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SE-310 INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES

AGENCY: Patriots Point Development Authority

PROJECT NAME: Pier Repairs

PROJECT NUMBER: P36-9544-JR CONSTRUCTION COST RANGE: \$830,000 to \$920,000

PROJECT LOCATION: Patriots Point Naval & Maritime Museum

DESCRIPTION OF PROJECT/SERVICES: *(450 character limit)*

Repairs to the approach pier and original pier head at the Patriots Point Naval and Maritime Museum in Mount Pleasant, South Carolina. Scope of work includes performing concrete repairs, demolition of a timber dock, and replacement of deck joint material.

BID/SUBMITTAL DUE DATE: 05/22/2026 TIME: 10:00 AM NUMBER OF COPIES: 1

PROJECT DELIVERY METHOD: Design-Bid-Build

AGENCY PROJECT COORDINATOR: L. David Coates

EMAIL: dcoates@patriotspoint.org TELEPHONE: (843) 901-1651

DOCUMENTS OBTAINED FROM: www.patriotspoint.org/about/board/solicitations

BID SECURITY IS REQUIRED IN AN AMOUNT NOT LESS THAN 5% OF THE BASE BID.

PERFORMANCE AND LABOR & MATERIAL PAYMENT BONDS: The successful Contractor will be required to provide Performance and Labor and Material Payment Bonds, each in the amount of 100% of the Contract Price.

DOCUMENT DEPOSIT AMOUNT: \$0.00 IS DEPOSIT REFUNDABLE: Yes No N/A

Bidders must obtain Bidding Documents/Plans from the above listed source(s) to be listed as an official plan holder. Bidders that rely on copies obtained from any other source do so at their own risk. All written communications with official plan holders & bidders will be via email or website posting.

Agency **WILL NOT** accept Bids sent via email.

All questions & correspondence concerning this Invitation shall be addressed to the A/E.

A/E NAME: GEL Engineering A/E CONTACT: Dan Campbell

EMAIL: dan.campbell@gel.com TELEPHONE: (843) 769-7378

PRE-BID CONFERENCE: Yes No MANDATORY ATTENDANCE: Yes No

PRE-BID DATE: 05/05/2026 TIME: 10:00 AM

PRE-BID PLACE: PATRIOTS POINT NAVAL & MARITIME MUSEUM - 40 PATRIOTS POINT RD, MT PLEASANT, SC 29464

BID OPENING PLACE: PATRIOTS POINT NAVAL & MARITIME MUSEUM - 40 PATRIOTS POINT RD, MT PLEASANT, SC 29464

BID DELIVERY ADDRESSES:

HAND-DELIVERY:

Attn: L DAVID COATES - Chief Engineer

40 Patriots Point Road

Mount Pleasant, SC 29464

MAIL SERVICE:

Attn: L DAVID COATES - Chief Engineer

40 Patriots Point Road

Mount Pleasant, SC 29464

IS PROJECT WITHIN AGENCY CONSTRUCTION CERTIFICATION? Yes No

APPROVED BY: _____

(OSE PROJECT MANAGER)

DATE: _____

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A701™ – 2018

Instructions to Bidders

for the following Project:

(Name, State Project Number, location, and detailed description)

Pier Repairs

P36-9544-JR

40 Patriots Point Road, Mount Pleasant, SC 29464

Repairs to the approach pier and original pier head at the Patriots Point Naval and Maritime Museum. Scope of work includes performing concrete repairs, demolition of a timber dock, replacement of deck joint material.

THE OWNER:

(Name, legal status, address, and other information)

Patriots Point Development Authority

40 Patriots Point Road

Mount Pleasant, SC, 29464

The Owner is a Governmental Body of the State of South Carolina as defined by S.C. Code Ann. § 11-35-310.

THE ARCHITECT:

(Name, legal status, address, and other information)

GEL Engineering, LLC

2040 Savage Road

Charleston, SC, 29407

This version of AIA Document A701-2018 is modified by the South Carolina Division of Procurement Services, Office of State Engineer. Publication of this version of AIA Document A701 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of State Engineer. A comparative version of AIA Document A701-2018 showing additions and deletions by the South Carolina Division of Procurement Services, Office of State Engineer is available for review on South Carolina state Web site.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.1.1 Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA Document A101-2017 Standard Form of Agreement Between Owner and Contractor, SCOSE Version. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA Document A201-2017 General Conditions of the Contract for Construction, SCOSE Version.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, has correlated the Bidder's observations with the requirements of the Proposed Contract Documents, and accepts full responsibility for any pre-bid existing conditions that would affect the Bid that could have been ascertained by a site visit. As provided in S.C. Code Ann. Reg. 19-445.2042(B), a bidder's failure to attend an advertised pre-bid conference will not excuse its responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to the State;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception;
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor; and
- .7 the Bidder understands that it may be required to accept payment by electronic funds transfer (EFT).

