that waterbody still meet water quality standards. "TMDL" refers to both a calculation of a pollutant entering a waterbody as well as the document containing this calculation along with source assessments, watershed and land use information, reductions and allocations information, implementation and other relevant information, maps, figures, and pictures.

Once a TMDL has been developed and approved by the EPA, the impaired WoS is removed from the 303(d) list. A separate list is maintained for WoS with approved TMDLs.

Any construction site whose discharges are released into a WoS listed on the 303(d) List or for which an EPA-approved TMDL has been developed must address the specific pollutant set forth in the TMDL and/or potential pollutants for the impairment. The SWPPP must include a description of BMPs to address these pollutants.

The primary permittee and/or contractor must ensure that the construction site discharges remain in compliance with the State's water quality standards. To do so, these parties will have to ensure the function of all approved BMPs to handle the specific pollutant.

Construction Stormwater Discharges are expected to contain the following pollutants that contribute and/or can cause the following impairments to receiving water bodies: Fecal Coliform. The presence of any of these impairments in receiving waters will require approval control of the site's construction stormwater discharges. Information on each of these impairments and how to treat stormwater runoff for these impairments has been provided below.

A. Impairments Affected by Construction Site Discharges and Methods to Control Potential Pollutants Causing or Contributing to the Impairments

1. **Fecal Coliform (FC) in Shellfish Harvesting waters:** Fecal Coliform is an indicator bacteria for other pathogens which may be present in a waterbody. Shellfish Harvesting Waters are tidal salt waters protected for shellfish harvesting and must be protected to a higher standard than other waters because of the risk to human health posed by ingesting shellfish from areas with high levels of bacteria. Bacteria levels increase following rain events. Potential sources of bacteria on construction sites include improperly located porta-johns and litter that may attract rodents and other animals.

   Address by: Porta-johns should be placed away from WoS and not placed on catch basins and other drainage structures. Litter and construction debris should be placed in identified areas and emptied on a routine basis.

B. Impairment Sources and Prevention

   Construction sites can contribute to these impairments directly through the release of excess soil and/or nutrients within stormwater runoff. For this reason, proper sediment and erosion control BMPs should be implemented and the design of the stormwater management systems, during both construction and post-construction, should address the control of stormwater runoff. A reduction in the volume released or the rate at which this volume is released can significantly improve the quality of stormwater runoff and limit the amount of the pollutants that contribute to the above listed impairments.

   As an example, sediment basins and/or traps should be used during construction to allow for sedimentation of soils/nutrients, and to control the release of stormwater into the impaired water body. Vegetated Detention and Infiltration structures should be implemented as post-construction BMPs to control stormwater volumes. Caution is advised when using fertilizers to reach Final Stabilization; excess fertilizer can contributes to each of the above listed impairments.

C. Site-Specific Requirements

   This construction site's discharges drain into WoS that is either Impaired or has an established TMDL for the following impairment(s): Fecal Coliform. Due to the possibility of pollutants in construction stormwater discharges from this site that may contribute to any of these impairments, the following must be conducted throughout the lifespan of all land-disturbing activities at this site:

   - Monthly monitoring of the construction site's outfalls;

- Biweekly inspections of all the primary sediment control BMPs;
- Employee training/acknowledgement during the Pre-Construction Meeting;
- Installation of additional BMPs to meet the water quality standards (as directed by the SWPPP preparer and as approved by the regulating agency); and
- All sediment control BMPs have been designed to meet or exceed an 80% trapping efficiency.

Additionally post-construction BMPs may be required to be installed, once final stabilization is reached, to address any established TMDL or Impairment once construction operations have been completed.

SECTION 3 – COMPLIANCE REQUIREMENTS

3.1. SWPPP Availability

A copy of the OS-SWPPP must be retained at the construction site or a nearby location easily accessible during normal business hours, from the date of commencement of construction activities to the date that final stabilization is reached.

If a location within the construction site is unavailable to store the OS-SWPPP when no personnel are present, notice of the plan's location, along with any updated contact information, must be posted near the main entrance at the construction site.

Contractors, who have day-to-day operational control over OS-SWPPP implementation, must have a copy of this SWPPP available at a central location within the construction site for the use by all those identified as having responsibilities under the OS-SWPPP.

OS-SWPPPs must be made available upon request and at the time of a construction site inspection by EPA, DES, local government officials, and the Operator of a Municipal Separate Storm Sewer System (MS4).

3.2. Pre-Construction Conferences

Prior to any construction activity, the Contractor shall schedule and organize an on-site Stormwater Pre-Construction Conference. Each contractor or subcontractor, who will work at the site, must attend this conference in person.

The Contractor shall invite the Owner, Engineer, Contracting Officer (if applicable) and agencies listed below to the Stormwater Pre-Construction Conference. The Contractor must invite the noted agencies to the meeting at least 7 days prior to conducting the meeting.

SCDES EQC Regional Office
Lancaster Midlands Office
803-285-7461
2475 Environmental Way,
Lancaster, SC 29720

3.3. Inspection Requirements

The Owner shall be responsible for contracting with a **third-party inspector** to complete all SWPPP inspections. Inspections shall include the following:

1. All areas of the site disturbed by construction activity and areas used for storage of materials that are exposed to precipitation;
2. All stormwater conveyance systems for any evidence of, or the potential for, pollutants entering these systems;
3. All BMPs identified in the OS-SWPPP;

4. All discharge locations to ascertain whether the implemented BMPs are effective in preventing the discharge of sediment from the site. Where discharge locations are inaccessible, nearby downstream locations must be inspected to the extent that such inspections are practicable; and
5. Locations where vehicles enter or exit the site must be inspected for evidence of off-site sediment tracking.

Inspection Frequency

After construction activities begin, inspections must be conducted at a minimum of at least once every calendar week, with no time period between inspections exceeding 9 days, and must be conducted until final stabilization is reached on all areas of the construction site. It is recommended that BMPs be assessed by the contractor within 24 hours of the end of a storm event of 1.0 inch or greater, as well as during the first rain event after the initiation of construction activities, after the installation of BMPs.

Inspector Qualifications

Inspections must be conducted by qualified personnel (provided by the General Contractor). "Qualified Personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of any BMPs selected to control the quality of stormwater discharges from the construction site. This person must be an individual who has been certified through a Construction Site Inspector Certification Course that has been approved by DES. Inspections may also be conducted by a person with a registration equivalent to the registration of the preparer of the C-SWPPP (professional engineer).

3.4. Maintenance Requirements

Proper maintenance of post-construction water quality BMP's and drainage systems is required to ensure they continue to function as designed and permitted. Maintenance activities shall be performed as follows:

System	Maintenance Requirements	Maintenance Frequency
A. Vegetated Areas	1. Mow Grass	1. Monthly
	2. Remove all litter and debris	2. Monthly
	3. Remove and replace dead or diseased vegetation	3. Semi-Annually
	4. Replace / Replenish mulch.	4. Semi-Annually
	5. Remove weeds.	5. Semi-Annually
	6. Prune vegetation to maintain appearance	6. Semi-Annually
B. Storm Drainage System	1. Remove all litter and debris from pipes.	1. Annually
	2. Remove sediment from drainage structure sumps	2. Annually, or when sump volume has been reduced by 50%.
C. Energy Dissipaters	1. Remove all litter and debris	1. Monthly
	2. Repair erosion or damaged dissipaters.	2. Annually

3.5. Record Keeping

Any logs necessary to track the progress, compliance, modifications and those associated with the construction site. These logs may include, but are not limited to, a pre-construction conference log, an inspection log, a stabilization log, a rain log, a contractor log and/or any additional record keeping as deemed necessary by the Permittee, Contractor, DES, MS4, or an entity delegated under Regulation 72-300.

3.6. Final Stabilization

Final site stabilization is achieved when perennial vegetative cover provides permanent stabilization with a density greater than 70 percent over the entire area to be stabilized by vegetative cover. This area is exclusive of areas that are covered with rock (crushed granite, gravel, etc.) or landscape mulch, paved or have a building or other permanent structure on them.

SECTION 313700 - RIP RAP

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers materials, labor and equipment for placement of rip rap for slope protection and erosion control as indicated on the drawings and as specified herein.

1.2 LUMP SUM PRICE

A. The items listed in the bid shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all material, equipment, labor, testing, construction supervision and all other work required for satisfactory completion of rip rap placement.

1.3 UNIT PRICES

A. None this Section.

1.4 SUBMITTALS

A. None this Section.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.6 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by South Carolina Department of Environmental Services (SCDES) .

1.7 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the Contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience with similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 RIP RAP

A. Rip rap shall comply with requirements as specified in Section 804 of the SCDOT Standard Specifications for Highway Construction and addendums. Rip rap shall be hard quarry or field stone and shall be of such quality that they will not disintegrate on exposure to water and weather. The stone shall range in weight from a minimum of 25 pounds to a maximum of 150 pounds. At least 20 percent of the stone pieces shall weigh more than 60 pounds. The stone pieces shall have a minimum dimension of 12 inches.

PART 3 - EXECUTION

3.1 SITE PREPARATION

A. The surface to receive the rip rap shall be prepared to a relatively smooth condition free of obstructions, depressions, debris, and soft or low-density pockets of material.

B. Rip rap shall be placed in the manner and at the locations shown on the drawings.

C. The contours and elevations shown on the drawings are to the surface of the stone.

3.2 PLACEMENT

A. The minimum thickness or depth of stone layer shall be 12 inches.

B. Placement shall begin in the trench at the bottom of the slope with filter fabric wrapped in stone at least 5 feet up the slope. The entire mass of stone shall be placed to be in conformance with the lines, grades, and thicknesses shown on the drawings.

C. Rip rap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material.

1. Placement of rip rap in layers, or by dumping into chutes, or by similar methods likely to cause segregation will not be permitted.
2. Stones shall not be dropped from a height greater than 3 feet during placement of the stones on top of filter fabric.

D. The larger stones shall be well distributed, and the entire mass of stone shall conform to the gradation specified. All materials that are part of rip rap protection shall be placed and distributed so there will be no large accumulations of either the larger or smaller sizes of stone.

3.3 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.4 ACCEPTANCE

A. Final acceptance will be based on satisfactory placement of rip rap as approved by the Owner and/or Engineer. Rip rap shall be re-worked to the satisfaction of the Owner and/or Engineer until specified requirements are met.

B. All additional work which is the result of a failed inspection shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 313700

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with:

1. Aggregate Base Course
2. Intermediate Course
3. Base Course
4. Prime Coat
5. Tack Coat
6. Asphaltic Concrete

B. Related Sections:

1. Division 31 Section “Earth Moving” for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.2 DEFINITIONS

A. Compaction: The process of mechanically stabilizing a material by increasing its density. “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D 1557 for general soil types or ASTM D 4253 or ASTM D 4254 for isolated cohesionless materials, abbreviated in this specification as “___ percent maximum density.” “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure ASTM D 1188 or ASTM D 2726 “___ percent maximum density for asphaltic concrete.”

B. nt maximum density for asphaltic concrete.”

C. Course: A layer or lift of soil or asphaltic concrete placed on top of a previously prepared or placed surface.

D. Lift: A layer or course of soil or asphaltic concrete placed on top of a previously prepared or placed surface.

E. Subgrade: Existing, in-situ soil or other material that is remaining after stripping or excavation. The subgrade is always existing material on which fill or new structures are to be placed.

1.3 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the material, compaction, shaping, finishing, dressing, disposal of surplus material, testing, construction supervision and all other work required for satisfactory completion of the asphalt paving.