§ 2.2 Certification of Independent Price Determination

§ 2.2.1 GIVING FALSE, MISLEADING, OR INCOMPLETE INFORMATION ON THIS CERTIFICATION MAY RENDER YOU SUBJECT TO PROSECUTION UNDER SC CODE OF LAWS §16-9-10 AND OTHER APPLICABLE LAWS.

§ 2.2.2 By submitting a Bid, the Bidder certifies that:

- .1 The prices in this Bid have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other bidder or competitor relating to:
 - .1 those prices;
 - .2 the intention to submit a Bid; or
 - .3 the methods or factors used to calculate the prices offered.
- .2 The prices in this Bid have not been and will not be knowingly disclosed by the Bidder, directly or indirectly, to any other bidder or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and
- .3 No attempt has been made or will be made by the Bidder to induce any other concern to submit or not to submit a Bid for the purpose of restricting competition.

§ 2.2.3 Each signature on the Bid is considered to be a certification by the signatory that the signatory:

- .1 Is the person in the Bidder's organization responsible for determining the prices being offered in this Bid, and that the signatory has not participated and will not participate in any action contrary to Section 2.2.2 of this certification; or
- .2 Has been authorized, in writing, to act as agent for the Bidder's principals in certifying that those principals have not participated, and will not participate in any action contrary to Section 2.2.2 of this certification [As used in this subdivision, the term "principals" means the person(s) in the Bidder's organization responsible for determining the prices offered in this Bid];
- .3 As an authorized agent, does certify that the principals referenced in Section 2.2.3.2 of this certification have not participated, and will not participate, in any action contrary to Section 2.2.2 of this certification; and
- .4 As an agent, has not personally participated, and will not participate, in any action contrary to Section 2.2.2 of this certification.

§ 2.2.4 If the Bidder deletes or modifies Section 2.2.2.2 of this certification, the Bidder must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

§ 2.2.5 Drug Free Workplace Certification

By submitting a Bid, the Bidder certifies that, if awarded a contract, Bidder will comply with all applicable provisions of The Drug-free Workplace Act, S.C. Code Ann. 44-107-10, et seq.

§ 2.2.6 Certification Regarding Debarment and Other Responsibility Matters

§ 2.2.6.1 By submitting a Bid, Bidder certifies, to the best of its knowledge and belief, that:

- .1 Bidder and/or any of its Principals-
 - .1 Are not presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any state or federal agency;
 - .2 Have not, within a three-year period preceding this Bid, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of bids; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, or receiving stolen property; and
 - .3 Are not presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in Section 2.2.6.1.1.2 of this provision.
- .2 Bidder has not, within a three-year period preceding this Bid, had one or more contracts terminated for default by any public (Federal, state, or local) entity.
- .3 "Principals," for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions).

§ 2.2.6.2 Bidder shall provide immediate written notice to the Procurement Officer if, at any time prior to contract award, Bidder learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

§ 2.2.6.3 If Bidder is unable to certify the representations stated in Section 2.2.6.1, Bidder must submit a written explanation regarding its inability to make the certification. The certification will be considered in connection with a review of the Bidder's responsibility. Failure of the Bidder to furnish additional information as requested by the Procurement Officer may render the Bidder non-responsible.

§ 2.2.6.4 Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by Section 2.2.6.1 of this provision. The knowledge and information of a Bidder is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

§ 2.2.6.5 The certification in Section 2.2.6.1 of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Bidder knowingly or in bad faith rendered an erroneous certification, in addition to other remedies available to the State, the Procurement Officer may terminate the contract resulting from this solicitation for default.

§ 2.2.7 Ethics Certificate

By submitting a Bid, the Bidder certifies that the Bidder has and will comply with, and has not, and will not, induce a person to violate Title 8, Chapter 13 of the SC Code of Laws, as amended (Ethics Act). The following statutes require special attention: S.C. Code Ann. §8-13-700, regarding use of official position for financial gain; S.C. Code Ann. §8-13-705, regarding gifts to influence action of public official; S.C. Code Ann. §8-13-720, regarding offering money for advice or assistance of public official; S.C. Code Ann. §8-13-755 and §8-13-760, regarding restrictions on employment by former public official; S.C. Code Ann. §8-13-775, prohibiting public official with economic interests from acting on contracts; S.C. Code Ann. §8-13-790, regarding recovery of kickbacks; S.C. Code Ann. §8-13-1150, regarding statements to be filed by consultants; and S.C. Code Ann. §8-13-1342, regarding restrictions on contributions by contractor to candidate who participated in awarding of contract. The State may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision. If the contractor participates, directly or indirectly, in the evaluation or award of public contracts, including without limitation, change orders or task orders regarding a public contract, the contractor shall, if required by law to file such a statement, provide the statement required by S.C. Code Ann. §8-13-1150 to the Procurement Officer at the same time the law requires the statement to be filed.

§ 2.2.8 Restrictions Applicable To Bidders & Gifts

Violation of these restrictions may result in disqualification of your Bid, suspension or debarment, and may constitute a violation of the state Ethics Act.

§ 2.2.8.1 After issuance of the solicitation, Bidder agrees not to discuss this procurement activity in any way with the Owner or its employees, agents or officials. All communications must be solely with the Procurement Officer. This restriction may be lifted by express written permission from the Procurement Officer. This restriction expires once a contract has been formed.

§ 2.2.8.2 Unless otherwise approved in writing by the Procurement Officer, Bidder agrees not to give anything to the Owner, any affiliated organizations, or the employees, agents or officials of either, prior to award.

§ 2.2.8.3 Bidder acknowledges that the policy of the State is that a governmental body should not accept or solicit a gift, directly or indirectly, from a donor if the governmental body has reason to believe the donor has or is seeking to obtain contractual or other business or financial relationships with the governmental body. SC Regulation 19-445.2165(C) broadly defines the term donor.

§ 2.2.9 Open Trade Representation

By submitting a Bid, the Bidder represents that Bidder is not currently engaged in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in S.C. Code Ann. §11-35-5300.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

§ 3.1.2 Any required deposit shall be refunded to all plan holders who return the paper Bidding Documents in good condition within ten (10) days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Reserved

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.1.6 All persons obtaining Bidding Documents from the issuing office designated in the advertisement shall provide that office with Bidder's contact information to include the Bidder's name, telephone number, mailing address, and email address.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2. Failure to do so will be at the Bidder's risk. Bidder assumes responsibility for any patent ambiguity that Bidder does not bring to the Architect's attention prior to Bid Opening.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least ten (10) days prior to the date for receipt of Bids.

§ 3.2.3 Modifications, corrections, changes, and interpretations of the Bidding Documents shall be made by Addendum. Modifications, corrections, changes, and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.2.4 As provided in S.C. Code Ann. Reg. 19-445.2042(B), nothing stated at the Pre-bid conference shall change the Bidding Documents unless a change is made by Addendum.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution. Where "brand name or equal" is used in the Bidding Documents, the listing description is not intended to limit or restrict competition.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten (10) days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.2.4 No request to substitute materials, products, or equipment for materials, products, or equipment described in the Bidding Documents and no request for addition of a manufacturer or supplier to a list of approved manufacturers or suppliers in the Bidding Documents will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten (10) days prior to the date for receipt of Bids established in the invitation to bid.

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Any subsequent extension of the date for receipt of Bids by addendum shall not extend the date for receipt of such requests unless the addendum so specifies. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the Work of other contracts that incorporation of the proposed substitution would require, shall be included.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued at least five (5) business days before the day of the Bid Opening, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids. A business day runs from midnight to midnight and excludes weekends and state and federal holidays.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

§ 3.4.5 When the date for receipt of Bids is to be postponed and there is insufficient time to issue an Addendum prior to the original Bid Date, the Owner will notify prospective Bidders by telephone or other appropriate means with immediate follow up with an Addendum. This Addendum will verify the postponement of the original Bid Date and establish a new Bid Date. The new Bid Date will be no earlier than the fifth (5th) business day after the date of issuance of the Addendum postponing the original Bid Date.

§ 3.4.6 If an emergency or unanticipated event interrupts normal government processes so that Bids cannot be received at the government office designated for receipt of Bids by the exact time specified in the solicitation, the time specified for receipt of Bids will be deemed to be extended to the same time of day specified in the solicitation on the first work day on which normal government processes resume. In lieu of an automatic extension, an Addendum may be issued to reschedule Bid Opening. If state offices are closed in the county in which Bids are to be received at the time a pre-bid or pre-proposal conference is scheduled, an Addendum will be issued to reschedule the conference. Bidders shall visit <https://www.scemd.org/closings/> for information concerning closings.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the Bid Form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in numbers.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid. Bidder shall not make stipulations or qualify his Bid in any manner not permitted on the Bid Form. An incomplete Bid or information not requested that is written on or attached to the Bid Form that could be considered a qualification of the Bid, may be cause for rejection of the Bid.