1.4 UNIT PRICES

A. None this Section.

B. Payment for the unit shown on the bid form shall be considered to cover the cost of all labor, material, equipment, testing, and performing all operations necessary to complete the work in place. Payment shall be made based upon the actual quantity multiplied by the unit prices.

C. Measurement will be made by means acceptable to the Owner and the Engineer. Actual amounts less than these figures will be deducted from the contract price at the unit price established in the allowance section. Amounts greater than the allowance will be added to the contract price.

D. n the allowance will be added to the contract price.

1.5 SUBMITTALS

A. Asphaltic Concrete Mix Design: For each mix to be used on the project by course, submit a mix design in accordance with the following:

1. Mix designs in compliance with requirements of the [“South Carolina Department of Transportation Standard Specifications for Highway Construction”]. Mix design shall bear the approval of the SCDOT and shall be dated within 24 months of the date of the submittal. All materials listed in the mix design shall be the materials used to produce the asphaltic concrete.

B. Laboratory Testing: Submit laboratory testing data for approval as identified in the paragraph titled “Laboratory Testing” for any of the following materials to be used on the project before any material is delivered to the site.

1. Subbase Course, Base Courses and Asphaltic Concrete (each course)

a. Maximum density

C. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the following:

1. Base Course
2. Tack coat
3. Prime coat
4. Asphaltic Concrete (each course)

a. Coarse aggregate
b. Fine aggregate
c. Mineral filler
d. Asphalt cement

D. Field Testing: Submit field testing data as identified in the paragraph titled “Field Testing” for the following:

1. Base Courses

a. In place densities
b. Grade
c. Straight Edge

2. Asphaltic Concrete (each course)

a. In place density
b. Mix Design Compliance
c. Grade
d. Straight Edge

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.7 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulatory requirements.

1.8 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience with similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Environmental Conditions: Place bituminous mixture only during dry weather and on dry surfaces. Place asphaltic concrete only when surface temperature of underlying course is greater than 45°F for course thicknesses greater than one inch and 55°F for course thickness' one inch or less.

F. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 SOIL AGGREGATE SUBBASE

A. In accordance with "South Carolina Department of Transportation Standard Specifications for Highway Construction", Section 302 - Soil-Aggregate Subbase.

2.2 GRADED AGGREGATE BASE COURSE

A.

A. In accordance with “South Carolina Department of Transportation Standard Specifications for Highway Construction”, Section 305 – Graded Aggregate Base.

2.3 ASPHALTIC CONCRETE BASE COURSE

A. In accordance with “South Carolina Department of Transportation Standard Specifications for Highway Construction”, Section 310 - Asphalt Base Course.

2.4 PRIME COAT

A. In accordance with “South Carolina Department of Transportation Standard Specifications for Highway Construction”, Section 305.4.6 – Application of Prime Coat.

2.5 TACK COAT

A. In accordance with “South Carolina Department of Transportation Standard Specifications for Highway Construction”, Section 401.4.18 – Application of Prime or Tack Coat.

2.6 ASPHALTIC CONCRETE

A. Shall be hot mixed, hot laid asphaltic concrete of the compacted thickness indicated.

B. Mix designs shall be prepared in accordance with the “South Carolina Department of Transportation Standard Specifications for Highway Construction” per the following sections.

1. Section 401 – Hot Mixed Asphalt (HMA) Pavement.
2. Section 402 – HMA Intermediate Course, Type B or Type C.
3. Section 403 – HMA Surface Course, Type B or Type C.

PART 3 - EXECUTION

3.1 SAWCUTTING OF EXISTING PAVEMENTS

A. Provide full depth sawcuts through existing asphaltic concrete pavements where new asphaltic concrete pavements are to join. Sawcuts shall be straight and vertical and shall be located a minimum of 3 inches from the existing edge or as indicated on the drawings.

3.2 PREPARATION OF SUBGRADE OR FILL

A. Prepare subgrade and/or fill as specified in Division 31 Section “Earth Moving”.

3.3 SUBBASE AND BASE COURSES

A. Graded Aggregate Base Course

1. Placement: Place aggregate course on prepared subgrade or fill in maximum loose lifts of 8 inches.

a. Do not place on surfaces that are muddy, frozen or that contain frost.
b. Total thickness shall be as indicated.

2. Compaction: Compact the aggregate course through the full depth to not less than 100 percent of maximum laboratory density per ASTM D1557.

a. Compact with equipment well suited for material being compacted.
b. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment being used.
c. Compact each lift as specified herein prior to placing the overlaying lift.

3. Tolerances

a. Finished grade of aggregate course shall be within 0.05 feet of indicated finish grade.
b. Finished surface of aggregate course shall not vary more than 0.375 inches when tested with a 10-foot straightedge.
c. Finished thickness of aggregate course shall not vary more than 0.50 inches from the required thickness at any point and the average of all depth measurements shall be at least that indicated.
d. Areas not meeting the specified requirements will be rejected until corrected by the Contractor.

4. Protection: Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance. Any repair or re-establishment of final grades shall be made prior to final acceptance.

B. Asphaltic Concrete Base Course

1. In accordance with “South Carolina Department of Transportation Standard Specifications for Highway Construction”, Section 310 - Asphalt Base Course.

3.4 PRIME COAT

A. Application: After receiving approval from the Engineer for priming, apply not more than 0.28 gal/sq. yd. nor less than 0.25 gal/sq. yd. to the completed and accepted base course.

1. Where base consists of fossiliferous limestone, the prime rate shall be not more than 0.15 gal/sq. yd. nor less than 0.10 gal/sq. yd.
2. The prime coat shall only be applied when the base course is only slightly damp, and when temperature of the air in the shade is 55°F or above.
3. In places where the distributor bars cannot reach, it will be necessary to apply the prime coat with a hand sprayer attached to the distributor by a hose.

B. Protection: Do not permit traffic on the primed area until the prime coat has cured adequately.

3.5 TACK COAT

A. Application: Apply not more than 0.15 gal/sq. yd. nor less than 0.05 gal/sq. yd. to indicated contact surfaces. Net rate of application shall be 0.10 gal/sq. yd. of net bitumen.

1. Apply half-rate application to prime coats that have been contaminated by traffic or dust.
2. The tack coat shall only be applied when the contact surface is dry and when the temperature has not been below 35°F for 12 hours immediately prior to application. The tack coat shall only be applied when the temperature of the air in the shade is 55°F or above.

3. Work shall be planned so that no more tack coat than is necessary for the day's operation is placed on the surface.
4. In places where the distributor bars cannot reach, it will be necessary to apply the tack coat with a hand sprayer attached to the distributor by a hose. When hand spray methods are used, care should be taken to give the surface a very light application of the asphalt.

B. Protection: Except paving equipment, do not permit any traffic on tacked surfaces.

3.6 ASPHALTIC CONCRETE

A. Mixing and Preparation of Bituminous Mixture

1. Plant mix bituminous mixture to comply with requirements specified herein.

B. Transportation of Bituminous Mixture

1. Transport bituminous mixture in trucks having tight, clean, smooth beds that have been coated with a minimum amount of a concentrated solution of hydrated lime and water to prevent adhesion of the mixture to the truck bodies. Each load shall be covered with canvas or other approved material of ample size to protect the mixture from the weather and to prevent loss of heat. Deliveries shall be made so that the spreading and rolling of all mixture prepared for one day's run can be completed during daylight, unless adequate, approved artificial lighting is provided. The mixture shall be delivered to the area to be paved in such a manner that the temperature at the time of dumping into the spreader will not be less than 250°F. Any loads that are below minimum temperature, that have crusts of cold, unworkable material, or that have been wet excessively by rain will be rejected. Hauling over freshly laid material will not be permitted.

C. Machine Spreading

1. Prior to the laying of the asphaltic concrete, clean underlying course of foreign or objectionable matter with power blowers or power brooms, supplemented by hand brooms and other cleaning methods where necessary.
2. The range of temperatures of the mixtures at the time of spreading shall be between 250°F and 300°F. Bituminous concrete having temperatures less than minimum spreading temperature when dumped into the spreader will be rejected. Adjust spreader and regulate speed so that the surface of the course is smooth and continuous without tears and pulling, and of such depth that, when compacted, the surface conforms with the cross section, grade, and contour indicated. Unless otherwise directed, begin the placing along the centerline of areas to be paved on a crowned section or on the high side of areas with a one-way slope. Place mixture in consecutive adjacent strips having a minimum width of 10 feet, except where the edge lanes require strips less than 10 feet to complete the area. Construct longitudinal joints and edges to true line markings. Establish lines parallel to the centerline of the area to be paved, and place string lines coinciding with the established lines for the spreading machine to follow. Provide the number and location of the lines needed to accomplish proper grade control. When specified grade and smoothness requirements can be met for initial lane construction by use of an approved long ski-type device of not less than 30 feet in length and for subsequent lane construction by use of a short ski or shoe, in-place string lines for grade control may be omitted. Place mixture as nearly continuous as possible and adjust the speed of placing as needed to permit proper rolling.

D. Shoveling, Raking, and Tamping After Machine Spreading

1. Shovelers and rakers shall follow the spreading machine. Add or remove hot mixture and rake the mixture as required to obtain a course that when completed will conform to requirements specified herein. Broadcasting or fanning of mixture over areas being compacted is prohibited. When segregation occurs in the mixture during placing, suspend

spreading operation until the cause is determined and corrected. Correct irregularities in alignment left by the spreader by trimming directly behind the machine. Immediately after trimming, compact edges of the course by tamping laterally with a metal lute or by other approved methods. Distortion of the course during tamping is prohibited.

2. mediately after trimming, compact edges of the course by tamping laterally with a metal lute or by other approved methods. Distortion of the course during tamping is prohibited.

E. Hand Spreading in Lieu of Machine Spreading

1. In areas where the use of machine spreading is impractical, spread mixture by hand. The range of temperatures of the mixtures when dumped onto the area to be paved shall be between 250 and 300°F. Mixtures having temperatures less than minimum spreading temperature when dumped onto the area to be paved will be rejected. Spread hot mixture with rakes in a uniformly loose layer of a thickness that, when compacted, will conform to the required grade, thickness, and smoothness. During hand spreading, place each shovel full of mixture by turning the shovel over in a manner that will prevent segregation. Do not place mixture by throwing or broadcasting from a shovel. Do not dump loads any faster than can be properly handled by the shovelers and rakers.

2. an can be properly handled by the shovelers and rakers.

F. Compaction of Mixture

1. Compact mixture by rolling. Begin rolling as soon as placement of mixture will bear rollers. Delays in rolling freshly spread mixture shall not be permitted. Start rolling longitudinally at the extreme sides of the lanes and proceed toward center of pavement, or toward high side of pavement with a one-way slope. Operate rollers so that each trip overlaps the previous adjacent strip by at least one foot. Alternate trips of the roller shall be of slightly different lengths. Conduct tests for conformity with the specified crown, grade, and smoothness immediately after initial rolling. Before continuing rolling, correct variations by removing or adding materials as necessary. If required, subject course to diagonal rolling with the steel wheeled roller crossing the lines of the previous rolling while mixture is hot and in a compactible condition. Speed of the rollers shall be slow enough to avoid displacement of hot mixture. Correct displacement of mixture immediately by use of rakes and fresh mixture or remove and replace mixture as directed. Continue rolling until roller marks are eliminated and course has a density of at least 96 percent but not more than 100 percent of that attained in a laboratory specimen of the same mixture prepared in accordance with ASTM D 1559. During rolling, moisten wheels of the rollers enough to prevent adhesion of mixture to wheels, but excessive water is prohibited. Operation of rollers shall be by competent and experienced operators. Provide sufficient rollers for each spreading machine in operation on the job and to handle plant output. In places not accessible to the rollers, compact mixture thoroughly with hot hand tampers. Skin patching of an area after compaction is prohibited. Remove mixture that becomes mixed with foreign materials or is defective and replace with fresh mixture compacted to the density specified herein. Roller shall pass over unprotected edge of the course only when laying of course is to be discontinued for such length of time as to permit mixture to become cold.