§ 4.1.5 Bid all requested Alternates. The failure of the Bidder to indicate a price for an Alternate may render the Bid non-responsive. Indicate the change to the Base Bid by entering the dollar amount and marking, as appropriate, the box for "ADD TO" or "DEDUCT FROM". If no change in the Base Bid is required, enter "ZERO" or "No Change".

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§ 4.1.6 Pursuant to S.C. Code Ann. § 11-35-3020(b)(i), as amended, Section 7 of the Bid Form sets forth a list of proposed subcontractors for which the Bidder is required to identify those subcontractors the Bidder will use to perform the work listed. Bidder must follow the instructions in the Bid Form for filling out this section of the Bid Form. Failure to properly fill out Section 7 may result in rejection of Bidder's bid as non-responsive.

§ 4.1.7 Contractors and subcontractors listed in Section 7 of the Bid Form who are required by the South Carolina Code of Laws to be licensed, must be licensed as required by law at the time of bidding.

§ 4.1.8 Each copy of the Bid shall state the legal name and legal status of the Bidder. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract.

§ 4.1.9 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 If required by the invitation to bid, each Bid shall be accompanied by a bid security in an amount of not less than five percent of the Base Bid. The bid security shall be a bid bond or a certified cashier's check.

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bid Bond shall:

- .1 be issued by a surety company licensed to do business in South Carolina;
- .2 be issued by a surety company having, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty", which company shows a financial strength rating of at least five (5) times the contract price.
- .3 be enclosed in the bid envelope at the time of Bid Opening, either in paper copy or as an electronic bid bond authorization number provided on the Bid Form and issued by a firm or organization authorized by the surety to receive, authenticate and issue binding electronic bid bonds on behalf the surety.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and performance and payment bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected.

§ 4.2.5 By submitting a Bid Bond via an electronic bid bond authorization number on the Bid Form and signing the Bid Form, the Bidder certifies that an electronic bid bond has been executed by a Surety meeting the standards required by the Bidding Documents and the Bidder and Surety are firmly bound unto the State of South Carolina under the conditions provided in this Section 4.2.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:

§ 4.3.2 All paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall, unless hand delivered by the Bidder, be addressed to the Owner's designated purchasing office as shown in the invitation to bid. The envelope shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, or special delivery service (UPS, Federal Express, etc.), the sealed envelope shall be labelled "SEALED BID ENCLOSED" on the face thereof. Bidders hand delivering their Bids shall deliver Bids to the place of the Bid Opening as shown in the invitation for bids. Whether or not Bidders attend the Bid Opening, they shall give their Bids to the Owner's Procurement Officer or his/her designee as shown in the invitation to bid prior to the time of the Bid Opening.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

Init.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted. Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.3.6 The official time for receipt of Bids will be determined by reference to the clock designated by the Owner's Procurement Officer or his/her designee. The Procurement Officer conducting the Bid Opening will determine and announce that the deadline has arrived and no further Bids or bid modifications will be accepted. All Bids and bid modifications in the possession of the Procurement Officer at the time the announcement is completed will be timely, whether or not the bid envelope has been date/time stamped or otherwise marked by the Procurement Officer.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

Bids received on time will be publicly opened and read aloud. The Owner will not read aloud Bids that the Owner determines, at the time of opening, to be non-responsive.

§ 5.1.1 At Bid Opening, the Owner will announce the date and location of the posting of the Notice of Intend to Award. If the Owner determines to award the Project, the Owner will, after posting a Notice of Intend to Award, send a copy of the Notice to all Bidders.

§ 5.1.2 The Owner will send a copy of the final Bid Tabulation to all Bidders within ten (10) working days of the Bid Opening.

§ 5.1.3 If only one Bid is received, the Owner will open and consider the Bid.

§ 5.2 Rejection of Bids

§ 5.2.1 The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.2.2 The reasons for which the Owner will reject Bids include, but are not limited to:

- .1 Failure by a Bidder to be represented at a Mandatory Pre-Bid Conference or site visit;
- .2 Failure to deliver the Bid on time;
- .3 Failure to comply with Bid Security requirements, except as expressly allowed by law;
- .4 Listing an invalid electronic Bid Bond authorization number on the Bid Form;
- .5 Failure to list qualified subcontractors as required by law;
- .6 Showing any material modification(s) or exception(s) qualifying the Bid;
- .7 Faxing a Bid directly to the Owner or Owner's representative; or
- .8 Failure to include a properly executed Power-of-Attorney with the Bid Bond.