2. xture to become cold.

G. Tolerances

1. Finished grade of asphaltic concrete shall be within 0.03 feet of indicated finish grade.
2. Finished surface shall not vary more than 1/8 inch when tested with a 10-foot straightedge.
3. The finished thickness shall not vary more than 1/4 inch from required thickness at any point and average thickness of depth measurements shall be at least the thickness indicated.

4. The finished surface shall be uniform in appearance and texture over the entire surface, including at joints. The entire surface shall be free of evidence of segregation, honeycombs, and back scattering.
5. Areas not meeting the above requirements will be rejected until corrected by the Contractor.

H. Joints

1. Joints shall present the same texture and smoothness as other portions of the course, except permissible density at the joint may be up to 2 percent less than the specified course density. Carefully make joints between old and new pavements or within new pavements in a manner to ensure a thorough and continuous bond between old and new sections of the course. Vertical contact surfaces of previously constructed sections that are coated with dust, sand, or other objectionable material shall be painted with a thin uniform coat of emulsion or other approved bituminous material just before placing fresh mixture.

2. Transverse Joints

a. Roller shall pass over unprotected end of freshly laid mixture only when laying of course is to be discontinued. Except when an approved bulkhead is used, cut back the edge of previously laid course to expose an even, vertical surface for the full thickness of the course. When required, rake fresh mixture against joints, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll. Transverse joints in adjacent lanes shall be offset a minimum of 2 feet.

3. Longitudinal Joints

a. Space is 6 inches apart. Do not allow joints to coincide with joints of existing pavement or previously placed courses. Spreader screed shall overlap previously placed lanes 2 to 3 inches and be of such height to permit compaction to produce a smooth dense joint. With a lute, push back mixture placed on the surface of previous lanes to the joint edge. Do not scatter mix. Remove and waste excess material. When edges of longitudinal joints are irregular, honeycombed, or poorly compacted, cut back unsatisfactory sections of joint and expose an even vertical surface for the full thickness of the course. When required, rake fresh mixture against joint, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll while hot.

b. ctory sections of joint and expose an even vertical surface for the full thickness of the course. When required, rake fresh mixture against joint, thoroughly tamp with hot tampers, smooth with hot smoothers, and roll while hot.

I. Protection: Do not permit traffic, including heavy equipment, on asphaltic concrete until surface temperature has cooled to at least 120°F.

3.7 PROTECTION

A. Existing Pavement: Protect existing pavements from damage. Movement of construction machinery and equipment over existing pavements during construction shall be at the Contractor’s risk. Existing pavements damaged by the Contractor’s operations shall be repaired or replaced to their original condition at the Contractor’s expense.

B. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the contract drawings.

C. Existing Utilities: Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to start of construction. The Contractor shall contact the local utility location company or each applicable utility company as required for assistance in locating existing utilities.

D. Structures and Surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance.

3.8 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.9 TESTING

A. All testing shall be made at the Owner's expense. The Engineer shall approve test locations.

B. Notify the testing laboratory, Engineer and Owner a minimum of 72 hours prior to all tests.

C. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.

D. Laboratory Testing

1. Independent testing laboratory shall operate in accordance with ASTM E329 and shall be approved by the Engineer prior to engagement.
2. Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test. Agencies to be used shall be submitted to the Engineer for review prior to engagement.

3. Aggregate Subbase and Graded Aggregate Base Courses

a. Maximum Density and Optimum Moisture Content: ASTM D1557 for general soil types and ASTM D4253 or ASTM D4254 for isolated cohesionless materials.
b. Frequency: One maximum density and optimum moisture content test for each source.

E. Field Testing

1. Independent Testing Laboratory shall prepare test reports that indicate test location, elevation data, and test results.
2. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer, and Contractor.
3. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

4. Aggregate Subbase and Graded Aggregate Base Courses

    a. In-Place Density: 1 per 1,000 SY per course and per lift, in accordance with one of the following:

        1) Sand Cone Method: ASTM D1556.
        2) Balloon Method: ASTM D2167.
        3) Nuclear Method: ASTM D2922.

    b. Grade: Entire site (50 feet grid maximum).
    c. Straightedge: Entire site (25 feet grid maximum).

5. Asphaltic Concrete (each course)

    a. Mix Design Compliance

        1) One analysis for each batch, but no less than one analysis for each 250 tons of asphaltic concrete produced or fraction thereof of asphalt produced.

    b. Maximum Density of Compacted Asphaltic Concrete:

        1) ASTM D1188 or ASTM D2726.
        2) One density test for each batch, but no less than one test for each 250 tons of asphaltic concrete produced or fraction thereof of asphalt produced.

    c. In-Place Density: 1 per 1,000 SY per course and per lift, in accordance with one of the following:

        1) ASTM D2950.
        2) Determine by taking 4-inch diameter cores. Separate courses by sawing.
        3) Determine in-place density of cores in accordance with ASTM D1188 or ASTM D2726.

    d. Grade: Entire site (50 feet grid maximum).
    e. Straightedge: Entire site (25 feet grid maximum).

3.10 ACCEPTANCE

A. If a tested material does not meet or exceed the specified requirements, the Contractor shall perform additional testing as directed by the Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Engineer until specified requirements are met.

B. All additional testing and work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all materials, labor, and equipment for jointed, portland cement concrete pavement including base course and joint sealing and all associated materials and work.

B. Related Sections:

1. Division 31 Section “Earth Moving” for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.2 DEFINITIONS

A. Compaction: The process of mechanically stabilizing a material by increasing its density. “Degree of Compaction” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D1557 or D698 for general soil types or ASTM D4253 or ASTM D4254 for isolated cohesionless materials.

B. Lift: A layer or course of soil placed on top of a previously prepared or placed surface.

C. Subgrade: Existing, in-situ soil or other material that is remaining after stripping or excavation. The subgrade is always existing material on which fill or new structures are to be placed.

1.3 LUMP SUM PRICE

A. The items listed in the proposal shall be considered as sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the material, compaction, shaping, finishing, dressing, disposal of surplus material, testing construction supervision and all other work required for satisfactory completion of concrete pavement.

1.4 UNIT PRICES

A. None this Section.

1.5 SUBMITTALS

A. Mix Designs

1. Submit a design mix for each class of concrete proposed for use. The mix shall be prepared by an approved testing laboratory. Compressive strength of at least 4 test cylinders of the design mix shall indicate 15% higher than 28 days strength specified.

B. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the following:

1. Aggregate Base

2. Portland Cement Concrete

    a. Aggregate
    b. Admixtures
    c. Cement

3. Joints

    a. Sealant
    b. Filler

C. Laboratory Testing: Submit laboratory testing data for approval as identified in the paragraph titled "Laboratory Testing" for any the following materials to be used prior to any material is delivered to the site.

    1. Aggregate Base: Maximum density.

D. Field Testing: Submit field testing data as identified in the paragraph titled "Field Testing" for the following:

    1. Aggregate Base: In place density.
    2. Portland Cement Concrete: Compressive Strength Tests (7 day and 28 day).

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.7 REGULATORY REQUIREMENTS

A. Comply with all Federal, State and local regulatory requirements.

1.8 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

F. Testing Agencies: Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test. Agencies to be used shall be submitted to the Engineer for review prior to engagement.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE

A. In accordance with “South Carolina State Highway Department Standard Specification for Highway Construction”, Section 305 - Aggregate Base Course.

2.2

2.2 FORMS

A. Shall be wood, plywood, metal, or other qualified material and shall be of the grade or type suitable to obtain the finish specified. Forms shall be constructed to the shape, for line, and grade required, and shall be maintained sufficiently rigid to prevent deformation under load.

B. Form work and details construction shall conform to Chapter 6 of ACI 318.

2.3 REINFORCEMENT

A. Dowel Bars: ASTM A615, Grade 40 or 60, plain billeted steel bars. Remove all burrs and projections from the bars. Coat sliding portion of each bar with shop applied paint. For doweled expansion joints, fit the outer end of the sliding portion of each dowel bar with a tight-fitting metal sleeve which conforms to manufacturer’s recommendations for dowel bars.

B. Tie Bars: ASTM A615, Grade 40 or 60, billeted or axle steel deformed bars.

C. Reinforcement

1. Reinforcing Steel: ASTM A615, Grade 60.
2. Mesh Reinforcement: ASTM A1064, flat sheets.

2.4 JOINT MATERIALS

A. Blocking Media: Compressible, non-shrinkable, non-reactive with joint sealant and non-absorption type such as plastic rod, free of oils or bitumens. Blocking media shall have a water absorption of not more than 5% by weight when tested in accordance with ASTM C509. Blocking media shall be consistent with the joint sealant manufacturers installation instructions and be at least 25% larger in diameter than the width of the joint being sealed.

B. Preformed Joint Filler: ASTM D1751 or ASTM D1752 Type II or III. Filler must be compatible with sealant.

C. Liquid Joint Sealant: Self-leveling silicone joint sealant such as Dow Corning 890SL or approved equal.

D. Preformed Compression Seals

1. ASTM D2628. Size as recommended by the manufacturer for the joint being sealed.
2. Primer, lubricant and adhesive as recommended by the manufacturer.

2.5 CURING MATERIALS

A. Impervious Sheeting: ASTM C171 with minimum sheet thickness of 10 mils. Non-reactive with other materials such as curing compound.

B. Liquid Membrane-Forming Compound: ASTM C309, white pigmented, Type 2, Class A or B.

2.6 PORTLAND CEMENT CONCRETE

A. Mix Materials

1. Cement: ASTM C150 Type I or II.
2. Water: Shall be clean, fresh and potable.
3. Aggregates: ASTM C33

4. Admixtures: Where not shown or specified, the use of admixtures is subject to the written approval of the Engineer.

a. Air Entraining: ASTM C260. Use in all portland cement concrete pavement.
b. Retarding: ASTM C494, Type B or D.
c. Accelerating: ASTM D98.
d. Water Reducing: ASTM C494.
e. Fly Ash and Pozzolans: ASTM C618: Types N, F, or C.
f. Ground Iron Blast Furnace Slag: ASTM C989: Grade 120.

B. Mix Properties

1. Design Mix in accordance with ACI 211.1. Concrete shall conform to the following:

a. Minimum Compressive Strength (28 days): 4,000 psi.
b. Maximum Aggregate Size: 1.5 inches.
c. Minimum Cement Content: 517 lbs./CY.
d. Maximum Water Cement Ratio: 0.5, by weight.
e. Range in Slump: 1 – 3 inches.
f. Allowable Air Content: 5, +/- 1.5%, by volume.

2. The minimum cement content is required for durable concrete with local aggregates but may be insufficient to obtain the specified strength, in which case, increase the cement content as necessary, without additional compensation under this contract.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE OR FILL

A. Water shall be removed from excavations before concrete is deposited. Hardened concrete debris and other foreign materials shall be removed from the interior of forms and from the inside of mixing and conveying equipment. The reinforcement shall be made secure in position and shall be subject to examination and approval.

B. Prepare subgrade or fill as specified in specification Division 31 Section “Earth Moving”.

3.2 AGGREGATE BASE COURSE

A. Placement: Place aggregate base on prepared subgrade or fill in maximum loose lifts of 8 inches. Do not place on surfaces that are muddy, frozen or that contain frost. Total thickness shall be as indicated. Compact with equipment well suited for material being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment being used. Compact each lift as specified herein prior to placing the overlaying lift.