§ 5.2.3 The Owner may reject a Bid as nonresponsive if the prices bid are materially unbalanced between line items or sub-line items. A Bid is materially unbalanced when it is based on prices significantly less than cost for some work and prices which are significantly overstated in relation to cost for other work, and if there is a reasonable doubt that the Bid

will result in the lowest overall cost to the Owner even though it may be the low evaluated Bid, or if it is so unbalanced as to be tantamount to allowing an advance payment.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed available funds. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Responsibility

Owner will make a determination of Bidder's responsibility before awarding a contract. Bidder shall provide all information and documentation requested by the Owner to support the Owner's evaluation of responsibility. Failure of Bidder to provide requested information is cause for the Owner, at its option, to determine the Bidder to be non-responsible.

§ 6.2 Reserved

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.4 Posting of Intent To Award

The Notice of Intent to Award will be posted at the following location:

Room or Area of Posting: N/A

Building Where Posted: N/A

Address of Building: N/A

WEB site address (if applicable): www.patriotspoint.org/about/board/solicitations

Posting date will be announced at Bid Opening. In addition to posting the Notice, the Owner will promptly send all responsive Bidders a copy of the Notice of Intent to Award and the final bid tabulation

§ 6.5 Protest of Solicitation or Award

§ 6.5.1 If you are aggrieved in connection with the solicitation or award of a contract, you may be entitled to protest, but only as provided in S.C. Code Ann. § 11-35-4210. To protest a solicitation, you must submit a protest within fifteen (15) days of the date the applicable solicitation document is issued. To protest an award, you must (i) submit notice of your intent to protest within seven (7) business days of the date the award notice is posted, and (ii) submit your actual protest within fifteen (15) days of the date the award notice is posted. Days are calculated as provided in Section 11-35-310(13). Both protests and notices of intent to protest must be in writing and must be received by the State Engineer within the time provided. The grounds of the protest and the relief requested must be set forth with enough particularity to give notice of the issues to be decided.

§ 6.5.2 Any protest must be addressed to the CPO, Office of State Engineer, and submitted in writing:

- .1 by email to protest-ose@mmo.sc.gov,
- .2 by facsimile at 803-737-0639, or
- .3 by post or delivery to 1201 Main Street, Suite 600, Columbia, SC 29201.

By submitting a protest to the foregoing email address, you (and any person acting on your behalf) consent to receive communications regarding your protest (and any related protests) at the e-mail address from which you sent your protest.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the state of South Carolina.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of 100% of the Contract Sum.

§ 7.2 Time of Delivery of Contract, Certificates of Insurance, and Form of Bonds

§ 7.2.1 Following expiration of the protest period, the Owner will forward the Contract for Construction to the Bidder for signature. The Bidder shall return the fully executed Contract for Construction to the Owner within seven (7) days. The Bidder shall deliver the required bonds and certificate of insurance to the Owner not later than three (3) days following the date of execution of the Contract. Failure to deliver these documents as required shall entitle the Owner to consider the Bidder's failure as a refusal to enter into a contract in accordance with the terms and conditions of the Bidder's Bid and to make claim on the Bid Security for re-procurement cost.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on the Performance Bond and Payment Bond forms included in the Bid Documents.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, SCOSE Version.
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, SCOSE Version.
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, SCOSE Version.
- .4 Drawings

Number	Title	Date
S0.1	Cover Sheet	03/31/26
S1.0 - S1.1	General Notes	03/31/26
S2.0	Overall Site	03/31/26
S3.0 - S6.0	Existing Conditions	03/31/26
S7.0 - S7.3	Details	03/31/26

- .5 Specifications

Section	Title	Date	Pages
030100	Maintenance of Concrete	03/31/26	42
031000	Concrete Formwork	03/31/26	11
032000	Concrete Reinforcement	03/31/26	13
033000	Structural Concrete	03/31/26	38

.6 Addenda:

Number	Date	Pages
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.7 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

- AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
- AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
- The Sustainability Plan:
- Supplementary and other Conditions of the Contract:

.8 Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

SE-310, Invitation for Design-Bid-Build Construction Services; SE-330, Lump Sum Bid Form; SE-355, Performance Bond; SE-357, Labor & Material Payment Bond; SE-380, Change Order to Design-Bid-Build Construction Contract; AIA Document A304-2024, Request for Contractor's Qualifications;