B. Compaction: Compact the base course through the full depth to not less than 100% of maximum laboratory density.

C. Tolerances

1. Finished grade of base course shall be within 0.05 feet of indicated finish grade.
2. Finished surface of base course shall not vary more than 0.375 inch when tested with a 10-foot straightedge.
3. Finished thickness of base course shall not vary more than 0.5 inches from the required thickness at any point and the average of all depth measurements shall be at least that indicated.
4. Areas not meeting the specified requirements will be rejected until corrected by the Contractor.

D. Protection: Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance. Any repair or re-establishment of final grades shall be made prior to final acceptance.

3.3 FORMS

A. Construct forms to be removable without damaging the concrete.

B. Coating: Before placing the concrete, coat the contact surfaces of forms, (except existing pavement sections where bonding is required) with a non-staining mineral oil, non-staining form coating compound, or two coats of nitro-cellulose lacquer. When using existing pavement as a form, clean existing concrete and then coat with an asphalt emulsion bondbreaker before concrete is placed.

C. Grade and Alignment: Check and correct grade elevations and alignment of the forms immediately before placing the concrete.

3.4 REINFORCEMENT

A. Dowel Bars: Install bars accurately aligned, vertically and horizontally, at indicated locations and dimensions. Dowel alignment shall not exceed 0.125 inch per foot from perpendicular to joint face. Before installation, thoroughly grease the sliding portion of each dowel.

B. Tie Bars: Install bars, accurately aligned, vertically and horizontally at indicated locations. For slipform construction, insert bent tie bars by hand or other approved means.

C. Slab Reinforcement

1. Placement: Place reinforcement on suitable chairs prior to concrete placement or depress the reinforcement into the plastic concrete to the required elevation after concrete has been spread.
2. Laps and Splices: Minimum 12 inches.

3. Joints: Place reinforcement at joints as indicated on drawings.

3.5 MEASURING, MIXING, CONVEYING, AND PLACEMENT CONCRETE

A. Measuring: ASTM C94.

B. Mixing: ASTM C94, except as modified herein. Begin mixing within 30 minutes after cement has been added to aggregates. When air temperature is greater than 85°F, reduce mixing time and place concrete within 60 minutes. Additional water may be added to bring slump within the required limits specified, provided that the specified water/cement ratio is not exceeded.

C. Conveying: ASTM C94.

D. Placing: ACI 301, except as modified herein. Do not exceed vertical drop of 3 feet from point of discharge.

E. Vibration: Immediately after spreading concrete, consolidate concrete with internal type vibrating equipment along the boundaries of all slabs regardless of slab thickness, and interior of all slabs 6 inches or more in thickness. Limit duration of vibration to that necessary to produce consolidation of concrete. Excessive vibration will not be allowed. Vibrators shall be operated at any one location for more than 15 seconds. With approval from the Engineer, alternative vibration equipment may be utilized on unreinforced pavements less than 6 inches in thickness.

F. inforced pavements less than 6 inches in thickness.

G. Cold Weather: Do not place concrete when ambient temperature is below 40°F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Obtain written approval from the Engineer if it becomes necessary to place concrete in cold weather conditions that exceed these limitations and, in such cases, follow the practices found in ACI 306.1.

H. Hot Weather: Maintain required concrete temperature in accordance with Figure 2.1.5 in ACI 305R to prevent evaporation rate from exceeding 0.2 pounds of water per square foot of exposed concrete per hour.

I. Finishing Concrete: Start finishing operations immediately after placement of concrete. Use finishing machine, except hand finishing may be used in emergencies and for slabs in inaccessible locations or of such shape or size that machine finishing is impractical. Transverse and longitudinal surface tolerances shall be 0.25 inches in 10 feet.

1. Side form finishing: Strike off and screed concrete to the required cross section by a power-driven transverse finishing machine. Elevation of concrete shall be such that, when consolidated and finished, pavement surface will be adequately consolidated and at the required grade. Equip finishing machine with two screeds which are readily and accurately adjustable for changes in pavement cross section and compensation for wear and other causes. Make as many passes as necessary to achieve the required compaction, retention of coarse aggregate at the surface, and surface of uniform texture, true to grade and cross section. Do not permit excessive operation over an area, which will result in an excess of mortar and water being brought to the surface.

2. and cross section. Do not permit excessive operation over an area, which will result in an excess of mortar and water being brought to the surface.
3. Equipment Operation: Maintain the travel of machine on the forms without lifting, wobbling or other variation of the machine which tend to affect the precision of the concrete finish. Keep tops of forms clean. During the first pass of the finishing machine, maintain a uniform ridge of concrete ahead of the front screed for its entire length.
4. Joint Finish: Before concrete is hardened, correct edge slump of pavement, exclusive of edge rounding, in excess of .02 foot. Finish pavement surfaces on both sides of a joint to the same

grade. Finish formed joints from a securely supported transverse bridge. Correct deviations before newly placed concrete has hardened.

5. Hand Finishing: Strike off and screed surface of concrete to elevations slightly above finish grade so that when consolidated and finished, the pavement surface will be at the required grade. Vibrate the entire surface until the required compaction and reduction of surface voids is secured with a strike off template.
6. Longitudinal Floating: After initial finishing, further smooth and consolidate concrete by means of hand operated longitudinal floats. Use floats that are not less than 12 feet long and 6 inches wide and stiffened to prevent flexing and warping.

7. Surface Finish

    a. Plastic Grooving: After surface irregularities have been removed, give the concrete surface a uniformly roughened finish by use of a wire comb or other approved texturing device similar to a wire comb. Prior to plastic grooving, make one pass with burlap drag in the longitudinal direction. Complete grooving while concrete surface is in such condition that it will not be torn or unduly roughened, and before surface has obtained its initial set. Texture small irregular areas, or areas not suitable for machine texturing, with a hand operated device producing a textured surface equivalent to that required for machine combing.
    b. Burlap Drag Finish: Before concrete becomes non plastic, finish the surface of the slab by dragging on the surface a strip of clean, wet burlap measuring from 3 to 10 feet in length and 2 feet wider than the width of the pavement. Drag the surface to produce a finished surface with a fine granular or sandy texture without leaving disfiguring marks.
    c. Brooming: Finish the surface of the slab by brooming the surface with a new wire broom at least 18 inches wide. Gently pull the broom over the surface of the pavement from edge to edge just before the concrete becomes non plastic. Slightly overlap adjacent strokes of the broom. Broom perpendicular to centerline of the pavement so that the corrugations produced will be uniform in character and width and not more than 0.0625 inch in depth. Broomed surface shall be free form porous spots, irregularities, depressions, and small pockets or rough spots such as may be caused by accidentally disturbing particles of coarse aggregate embedded near the surface.
    d. Edging: At the time the concrete has attained a degree of hardness suitable for edging, carefully finish slab edges, including edges of formed joints, with an edge having a maximum radius of 0.125 inches. When brooming is specified as the final finish, edge transverse joints before starting brooming, then operate broom to obliterate the marks left by the edging tool as much as possible without disturbing the rounded corner left by the edger. Clean by removing loose fragments and soupy mortar for proper finishing. Refill voids solidly with a mixture of suitable proportions and consistency and refinish. Remove unnecessary tool marks and edges. Remaining edges shall be smooth and true to line.

3.6 JOINT SEALING

A. Equipment

1. Sandblasting: Sandblasting equipment shall include compressor, hose, and nozzles of proper size and shape to produce clean joints. Equip compressor with traps that will maintain compressed air free of oil and water.
2. Power Saws: Concrete saws shall be self-propelled and capable of sawing joints in concrete to indicated depths, width, and alignment without spalling or raveling of concrete and at a production rate to avoid uncontrolled cracking.
3. Joint Sealing Equipment: In accordance with the sealant manufacturer’s written instructions.

B. Joints

1. General: Joints shall be of the type and location shown on the drawings. Where curved pavement edges occur, make joints to intersect tangents to curve at right angles. Joints shall be in a continuous straight line extending from edge of pavement to edge of pavement. Do not

stagger joints in abutting pavements except where shown. Protect joints from curing compounds by covering with tape or rope. Take necessary precautions to ensure proper curing at joints.

2. Sawing of Joints: Sawing will be conducted when concrete has hardened sufficiently to prevent raveling or flaking along edges of sawcut and before uncontrolled shrinkage cracking of pavement occurs. Time for joint sawing shall not exceed 12 hours from time of placement. Mark alignment of joints by chalk line or other suitable guide. Saw cuts shall not vary from required alignment by more than 0.5 inches in 10 feet. Sawcutting shall be carried on both during the night and day as required to prevent uncontrolled cracking. A supply of sawblades and at least one standby unit in working condition will be readily available during sawing operations. If uncontrolled cracking has occurred do not saw along the cracks but notify the Engineer.
3. Protection of Joints: Immediately after each joint is sawed, thoroughly clean the saw cut and adjacent surface by flushing with water and blowing with compressed air to remove waste. Respray curing compound on surfaces affected by sawing and cleaning operations, but do not permit curing compound into the joints. Protect joints from intrusion of foreign materials by installation of blocking media as indicated or by other approved means. Do not seal joints until concrete has cured sufficiently as required by the sealant manufacturer's written instructions.
4. acturer's written instructions.
5. Joints at Vertical Surfaces: Construct joints where slabs abut light pads, catch basins, manholes, footings, walls, columns and structures as expansion joints, 0.75 inches wide and full depth of the pavement. Provide joints with preformed joint filler and sealant. Secure filler in place by bonding adhesive. Do not nail of stake filler in place. Fit abutting sections or ends of filler material tightly together to prevent concrete from entering expansion joint space. Place sealant in accordance with the manufacturer's written instructions.
6. Expansion Joints: Expansion joints shall have the dimensions and spacing shown and be filled with preformed joint filler and sealant. Hold filler in place accurately and securely during placement and finishing of concrete. Use bonding adhesive to secure filler. Do not nail or stake filler in place. Under no circumstances shall concrete be left above expansion material or across the joint. Fit abutting sections or ends of filler material tightly together to prevent concrete from entering expansion joint space. Bulkheads, when used, shall have sufficient strength to remain straight form edge to edge of slab when concrete is placed against it.
7. Contraction Joints: Saw joints to dimensions indicated. Joint lines shall be within specified tolerances, straight, and extend for width of transverse joint and for entire length of longitudinal joint.

8. Construction Joints

    a. Butt Type Joints: Provide butt type joints as indicated by placing fresh concrete against hardened concrete. Clean vertical surface of hardened concrete and coat with curing compound or asphalt emulsion bond breaker before concrete is placed. After concrete has cured, saw joint as specified and in accordance with dimensions shown.
    b. Emergency Stops: If an emergency stop occurs remove the concrete back to the nearest transverse joint and install a keyed or doweled construction joint.
    c. Keyed Joints: Locate keyways as indicated. When concrete is placed using side or stationary forms, use plastic or metal forms securely fastened to the side forms to form the keyway. When concrete is placed using slip form pavers, form the keyway by metal forms permanently attached to the side forms or during slip form operation by inserting preformed metal or plastic keyway liner which by be left in place.

9. Preparation of Joints

    a. General: Seal joints unless otherwise indicated. Immediately before installation of sealant, thoroughly clean joints until, laitance, curing compound, preformed joint filler, and protrusions of hardened concrete are removed from sides and upper edges of joint space.
    b. Cleaning of Sawed Joints: Use a power-driven concrete saw to saw through preformed joint filler and to widen joint to indicated dimensions. Blow loosened materials from the joint with compressed air. Clean concrete joint faces and pavement joint surfaces extending at least one inch from the edges of joints by thoroughly sandblasting and air

blowing until the surfaces are free of dust, dirt, curing compound, preformed joint filler, and other material that might prevent bonding of sealer to concrete.

10. Installation

    a. Blocking Media: Immediately after joints receive final cleaning, install blocking media specified in the bottom of the joint reservoir.
    b. Liquid Sealants: Install liquid sealants in accordance with the manufacturer's written instructions. Fill joints to the depths and tolerances indicated without formation of voids or entrapped air. Remove excess or spilled sealant from pavement and discard.
    c. Preformed Compression Seals: Install preformed compression seals in accordance with the manufacturer's written instructions. Size preformed compression seals appropriately for the joint being sealed as recommended by the manufacturer.

3.7 CURING

A. General: Protect concrete adequately from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, oil stains and other deleterious actions. Do not allow newly placed pavement to dry out from the time it is placed until the expiration of the specified curing period. Use impervious sheeting curing or liquid membrane forming compound curing. Do not use membrane forming compound curing where surface is to be painted, where coverings are to bonded, where other concrete is to be bonded. Maintain temperature of air next to concrete above 40°F for duration of curing.

B. Impervious Sheeting Curing: Wet entire exposed surface thoroughly with a fine spray of water and then cover with impervious sheeting. Lay sheets directly on concrete surface and overlap 12 inches. Make sheeting not less than 18 inches wider than the surface being cured. Weigh down edges and overlaps to form closed joints. Repair or replace sheets when torn or otherwise damaged during curing. Leave sheeting on concrete surface to be cured for at least 7 days.

C. Liquid Membrane Forming Compound Curing

    1. Seal or cover joint openings prior to application of curing compound to prevent curing compound from entering the joints. Compound shall remain on concrete for 7 days before removing sealer or covering and placing sealing material in joints.
    2. Apply compound immediately after surface loses its water sheen and has a dull appearance and before joints are sawed. Apply in strict accordance with manufacturer's written instruction. Apply an additional coat of compound immediately to areas where film is defective. Reapply to areas that are subject to heavy rainfall within 3 hours after curing compound has been applied in the same area.
    3. Keep concrete surfaces to which liquid membrane forming compound have been applied free from vehicular traffic and other sources of abrasion for not less than 2 hours. Except for joint sawing operations, foot traffic is restricted until after 24 hours for inspection purposes. Maintain continuity of coating for entire curing period and repair damage to coating immediately.

3.8 PROTECTION

A. Protect new portland cement concrete pavement from damage for the duration of the contract.

B. Existing Pavement: Protect existing pavements to remain from damage. Movement of construction machinery and equipment over existing pavements during construction shall be at the Contractor's risk. Existing pavements damaged by the contractor's operations shall be repaired or replaced to their original condition at the contractor's expense.

C. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the contract drawings.

D. Existing Utilities: Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the local utility location company or each applicable utility company as required for assistance in locating existing utilities.

E. Structures and surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance.

3.9 INSPECTION

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

D. Inspections

1. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections or tests.
2. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

    a. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
    b. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

3. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

    a. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.10 TESTING

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

1. All testing of soil material and compaction for subgrade, bedding and backfill shall be in accordance with Division 31 Section “Earth Moving”.
2. The Engineer shall approve test locations.

B. Notify the Testing Agency, Engineer, and Owner a minimum of 72 hours prior to all tests.

C. Laboratory Testing

1. Independent Testing Laboratory shall operate in accordance with ASTM E-329 (latest revision) and shall be approved by the Engineer prior to engagement.
2. Maximum density and optimum moisture for Aggregate Base Course: ASTM D1557 for general soil types or ASTM D4253 or ASTM D4254 for isolated cohesionless materials.
3. Frequency of laboratory testing: One maximum density and optimum moisture content test for each source.

D. Field Tests

1. Aggregate Base Courses:

a. In-Place Density: 1 per 1,000 SF per course and per lift, in accordance with one of the following:

1) Sand Cone Method: ASTM D1556
2) Balloon Method: ASTM D2167
3) Nuclear Method: ASTM D2922

b. Testing Frequency

1) One test per 1,000 SF per lift.

2. Portland Cement Concrete Pavement:

a. Slump Tests: ASTM C143.

1) Frequency: Take samples for slump determination from concrete during placement. Perform tests at the beginning of a concrete placement operation and at subsequent intervals to ensure that requirements are met. In addition, perform tests each time test cylinders are made.

b. Compressive Tests: ASTM C39.

1) Make four test cylinders for each set of tests. Test two cylinders at 7 days and two at 28 days.
2) Concrete strength will be considered satisfactory when the minimum of the 28-day test results equals or exceeds the specified 28-day compressive strength and no individual strength test is less than 3,200 psi.
3) If the ratio of the 7-day strength test to the specified 28-day strength is less than 65%, make necessary adjustments for conformance.
4) Frequency: Shall not be less than four test cylinders for each 50 CY or fraction thereof, placed.
5) Concrete which is determined to be defective based on strength acceptance criteria herein, shall be removed and replaced with acceptable concrete at the Contractor's expense.

c. Air Content Tests: ASTM C231.

1) Frequency: One sample taken during placement of concrete and at the same frequency as slump testing.

E. Test Reports

1. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.
2. Test reports prepared by the Independent Testing Laboratory shall prepare indicate test location, elevation data, and test results.
3. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer, and Contractor.
4. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

3.11 FIELD QUALITY CONTROL

1. Surface Tests: After curing, test the entire pavement surface with a 10-foot straight edge. Remove and replace concrete, mechanically grind, or profile concrete surface, or correct surface as approved, for any portion of the pavement which shows irregularities greater than 0.25 inches in 10 feet in a longitudinal and transverse direction.

    a. Grade: Entire site (50 feet grid maximum).
    b. Straightedge: Entire site (25 feet grid maximum).

2. Thickness Tests: Measure during placement to determine in place thickness of concrete pavement.
3. Reinforcement: Inspect reinforcement prior to installation to assure it is free of loose flaky rust, loose scale, oil, mud, or other objectionable material.
4. Dowels: Inspect dowel placement prior to placing concrete to assure that dowels are of the size indicated, and are spaced, aligned, painted, and oiled as specified. Dowels shall not deviate from vertical or horizontal alignment after concrete placement by more than 0.125 inch per foot.

3.12 ACCEPTANCE

A. If a tested material does not meet or exceed the specified requirements, the Contractor shall perform additional testing as directed by the Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Engineer until specified requirements are met.

B. All additional testing and work that is the result of a failed test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 321313

SECTION 321613 - SITE WORK CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all materials, labor, and equipment for portland cement concrete used in structures, sidewalks, curb and gutter.

B. Related Sections:

1. Division 31 Section “Earth Moving” for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.2 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the material, compaction, shaping, finishing, dressing, disposal of surplus material, testing construction supervision and all other work required for satisfactory completion of site work concrete.

1.3 UNIT PRICES

A. None this Section.

1.4 SUBMITTALS

A. Mix Designs: The Contractor shall submit for review a design mix for each class of concrete proposed for use. The mix shall be prepared by an approved testing laboratory. Compressive strength of at least four test specimens of the design mix shall indicate 15% higher than 28 days strength specified.

B. Field Testing: Compressive strength tests.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver and store materials in a manner to prevent contamination or segregation. Do not stockpile materials in a manner or location that will cause excessive wetting or transporting of materials off-site or into storm drainage collection systems.

1.6 REGULATORY REQUIREMENTS

A. Comply with all Federal, State and local regulatory requirements.

1.7 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience with similar work. At the option of the Owner and/or Engineer, a list of projects and the contacts who are familiar with this competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Environmental Conditions: Concrete shall be mixed and placed only when temperature is at least 40°F and rising.

F. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

G. Testing Agencies: Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test.

PART 2 - PRODUCTS

2.1 CONCRETE

A. Design Mix in accordance with ACI 211.1.

Class	**Compressive Strength (28 day)**	**Application**
A	3,000 psi	Curb and gutters, sidewalks, structures
B	2,500 psi	Thrust blocks

1. Maximum Water/Cement Ratio: 0.5.
2. Range in Slump: 2 – 5 inches.
3. Cement: ASTM C150, Type I.
4. Water: Shall be clean, fresh and potable.
5. Aggregates: ASTM C33.

6. Admixtures: Where not shown or specified, the use of admixtures is subject to the written approval of the Engineer.

   a. Air Entraining: ASTM C260. Use in all portland cement concrete pavement.
   b. Retarding: ASTM C494.
   c. Accelerating: ASTM D98.
   d. Water Reducing: ASTM C494.
   e. Fly Ash and Pozzolans: ASTM C618, Types N, F, or C.

f. Ground Iron Blast Furnace Slag: ASTM C989, Grade 120.

2.2 FORMS

A. Shall be wood, plywood, metal, or other qualified material and shall be of the grade or type suitable to obtain the finish specified. Forms shall be constructed to the shape, for line, and grade required, and shall be maintained sufficiently rigid to prevent deformation under load. Form work and details construction shall conform to Chapter 6 of ACI 318.

2.3 REINFORCEMENT:

A. Reinforcing Steel: Conform to ASTM A615, Grade 60.

B. Mesh Reinforcement: Conform to ASTM A185, flat sheets.

2.4 JOINT MATERIALS

A. Blocking Media: Compressible, non-shrinkable, non-reactive with joint sealant and non-absorption type such as plastic rod, free of oils or bitumens. Blocking media shall have a water absorption of not more than 5% by weight when tested in accordance with ASTM C509. Blocking media shall be consistent with the joint sealant manufacturers installation instructions and be at least 25% larger in diameter than the width of the joint being sealed.

B. Preformed Joint Filler: ASTM D1751 or ASTM D1752 Type II or III. Filler must be compatible with sealant.

C. Liquid Joint Sealant: Silicone joint sealant such as Dow Corning 890SL or approved equal.

2.5 CURING MATERIALS

A. Impervious Sheeting: ASTM C171 with minimum sheet thickness of 10 mils. Non-reactive with other materials such as curing compound.

B. Liquid Membrane-Forming Compound: ASTM C309, white pigmented, Type 2, Class A or B.

2.6 ANCHORAGE ITEMS

A. Slots, inserts, clips, and other devices for anchoring masonry, wood, steel, and mechanical items to concrete shall be of standard manufacture, and of qualified types as required to engage and anchor the work specified under other sections.

PART 3 - EXECUTION

3.1 PREPARATION BEFORE PLACING

A. Water shall be removed from excavations before concrete is deposited. Hardened concrete debris, and other foreign materials shall be removed from the interior of forms and from the inside of mixing and conveying equipment. The reinforcement shall be made secure in position and shall be subject to examination and approval.

B. Prepare surface to receive concrete in accordance with Division 31 Section “Earth Moving”.

3.2 FORMS

A. Construct forms to be removable without damaging the concrete.

B. Coating: Before placing the concrete, coat the contact surfaces of forms, (except existing pavement sections where bonding is required) with a non-staining mineral oil, non-staining form coating compound, or two coats of nitro-cellulose lacquer. When using existing pavement as a form, clean existing concrete and then coat with an asphalt emulsion bondbreaker before concrete is placed.

C. Grade and Alignment: Check and correct grade elevations and alignment of the forms immediately before placing the concrete.

3.3 REINFORCEMENT

A. Metal reinforcement shall be free from rust, scale, or other coatings, and shall be accurately placed and properly secured in position by concrete blocks or metal chairs and by spacers. Bars shall be bent cold. Exposed bars intended for bonding with fixture extensions shall be protected from corrosion by an accepted covering. Bar chairs shall be hot dipped galvanized where in contact with forms for concrete that is exposed to view.