ARTICLE 9 Miscellaneous

§ 9.1 Nonresident Taxpayer Registration Affidavit Income Tax Withholding Important Tax Notice - Nonresidents Only

§ 9.1.1 Withholding Requirements for Payments to Nonresidents: SC Code of Laws §12-8-550 requires persons hiring or contracting with a nonresident conducting a business or performing personal services of a temporary nature within South Carolina to withhold 2% of each payment made to the nonresident. The withholding requirement does not apply to (1) payments on purchase orders for tangible personal property when the payments are not accompanied by services to be performed in South Carolina, (2) nonresidents who are not conducting business in South Carolina, (3) nonresidents for contracts that do not exceed \$10,000 in a calendar year, or (4) payments to a nonresident who (a) registers with either the S.C. Department of Revenue or the S.C. Secretary of State and (b) submits a Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, Form I-312 to the person letting the contract.

§ 9.1.2 For information about other withholding requirements (e.g., employee withholding), contact the Withholding Section at the South Carolina Department of Revenue at 803-898-5383 or visit the Department's website at:

www.sctax.org

§ 9.1.3 This notice is for informational purposes only. This Owner does not administer and has no authority over tax issues. All registration questions should be directed to the License and Registration Section at 803-898-5872 or to the South Carolina Department of Revenue, Registration Unit, Columbia, S.C. 29214-0140. All withholding questions should be directed to the Withholding Section at 803-898-5383.

PLEASE SEE THE "NONRESIDENT TAXPAYER REGISTRATION AFFIDAVIT INCOME TAX WITHHOLDING" FORM (Available through SC Department of Revenue).

Init.

§ 9.2 Submitting Confidential Information

§ 9.2.1 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "CONFIDENTIAL" every page, or portion thereof, that the Bidder contends contains information that is exempt from public disclosure because it is either (a) a trade secret as defined in Section 30-4-40(a)(1), or (b) privileged & confidential, as that phrase is used in SC Code of Laws §11-35-410.

§ 9.2.2 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the words "TRADE SECRET" every page, or portion thereof, that the Bidder contends contains a trade secret as that term is defined by SC Code of Laws §39-8-20.

§ 9.2.3 For every document the Bidder submits in response to or with regard to this solicitation or request, the Bidder must separately mark with the word "PROTECTED" every page, or portion thereof, that the Bidder contends is protected by SC Code of Laws §11-35-1810.

§ 9.2.4 All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark your entire Bid as confidential, trade secret, or protected! If your Bid, or any part thereof, is improperly marked as confidential or trade secret or protected, the State may, in its sole discretion, determine it nonresponsive. If only portions of a page are subject to some protection, do not mark the entire page.

§ 9.2.5 By submitting a response to this solicitation, Bidder (1) agrees to the public disclosure of every page of every document regarding this solicitation or request that was submitted at any time prior to entering into a contract (including, but not limited to, documents contained in a response, documents submitted to clarify a response, & documents submitted during negotiations), unless the page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or "PROTECTED", (2) agrees that any information not marked, as required by these bidding instructions, as a "Trade Secret" is not a trade secret as defined by the Trade Secrets Act, & (3) agrees that, notwithstanding any claims or markings otherwise, any prices, commissions, discounts, or other financial figures used to determine the award, as well as the final contract amount, are subject to public disclosure.

§ 9.2.6 In determining whether to release documents, the State will detrimentally rely on the Bidders' marking of documents, as required by these bidding instructions, as being either "Confidential" or "Trade Secret" or "PROTECTED".

§ 9.2.7 By submitting a response, the Bidder agrees to defend, indemnify & hold harmless the State of South Carolina, its officers & employees, from every claim, demand, loss, expense, cost, damage or injury, including attorney's fees, arising out of or resulting from the State withholding information that Bidder marked as "confidential" or "trade secret" or "PROTECTED".

§ 9.3 Solicitation Information From Sources Other Than Official Source

South Carolina Business Opportunities (SCBO) is the official state government publication for State of South Carolina solicitations. Any information on State agency solicitations obtained from any other source is unofficial and any reliance placed on such information is at the Bidder's sole risk and is without recourse under the South Carolina Consolidated Procurement Code.

§ 9.4 Builder's Risk Insurance

Bidders are directed to Exhibit A of the AIA Document A101, 2017 SCOSE Version, which, unless provided otherwise in the Bid Documents, requires the contractor to provide builder's risk insurance on the project.

§ 9.5 Reserved

§ 9.6 Other Special Conditions Of The Work

Bidder's work must not affect museum activities. Bidder may not store or leave materials or equipment unattended on the pier when not actively being used. Bidder's repairs to the pier deck must be completed after normal museum business hours. Bidders may not conduct any work or repairs from July 1, 2026 to July 8, 2026.

SE-330 LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: _____
(Bidder's Name)

BID SUBMITTED TO: Patriots Point Development Authority
(Agency's Name)

FOR: PROJECT NAME: Pier Repairs
PROJECT NUMBER: P36-9544-JR

OFFER

§ 1. In response to the Invitation for Construction Services and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Agency on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to SC Code § 11-35-3030(1), Bidder has submitted Bid Security in the amount and form required by the Bidding Documents.

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

(Bidder, check all that apply. Note, there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: #1 #2 #3 #4 #5

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of **60** Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Agency.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 **BASE BID WORK** *(as indicated in the Bidding Documents and generally described as follows):* Repairs to the approach pier and original pier head at the Patriots Point Naval and Maritime Museum in Mount Pleasant, South Carolina. Scope of work includes performing concrete repairs, demolition of a timber dock, and replacement of deck joint material.

\$ _____, which sum is hereafter called the Base Bid.

(Bidder to insert Base Bid Amount on line above)

**SE-330
LUMP SUM BID FORM**

§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED
(See Instructions on page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Classification work listed:

(A) LICENSE CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION per SCLLR <i>(Completed by Agency)</i>	(B) NAME of SUBCONTRACTOR and/or PRIME CONTRACTOR <i>(Completed by Bidder)</i>	(C) SUBCONTRACTOR'S and/or PRIME CONTRACTOR'S SC LICENSE NUMBER <i>(Completed by Bidder)</i>
BASE BID		
Marine - MR		
Concrete - CT		
ALTERNATE #1		
ALTERNATE #2		
ALTERNATE #3		

SE-330 LUMP SUM BID FORM

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

1. Section 7 of the Bid Form sets forth an Agency-developed list of subcontractor license classifications or subclassifications for which Bidder is required to identify the entity (subcontractor(s) and/or prime) Bidder will use to perform this work.
 - a. **Column A:** The Agency enters the appropriate SCLLR abbreviation to identify the subcontractor license classification / subclassification for which the Bidder is required to list either a subcontractor or itself as the entity that will perform the work. Abbreviations of licenses can be found at: <https://lir.sc.gov/clb/PDFFiles/CLBClassificationAbbreviations.pdf>. If the Agency has not identified a subcontractor license classification/subclassification, the Bidder does not list a subcontractor.
 - b. **Columns B and C:** The Bidder identifies the subcontractors, by name and license number, it will use for the work of each license listed by the Agency in Column A. Bidder must identify only the subcontractor(s) who will perform the work and no others. Bidders must make sure that their identification of each subcontractor is clear and unambiguous. A listing that could be any number of different entities may be cause for rejection of the bid as non-responsive. For example, a listing of M&M without additional information may be problematic if there are multiple different licensed contractors in South Carolina whose names start with M&M.
2. **Subcontractor Defined:** For purposes of subcontractor listing, a subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site pursuant to a contract with the prime contractor. Bidder should not identify sub-subcontractors in the spaces provided on the bid form but only those entities with which Bidder will contract directly. Do not identify material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the Bidder or proposed subcontractor(s).
3. **Subcontractor Qualifications:** Bidder must only list subcontractors who possess a South Carolina contractor's license that includes the license classification and/or subclassification identified by the Agency in Column A. The subcontractor license must also be within the appropriate license group for the work (do not list the Group number). If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsible.
4. **Use of Own forces:** If, under the terms of the Bidding Documents and SC Contractor Licensing laws, Bidder is qualified to perform the work of a listed subcontractor classification or subclassification and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert itself in the space provided.
5. **Use of Multiple Subcontractors:**
 - a. If Bidder intends to use multiple subcontractors to perform the work of a single license classification/subclassification, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word **"and"**. If Bidder intends to use both his own employees to perform a part of the work of a single license classification/subclassification and to use one or more subcontractors to perform the remaining work, Bidder must insert itself and each subcontractor, preferably separating them with the word **"and"**. Bidder must use each entity listed for the work of a single license classification/subclassification in the performance of that work.
 - b. **Optional Listing Prohibited:** Bidder may not list multiple subcontractors for a license classification/subclassification in a form that provides the Bidder the option, after bid opening or award, to choose one or more but not all the listed subcontractors to perform the work for which they are listed. A listing, which on its face requires subsequent explanation to determine whether it is an optional listing, is non-responsive. If Bidder intends to use multiple entities to perform the work for a single listing, Bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word **"and"** between the names of each entity listed. Agency will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word **"or"**, a virgule (that is a /), or any separator that the Agency may reasonably interpret as an optional listing.
6. If Bidder is awarded the contract, Bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
7. Bidder's failure to identify an entity (subcontractor or itself) to perform the work of a subcontractor listed in Column A will render the Bid non-responsive.