B. Concrete Protection over Steel Reinforcement:

1. Concrete deposited against ground: 3 inches.
2. Formed surfaces exposed to weather or ground – Bars #6 and Larger: 2 inches.
3. Formed surfaces exposed to weather or ground – Bars less than #6: 1.5 inches.
4. Interior surfaces, beams, girders, and columns: 1.5 inches.
5. Slabs, walls, and joists – Bars #11 and smaller: 0.75 inches.

3.4 MEASURING, MIXING, AND CONVEYING CONCRETE

A. Measuring, mixing and conveying: ASTM C94.

B. Concrete mixed at the job site shall be mixed in a batch mixer in accordance with ACI 318, and in a similar manner subject to approval. Mixing time for stationary mixers over 1 CY in capacity shall be increased 15 seconds for each additional 0.5 CY or fraction thereof of material mixed.

3.5 PLACING CONCRETE

A. Placing of concrete shall conform to Chapter 5 of ACI 318.

B. Concrete having attained initial set or having contained water for one more than 90 minutes shall not be used in the work. Concrete shall not be dropped freely more than 5 feet on unexposed work, or more than 3 feet in exposed work. Concrete shall be mixed and placed only when temperature is at least 40°F and rising. Concrete footings shall be placed only upon surfaces that are free from frost, ice, mud, or other detrimental circumstances. When placed on dry soil or pervious material, waterproof paper or polyethylene sheeting shall be laid over the surfaces that are to receive the concrete.

3.6 FINISHES

A. Concrete shall be deposited to the required thickness, compacted, screed to grade, and finished monolithically to a smooth broom finish. Where drains, or sumps occur, the concrete shall be sloped to drain. Slight honeycomb and minor defects shall be patched with cement mortar made with one part cement and two parts fine aggregate and then rubbed smooth with carborundum brick. Patching shall be accomplished immediately after forms are removed. Immediately after removing forms, other exposed surfaces shall be dampened, brush-coated with grout, and rubbed with a wood float. Floating devices shall be rubbed with burlap and kept damp by fog spraying.

3.7 CURING

A. Immediately after placing or finishing, concrete surfaces not covered by forms shall be protected against moisture loss for not less than 7 days by use of impervious sheeting or curing compound. Curing compound shall be applied in strict accordance with the manufacturer's recommendations.

3.8 BONDING AND GROUTING

A. Before depositing new concrete on concrete that has set, the surface of the set concrete shall be thoroughly cleaned of laitance, foreign matter, and loose particles leaving a rough surface with clean and sound exposed aggregate. Forms shall be re-tightened, and the surfaces of the set concrete shall be slushed with a grout coat of neat cement and water. Where an epoxy bonding agent is called for on the drawings, the epoxy bonding agent shall be polysulfide liquid polymer and an epoxy resin combined at the job site, in equal volumes and thoroughly mixed. The mixed agent shall be applied on a clean concrete surface by brushing or spraying. A 10 mil coating shall be spread evenly to cover all bonding surfaces. When a bonding agent has been applied, and while the surface is still sticky, new concrete to be bonded shall be put into place.

3.9 PROTECTION

A. Protect new concrete from damage for the duration of this contract.

B. Existing Pavement: Protect existing pavements from damage. Movement of construction machinery and equipment over existing pavements during construction shall be at the Contractor's risk. Existing pavements damaged by the contractor's operations shall be repaired or replaced to their original condition at the contractor's expense.

C. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the contract drawings.

D. Existing Utilities: Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the local utility location company or each applicable utility company as required for assistance in locating existing utilities.

E. Structures and surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance.

3.10 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.11 TESTING

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

1. All testing of soil material and compaction for subgrade, bedding and backfill shall be in accordance with Division 31 Section “Earth Moving”.
2. The Engineer shall approve test locations.

B. Notify the Testing Agency, Engineer and Owner a minimum of 72 hours prior to all tests.

C. Field Testing

1. Portland Cement Concrete:

a. Compressive Strength Test: ASTM C39

1) Three test cylinders per each 50 CY of concrete placed or for each structure requiring more than 10 CY of concrete.
2) One cylinder shall be tested at 7 days and two at 28 days in accordance with ASTM C39.

D. Test Reports

1. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.
2. Test reports prepared by the Independent Testing Laboratory shall prepare indicate test location, elevation data, and test results.
3. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer, and Contractor.
4. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

3.12 FIELD QUALITY CONTROL

A. Portland Cement Concrete:

1. Surface Tests: After curing, check each structure, sidewalk or other feature with a 10-foot straight edge for proper grade, slope and cross slope. Remove and replace concrete, mechanically grind, or profile concrete surface, or correct surface as approved, for any

portion of the pavement which shows irregularities greater than 0.25 inches in 10 feet in a longitudinal and transverse direction.

2. Thickness Tests: Measure during placement to determine in place thickness of concrete pavement.

3.13 ACCEPTANCE

A. If a tested material does not meet or exceed the specified requirements, the Contractor shall perform additional testing as directed by the Engineer to adequately define the limits of the material not meeting the specifications. Materials shall be re-tested to the satisfaction of the Engineer until specified requirements are met.

B. All additional testing and work that is the result of a failed inspection and/or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 321613

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, equipment, and services for pavement markings of types, patterns, sizes and colors as shown on the plans and as specified herein:

1.2 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the plans and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for all material, equipment, labor, testing, construction supervision and all other work required for satisfactory completion of pavement marking.

1.3 UNIT PRICES

A. None this Section.

1.4 SUBMITTALS

A. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the following:

1. Paints
2. Reflective Media
3. Thermoplastic Material

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver paints and paint materials in original sealed containers that plainly show the designated name, specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer. Provide storage facilities at the job site for maintaining materials at temperatures recommended by the manufacturer.

1.6 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

1.7 QUALITY ASSURANCE

A. Materials: All material submittals shall be submitted by the contractor and reviewed and accepted in writing by the Engineer prior to ordering of any materials.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of 2 years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience with similar work. At the option of the Engineer, a list of projects and the Owners or Engineers who are familiar with his competence may be required to be submitted to verify experience.

D. Environmental Conditions: Unless otherwise approved by the manufacturer's written instructions, apply paint to clean, dry surfaces, and unless otherwise approved, only when air and pavement temperatures are above 40°F for oil-based materials, 50°F for water-based materials, and less than 95°F. Maintain paint temperature within these same limits.

E. Equipment: Shall be well maintained, suited for the intended work and capable of delivering the finished product to the standards shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paints: Federal Specification TT-P-1952, color as indicated.

B. Reflective Media: Federal Specification TT-B-1325, Type I, Gradation A.

C. Thermoplastic Materials: In accordance with South Carolina Department of Transportation Standard Specifications for Highway Construction (SCDOT SSHC).

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACE

A. Prepare surface in accordance with manufacturer's written instructions.

B. Allow new pavement surfaces to cure as recommended by the manufacturer's written instructions or 30 days if not specified by the manufacturer.

C. Except as otherwise specified by the manufacturer's written instructions:

D. Thoroughly clean surfaces to be marked before application of the paint. Remove dust, dirt, residual curing compounds and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, waterblasting or a combination of these methods as required. Scrub affected areas, where oil or grease is present on old pavements to be marked, with several applications of trisodium phosphate solution or other approved detergent or degreaser and rinse thoroughly after each application. After cleaning oil-soaked areas, seal with shellac or primer recommended by the manufacturer to prevent bleeding through the new paint. Do not commence painting in any area until pavement surfaces are dry and clean.

3.2 APPPLICATION

A. Rate of Application

1. Paint: Apply paint evenly to the pavement area to be coated at a rate of 105 SF/GAL plus or minus 5 SF/GAL.
2. Reflective media: Apply glass spheres uniformly to the wet paint on road and street pavement at a rate of 6 lbs./GAL plus or minus 0.5 lbs./GAL.
3. Thermoplastic material: Apply in accordance with SCDOT SSHC.

B. Painting: Provide guidelines and templates as necessary to control paint application. Take special precautions in marking numbers, letters, and symbols. Manually paint numbers, letters, and symbols. Sharply outline all edges of markings. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. Discontinue painting operations if there is a deficiency in drying of the markings until cause of the slow drying is determined and corrected.

C. Reflective Media: Application of reflective media shall immediately follow the application of paint. Accomplish drop-on application of the glass spheres to ensure even distribution at the specified rate of coverage. Should there be a malfunction of either paint applicator or reflective media dispenser, discontinue operations until deficiency is corrected.

D. Curing: Allow markings to cure in accordance with manufacturer's written instructions.

3.3 PROTECTION

A. Protect new markings from adverse weather and traffic as recommended by the manufacturer's written instructions.

B. As required, place warning signs near the beginning of the work site and well ahead of the work site for alerting approaching traffic from both directions. Place small markers along newly painted lines to control traffic and prevent damage to newly painted surfaces. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation.

3.4 INSPECTIONS

A. Notify the Owner, Project Representative and Engineer a minimum of 72 hours prior to all required observations, inspections, or tests.

B. All work conducted and materials furnished shall be subject to review by the Engineer or the Project Representative. The Engineer will also have the right to require that any portion of the work be conducted in his presence.

1. If the work is covered after such instruction, it shall be exposed by the Contractor for observation.
2. However, if the Engineer is notified that such work is scheduled and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.5 ACCEPTANCE

A. Final acceptance will be based on satisfactory construction of markings as approved by the Owner and/or Engineer. Markings shall be re-worked to the satisfaction of the Engineer until specified requirements are met.

B. All additional work that is the result of failed inspection shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 321723

SECTION 334100 - SITE STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. This section covers all work associated with the excavation, installation and construction, backfilling and testing for storm drainage piping and structures as indicated on the drawings and as specified herein.

B. Related Sections:

1. Division 31 Section “Earth Moving” for excavating, trenching, backfilling, site grading, controlling surface-water runoff and ponding and testing of soils for utilities.
2. Division 31 Section “Rip Rap” for placement of rip rap for slope protection and erosion control.
3. Division 32 Section “Site Work Concrete” for cast-in-place concrete.

1.2 DEFINITIONS

A. Subgrade: Existing, in-situ soil or other material that is remaining after stripping or excavation. The subgrade is always existing material on which fill or new structures are to be placed.

B. Excavation: The removal of soil or material to obtain a specified depth or elevation.

C. Borrow: Material that must be transported to the site. A material that must be developed by others and transported to the site. Not available on site.

D. Backfill: Fill material used in refilling a cut, trench or other excavation.

E. Lift: A layer or course of material placed on top of a previously prepared or placed material.

F. Unsuitable Material: Existing, in situ soil or other material which can be identified as having insufficient strength characteristics or stability to carry intended loads in fill or embankment without excessive consolidation or loss of stability. Materials classified as PT, OH, or OL by ASTM D 2487 are unsuitable. Unsuitable materials also include man-made fills, refuse, frozen material, uncompacted backfills from previous construction, unsound rock or soil lenses, or other deleterious, organic, or objectionable material.

G. Granular Material: Soils classified as GW, GP, SW or SP by ASTM D 2487. Materials classified as GM and SM will be identified as granular only when fines have a plasticity index of zero.

H. Compaction: The process of mechanically stabilizing a material by increasing its density at a controlled moisture condition. “*Degree of Compaction*” is expressed as a percentage of the maximum density obtained by the test procedure described in ASTM D698 for general soil types or ASTM D 4253 or ASTM D 4254 for isolated cohesionless materials, abbreviated in this specification as “___ *percent maximum density*”.

I. Drainage Structure: Any structure constructed as part of the storm drainage collection or removal system. This includes catch basins, curb inlets, control structures, headwalls, flared end sections, junction boxes and manholes.

J. Bedding: The subgrade or fill material that directly supports the load of a pipe.

1.3 LUMP SUM PRICE

A. The items listed in the proposal shall be considered sufficient to complete the work in accordance with the drawings and specifications. Any portion of the work not specifically listed in the bid form shall be deemed a part of the item with which it is associated and shall be included in the lump sum price. The price shall be full compensation for the excavating, filling, transporting of material, compaction, shaping, finishing, dressing, disposal of surplus material, testing, staking, construction supervision and all other work required for satisfactory completion of the storm drainage operations.

B. Base bids on the following criteria:

1. Surface elevations as indicated.
2. No pipes or other man-made structures other than those indicated will be encountered. The utility locations shown are based on available information and are approximate and shall be field verified prior to beginning any work.
3. Borrow material in the quantities required are not available on site and must be developed and obtained by the Contractor.

1.4 UNIT PRICES

A. None this Section.

1.5 SUBMITTALS

A. Shop Drawings

1. Pre-Cast Structures and accessories

B. Certifications: Provide manufacturer or supplier certification of compliance indicating conformance to this specification or the referenced standard(s) for the following:

1. Piping

a. Reinforced concrete pipe (RCP), including fittings and joint materials.
b. High density polyethylene pipe (HDPE), including fittings and joint materials.
c. High density polypropylene (PP), including fittings and joint materials.
d. Polyvinyl chloride pipe (PVC), including fittings and joint materials.
e. Ductile iron pipe (DIP), including fittings and joint materials.

2. Perforated Drain Piping

a. HDPE less than 12-inch diameter.
b. HDPE equal to or greater than 12-inch diameter.
c. PVC 4 inch and 6 inches only.

3. Pre-cast structures.
4. Cast iron frames, covers and gratings.
5. Cleanout materials.
6. Downspout boots.
7. Water Quality Units.

C. Inspection Reports

1. Pipeline Post Installation Inspection Report

D. Operational Closeout Documentation: Provide documentation required by the Utility and SCDES prior to placing the system into operation. Items include but are not limited to:

1. Storm Drainage Record Drawings
2. Easement Plat with Legal Description
3. Guarantee / Warranty Documentation

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery and Storage

1. Piping: Inspect materials delivered to site for damage; store with minimum of handling. Store plastic piping, jointing materials, and rubber gaskets under cover out of direct sunlight. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.

2. Metal Items: Check upon arrival; identify and segregate as to types, functions, and sizes. Store off the ground in a manner affording easy accessibility and not causing excessive rusting or coating with grease or other objectionable materials.

B. Handling

1. Handle pipe, fittings, and other accessories in a manner to ensure delivery to the trench in sound undamaged condition. Take special care not to damage coatings and linings on pipe and fittings; if damaged, make repairs. Carry pipe to trench - do not drag.

1.7 REGULATORY REQUIREMENTS

A. Comply with Federal, State, and local regulations.

B. Comply with the requirements of the land disturbance permit and stamped approved drawings issued for this project by the South Carolina Department of Environmental Services (SCDES) and/or the MS4.

1.8 QUALITY ASSURANCE

A. Materials: The Contractor will furnish the Engineer and Owner all submittals identified in the paragraph “Submittals” before ordering. The Engineer will review the Contractor’s submittals and provide in writing an acceptance or rejection of material.

B. Manufacturer: Material and equipment shall be the standard products of a manufacturer who has manufactured them for a minimum of two years and who provides published data on the quality and performance of the projects.

C. Subcontractor: A subcontractor for any part of the work must have experience on similar work. At the option of the Engineer, a list of projects and the contacts who are familiar with his competence may be required to be submitted to verify experience.

D. Design: Devices, equipment, structures, and systems not designed by the Engineer that the Contractor wishes to furnish shall be designed by either a registered professional engineer or by someone the Engineer accepts as qualified. Complete design calculations and assumptions shall be furnished to the Engineer or Owner before acceptance.

E. Testing Agencies: Mill certificates of tests on materials made by the manufacturers will be accepted provided the manufacturer maintains an adequate testing laboratory, makes regularly scheduled tests that are spot checked by an outside laboratory, and furnishes satisfactory certificates with the name of the one making the test. Agencies to be used shall be submitted to the Engineer for review prior to engagement.

1.9 SPECIAL WARRANTY / GUARANTEE

A. The Contractor shall guarantee the quality of the materials, equipment, and workmanship for a period of 24 months after commissioning of the storm drainage system. Defects discovered during that period shall be repaired by the Contractor at no cost to the Owner. The Performance Bond shall reflect this guarantee.

B. This guarantee is in addition to any warranties or guarantees required by other Sections of the Contract Documents.

PART 2 - PRODUCTS

2.1 CONCRETE PIPE

A. Circular concrete pipe shall be reinforced concrete pipe (RCP) conforming to ASTM C76, Class IV.

B. Horizontal elliptical concrete pipe shall be RCP conforming to ASTM C507, Class HE-III. Provide Class IV where indicated on the drawings.

C. Joints, including pipe and gasket material, shall meet ASTM C990 for tongue & groove with mastic sealant and ASTM C443 for bell & spigot or modified tongue & groove with O-ring rubber gasket.

D. Joint Sealants

1. O-Ring or Profile Gasket

a. ASTM C443 and the manufacturer’s recommendations.
b. Installed at all locations.

2. Mastic/Butyl gaskets shall not be used.

2.2 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

A. Less than 12-inch diameter

1. ASTM F2648 or AASHTO M252, Type S.
2. Fittings and joints shall be at least the strength and capacity of the pipe and meet the requirements of ASTM F2306 or AASHTO M252, Type S.
3. Joints shall be soil-tight using an engaging dimple connection.

B. Equal to or greater than 12-inch diameter

1. ASTM F2648 or AASHTO M294, Type S.
2. Fittings and joints shall be at least the strength and capacity of the pipe and meet the requirements of ASTM F2306 or AASHTO M294, Type S.

3. Joints shall be soil-tight in accordance with ASTM F477 and water-tight in accordance with ASTM D3212.

C. The use of single wall, Type C pipe, is prohibited.

D. Pipe and fitting shall be manufactured by one manufacturer.

2.3 HIGH DENSITY POLYPROPYLENE (PP) PIPE

A. ASTM F2881 or AASHTO M330.

B. Fittings and joints shall be at least the strength and capacity of the pipe and meet the requirements of ASTM F2881 or AASHTO M330.

C. Watertight joints shall meet the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477.

2.4 POLYVINYL CHLORIDE (PVC) PIPE

A. Pipe and fittings shall meet ASTM D3034, SDR [**26**][**35**], having ends adaptable for elastomeric gasket joints.

B. Joints shall conform to ASTM D3212.

C. Gaskets shall conform to ASTM F477.

D. Pipe and fittings shall be white.

2.5 DUCTILE IRON PIPE (DIP)

A. Pipe shall conform to ANSI A21.50/AWWA C150 and ANSI A21.51/AWWA C 151 and ASTM A746. All pipe shall be Pressure Class 350, unless noted otherwise.

B. Joints shall be AWWA C111 / ANSI A21.11 push-on type with rubber gaskets meeting ASTM F477.

2.6 PERFORATED DRAIN PIPE

A. Perforated HDPE Piping

1. Less than 12-inch diameter: AASHTO M252, Type SP.
2. Greater than or equal to 12-inch diameter: AASHTO M294, Type SP.
3. HDPE perforated pipe shall be wrapped with subsurface drainage filter fabric in accordance with AASHTO M288-92, Class A.

B. Perforated PVC Piping (4- and 6-inch diameter only)

1. ASTM D2729.

2.7 DRAINAGE STRUCTURES

A. Construct of pre-cast concrete. Structures may be constructed of solid concrete masonry or cast-in-place concrete, in lieu of pre-cast concrete.

1. Pipe-to-wall connections shall be mortared to produce smooth transitions and watertight joints or provided with ASTM C923 resilient connectors.
2. Bases shall have smooth inverts accurately shaped to a semicircular bottom conforming to the inside contour of the adjacent sewer sections.
3. Changes in direction of the sewer and entering branches into the manhole shall have a circular curve in the manhole invert of as large a radius as the size of the manhole will permit.

B. Concrete

1. Cast in place concrete shall be in accordance with Division 32 Section 'Site Work Concrete'.
2. Pre-cast concrete manholes shall be in accordance with ASTM C478. Provide a minimum wall thickness of 5 inches.
3. Pre-cast concrete catch basins, curb inlets and junction boxes shall be in accordance with ASTM C913. Provide a minimum wall thickness of 6 inches.
4. Reinforcing bars shall be in accordance with ASTM A615 and welded wire fabric shall be in accordance with ASTM A497.
5. Gaskets for joint connections shall be in accordance with ASTM C443 for O-rings and AASHTO M198, Type B for mastic sealants.

C. Masonry

1. Mortar: ASTM C270, Type M.
2. Brick: ASTM C32, Grade MS, or ASTM C62, Grade SW.
3. Concrete Masonry Units (CMU): ASTM C139.
4. Water for masonry mortar shall be fresh, clean, potable.
5. Grout: ASTM C476.

D. Frames, Covers and Grates

1. Castings shall be of uniform quality, free from blowholes, shrinkage, distortion, and other defects. Metal used shall conform to ASTM A48-83, Class 35B for gray iron or ASTM A536-80, Grade 65-45-12 for ductile iron.
2. Frames and covers shall have continuously machined bearing surfaces to prevent rocking.
3. Dimensions shall be as indicated on the drawings, as a minimum. Variations in dimensions will be accepted provided that hydraulic capacity and load capacity are equal to or greater than that shown.
4. The Contractor is responsible for all coordination due to varying dimensions for frames and grates.

E. Flared end sections shall be same material as pipe material unless indicated otherwise. Flared ends are included in the lengths of pipe indicated.

2.8 SOIL MATERIALS

A. Provide rip rap in accordance with Division 31 Section "Rip Rap".

B. Bedding material shall be crushed stone or gravel conforming to ASTM C33, gradation 57.

C. Backfill material shall be as specified in Division 31 Section "Earth Moving".

D. Compaction shall be as specified in Division 31 Section “Earth Moving”.

PART 3 - EXECUTION

3.1 GENERAL

A. Cutting Pavements, Curbs and Gutters

1. Saw cut with neat, parallel, straight lines 1 foot wider than trench width on each side of trenches and 1 foot beyond each edge of pits. When the saw cut is within 3 feet of an existing joint, remove pavement to the existing joint.

B. Location: Storm drainage piping and structures shall be at the locations, grades, inverts, and slopes indicated.

3.2 EARTHWORK

A. Refer to Division 31 Section “Earth Moving” for excavating, trenching, backfilling and testing of soils for utilities.

B. Excavation

1. Keep excavations free from water while construction is in progress.
2. Immediately notify the Engineer, in writing, if it becomes necessary to remove rock or hard or unsuitable material to a depth greater than indicated.
3. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Sides of trenches shall not be sloped from the bottom of the trench up to the elevation of the top of the pipe.
4. Excavate ledge rock, boulders, and other unyielding material to an overdepth at least 6 inches below the bottom of the pipe and appurtenances unless otherwise indicated or specified. Overexcavate unsuitable material as indicated.
5. Use granular fill placed in 6-inch maximum layers to refill overdepths to the proper grade. At the Contractor's option, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified.
6. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe or structure on undisturbed soil, or bedding material as indicated or specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Dig bell holes and depressions for joints after trench has been graded. Dimension of bell holes shall be as required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation. Trench dimensions shall be as indicated.

C. Bedding

1. Bedding shall be of materials and depths as indicated or specified for storm drainage piping and structures.
2. Place bedding in 6-inch maximum loose lifts.
3. Provide uniform and continuous support for each section of structure except at bell holes or depressions necessary for making proper joints.

D. Backfilling

1. Construct backfill in two operations (initial and final) as indicated and specified in this section.

2. Place initial backfill in 6-inch maximum loose lifts to 1 foot above pipe unless otherwise specified. Ensure that initially placed material is tamped firmly under pipe haunches. Bring up evenly on each side and along the full length of the pipe or structure. Ensure that no damage is done to the utility or its protective coating.
3. Place the remainder of the backfill (final backfill) in 9-inch maximum loose lifts unless otherwise specified. Compact each loose lift as specified in Division 31 Section “Earth Moving” before placing the next lift.
4. Do not backfill in freezing weather or where the material in the trench is already frozen or is muddy, except as authorized. Provide a minimum cover from final grade of 2 feet for storm drains.
5. Where settlements greater than the tolerance allowed herein for grading occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation.
6. Coordinate backfilling with testing of storm drain pipes and structures. Testing for the storm drainage pipe and structures shall be complete before final backfilling.

E. Compaction

1. Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging pipes and protective pipe coatings.
2. Compact material in accordance with Division 31 Section “Earth Moving”. If necessary, alter, change, or modify selected equipment or compaction methods to meet specified compaction requirements.

F. Structures

1. Provide at least 12 inches clear from outer surfaces to the embankment or shoring. Remove unsuitable material that is incapable of supporting the structure to an overdepth of 1 foot and refill with gravel or sand to the proper elevation. Refill overdepths with gravel, sand or concrete to the required grade and compact as specified.

G. Subsurface Drains

1. Excavation and Backfill

a. Excavate to dimensions indicated. Provide a bedding surface of no more than 1 inch of sand, gravel or granular material and place on compacted material as indicated. Backfill around and over the pipes after pipe installation has been approved. Place granular material in 6-inch lifts and compact with mechanical, vibrating plate tampers or rammers until no further consolidation can be achieved. Compact backfill overlying the granular material as specified for adjacent or overlying work.

2. Filter Fabric

a. Provide filter fabric in accordance with Division 31 Section “Filter Fabric”.
b. Wrap one layer of filter fabric around pipe in such a manner that longitudinal overlaps are in unperforated or unslotted quadrants of the pipe. Overlap fabric a minimum of 2 inches.
c. Secure fabric to pipe so that backfill material does not infiltrate through overlaps.
d. Place granular material and extend it for one pipe diameter, minimum of 6 inches on each side, and 18 inches above top of pipe or as indicated.
e. Place a layer of filter fabric on top of granular material before continuing with backfill.

3.3 PIPE LAYING AND JOINTING

A. General Requirements

1. Inspect each pipe and fitting before and after installation. Remove those found defective from site and replace with new.
2. Provide proper facilities for lowering sections of pipe into trenches. Lay pipe with the bell or groove ends in the upgrade direction.
3. Adjust spigots in bells and tongues in grooves to produce a uniform space. Blocking or wedging between bells and spigots or tongues and grooves will not be permitted.
4. Replace by one of the proper dimensions any pipe or fitting that does not allow sufficient space for proper caulking or installation of joint material.
5. At the end of each workday, close open ends of pipe temporarily with wood blocks or bulkheads.
6. Provide batterboards not more than 25 feet apart in trenches for checking and ensuring that pipe invert elevations are as indicated. Laser beam method may be used in lieu of batterboards for the same purpose.

B. Connections to Existing Lines or Structures

1. Notify the Engineer, in writing, at a minimum of 7 days prior to date that connections are to be made.
2. Obtain approval of the appropriate Authority Having Jurisdiction (AHJ) before interrupting service.
3. Conduct work so that there is minimum interruption of service on existing line.

C. Concrete Pipe

1. Install pipe and fittings in accordance with the provisions for rubber gasket jointing and jointing procedures of ACPA 01-103 or of ACPA 01-102, Chapter 9.
2. Make joints with the gaskets previously specified for joints with this piping. Clean and dry surfaces receiving lubricants, cements, or adhesives. Affix gaskets to pipe not more than 24 hours prior to the installation of the pipe.
3. Protect gaskets from sun, blowing dust, and other deleterious agents at all times. Before installation of the pipe, inspect gaskets and remove and replace loose or improperly affixed gaskets.
4. Align each pipe section with the previously installed pipe section and pull the joint together.
5. If, while pulling the joint, the gasket becomes loose and can be seen through the exterior joint recess when the pipe is pulled up to within 1 inch of closure, remove the pipe and remake the joint.

D. HDPE Pipe

1. Install in accordance with ASTM D2321 and the requirements of the HDPE pipe manufacturer.

E. PP Pipe

1. Install in accordance with ASTM D2321 and the requirements of PP pipe manufacturer.

F. PVC Pipe

1. Install pipe and fittings in accordance with the paragraph entitled "General Requirements" of this Article and with the requirements of ASTM D2321 for laying and joining pipe and fittings.

2. Make joints with the gaskets specified for joints with this piping; assemble in accordance with the requirements of ASTM D2321 for assembly of joints. Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

G. Perforated Drain Pipe

1. The laying of pipe and tile shall proceed upgrade from the lower end of the line and shall have a uniform pitch to the outlets.
2. Perforated pipe shall have joints made with standard coupling bands in a manner approved by the Engineer.

3.4 DRAINAGE STRUCTURES

A. Concrete Work

1. Perform cast-in-place concrete work in accordance with Division 32 Section “Site Work Concrete”.

B. Manhole, Curb Inlet and Catch Basin Construction

1. Construct base slab of cast-in-place concrete or use pre-cast concrete base sections.
2. Provide sumps in structures in accordance with the drawings.
3. For cast-in-place concrete construction, either pour bottom slabs and walls integrally or key and bond walls to bottom slab.
4. For pre-cast concrete construction, make joints between sections with the gaskets specified for this purpose; install in the manner specified for installing joints in concrete piping. Give a smooth finish to inside joints of pre-cast concrete structures.
5. Parging will not be required for pre-cast concrete manholes.
6. Cast-in-place concrete work shall be in accordance with the paragraph entitled, "Concrete Work."
7. Make joints between concrete structures and pipes entering structures with the resilient connectors specified for this purpose or mortared to produce a watertight joint; install in accordance with the recommendations of the connector manufacturer.
8. Where a new structure is constructed on an existing line, remove existing pipe as required to construct the structure. Cut existing pipe so that pipe ends are approximately flush with the interior face of structure wall but not protruding beyond into the structure.

C. Metal Work

1. Perform metal work so that workmanship and finish will be equal to the best practice in modern structural shops and foundries. Form iron and steel to shape and size with sharp lines and angles. Do shearing and punching so that clean true lines and surfaces are produced. Make castings sound and free from warp, cold shuts, and blow holes that may impair their strength or appearance. Give exposed surfaces a smooth finish with sharp well-defined lines and arises. Provide rabbets, lugs, and brackets wherever necessary for fitting and support.

3.5 PROTECTION

A. Shoring and Sheeting shall be in accordance with Division 31 Section “Earth Moving”.

B. Drainage and Dewatering shall be in accordance with Division 31 Section “Earth Moving”.

C. Erosion Control: Protect existing streams, ditches, and storm drain inlets from water-borne soil by the means indicated on the drawings.

D. Existing Utilities

1. All known utility facilities are shown schematically on the drawings and are not necessarily accurate in location as to plan or elevation. Utilities such as service lines or unknown facilities not shown on drawings will not relieve the Contractor of his responsibility under this requirement. “Existing Utilities Facilities” means any utility that exists on the project in its original, relocated or newly installed position. The Contractor will be held responsible for the cost of repairs to damaged underground facilities; even when such facilities are not shown on the drawings.
2. The Contractor shall contact all utility companies prior to beginning work and request accurate field location of their respective utility lines.
3. Movement of construction machinery and equipment over pipes during construction shall be at the Contractor’s risk. Repair or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

E. Structures and Surfaces

1. Graded areas shall be protected from traffic, erosion, settlement, or any washing away that may occur from any cause prior to acceptance.
2. Any repair or re-establishment of final grades shall be made prior to final acceptance.

F. Disposal of Excavated Materials shall be in accordance with Division 31 Section “Earth Moving”.

3.6 INSPECTIONS

A. Notify the Owner, Project Representative, Engineer and Authority Having Jurisdiction (AHJ) a minimum of 72 hours prior to all required observations, inspections or tests.

B. The Engineer will have the right to require that any portion of the work be done in his presence and if the work is covered up after such instruction, it shall be exposed by the Contractor for observation.

1. However, if the Contractor notifies the Engineer that such work is scheduled, and the Engineer fails to appear within 72 hours, the Contractor may proceed without him.

C. All work completed and materials furnished shall be subject to review by the Engineer or the Project Representative.

D. All improper work shall be reconstructed and all materials which do not conform to the requirements of the specifications shall be removed from the work upon written notice.

1. The Engineer shall have the right to mark materials as rejected to distinguish them as such.

3.7 TESTING

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections for earthwork activities.

1. All testing of soil material and compaction for subgrade, bedding and backfill shall be in accordance with Division 31 Section “Earth Moving”.

B. Contractor Testing: All other testing in this Specification Section shall be made at the Contractor’s expense.

1. Test locations shall be approved by the Engineer.

C. Notify the Testing Agency, Engineer and Owner a minimum of 72 hours prior to all tests.

D. Laboratory Testing

1. Independent Testing laboratory shall operate in accordance with ASTM E329 and shall be submitted to the Engineer for approval.

a. The Contractor shall provide free access to the site for testing activities.

E. Test Reports

1. Test results shall be furnished to the Contractor, Engineer and Owner within 72 hours after field tests are taken.
2. Test reports prepared by the Independent Testing Laboratory shall prepare indicate test location, elevation data, and test results.
3. If any test performed fails to meet these specifications, Independent Testing Laboratory shall immediately notify the Owner, Engineer, and Contractor.
4. The Owner reserves the right to employ an Independent Testing Laboratory and to direct any testing that it may deem necessary. The Contractor shall provide free access to the site for testing activities.

3.8 AS-BUILT (RECORD) DRAWINGS

A. Upon completion of installation of the storm drainage system, a land surveyor registered in the State of South Carolina shall prepare and provide Preliminary Record Drawings to the Engineer for review.

1. As a minimum, these drawings shall show all storm drainage structures, storm pipes, pond size (stage/storage table), bottom elevations, top elevations, low flow channels, details of and pond outlet control structures and pertinent data input as attributes as required by the AHJ or SCDES, and tied to State Plane Coordinates.
2. Record drawings shall accommodate the Engineer's seal, signature, and certification.

B. After review by the Engineer and AHJ, the Surveyor shall make all required changes and/or revisions and submit to the Engineer signed and sealed copies along with electronic media.

C. Contractor shall include in his project schedule 30 calendar days for the approval of the record drawings by SCDES after incorporation of Engineer's comments.

3.9 ACCEPTANCE

A. Final acceptance will be based on satisfactory materials, installation and construction of the specified work as approved by the Owner, AHJ and/or Engineer.

B. If a tested material or system does not meet or exceed the specified requirements, the Contractor shall perform additional tests as directed by the Owner, AHJ and/or Engineer to adequately define the limits of the material not meeting the specifications.

1. Materials shall be re-tested to the satisfaction of the Owner, AHJ and/or Engineer until specified requirements are met.
2. All additional testing and work that is the result of a failed inspection or test shall be performed by the Contractor at no additional cost to the Owner.

END OF SECTION 334100