SE-330 LUMP SUM BID FORM

§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (*FOR INFORMATION ONLY*):

Pursuant to instructions in the Invitation for Construction Services, if any, Bidder will provide to Agency upon the Agency's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code § 11-35-3020(b)(i).

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a) CONTRACT TIME

Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Agency. Bidder agrees to substantially complete the Work within _____ Calendar Days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b) LIQUIDATED DAMAGES

Bidder further agrees that from the compensation to be paid, the Agency shall retain as Liquidated Damages the amount of \$_____ for each Calendar Day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

- a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.
- b) Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.
- c) Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

§ 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, referenced in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

**SE-330
LUMP SUM BID FORM**

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION

SC Contractor's License Number(s): _____

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

By signing this Bid, the person signing reaffirms all representation and certification made by both the person signing and the Bidder, including without limitation, those appearing in Article 2 of the SCOSE Version of the AIA Document A701, Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the _____ day of _____ in the year _____
(In words, indicate day, month and year.)


BETWEEN the Owner:
(Name, legal status, address and other information)

Patriots Point Development Authority
40 Patriots Point Road
Mount Pleasant, SC, 29464

The Owner is a Governmental Body of the State of South Carolina as defined in S.C. Code Ann. § 11-35-310.

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, State Project Number, location and detailed description)

Pier Repairs
P36-9544-JR
40 Patriots Point Road, Mount Pleasant, SC 29464
Repairs to the approach pier and original pier head at the Patriots Point Naval & Maritime Museum in Mount Pleasant, South Carolina. Scope of work includes performing concrete repairs, demolition of a timber dock, and replacement of deck joint material. 

The Architect:
(Name, legal status, address and other information)

GEL Engineering, LLC
2040 Savage Road
Charleston, SC, 29407

This version of AIA Document A101–2017 is modified by the South Carolina Division of Procurement Services, Office of State Engineer. Publication of this version of AIA Document A101 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement Services, Office of State Engineer. A comparative version of AIA Document A101–2017 showing additions and deletions by the South Carolina Division of Procurement Services, Office of State Engineer is available for review on South Carolina state Web site.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

§ 1.1 The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

§ 1.2 Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101-2017 Standard Form of Agreement Between Owner and Contractor, SCOSE Version. Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201-2017 General Conditions of the Contract for Construction, SCOSE Version.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The Date of Commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner. The Owner shall issue the Notice to Proceed to the Contractor in writing, no less than seven (7) days prior to the Date of Commencement. Unless otherwise provided elsewhere in the Contract Documents and provided the Contractor has secured all required insurance and surety bonds, the Contractor may commence work immediately after receipt of the Notice to Proceed.

§ 3.2 The Contract Time as provided in the Notice to Proceed for this project shall be measured from the Date of Commencement of the Work to Substantial Completion.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work within the Contract Time indicated in the Notice to Proceed.

§ 3.3.2 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum, including all accepted alternates indicated in the bid documents, in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be

(\$ _____), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates that are accepted, if any, included in the Contract Sum:

(Insert the accepted Alternates.)

Item	Price
------	-------

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price
------	-------

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

§ 4.5 Liquidated damages

§ 4.5.1 Contractor agrees that from the compensation to be paid, the Owner shall retain as liquidated damages the amount indicated in Section 9(b) of the Bid Form for each calendar day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. The liquidated damages amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty.

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect and Owner by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

§ 5.1.3 The Owner shall make payment of the certified amount to the Contractor not later than twenty-one (21) days after receipt of the Application for Payment.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to S.C. Code Ann. § 12-8-550 (Withholding Requirements for Payments to Non-Residents), in accordance with AIA Document A201®-2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201-2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201-2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold three and one-half percent (3.5%), as retainage, from the payment otherwise due.

§ 5.1.7.2 When a portion, or division, of Work as listed in the Schedule of Values is 100% complete, that portion of the retained funds which is allocable to the completed division must be released to the Contractor. No later than ten (10) days after receipt of retained funds from the Owner, the Contractor shall pay to the subcontractor responsible for such completed work the full amount of retainage allocable to the subcontractor's work.

§ 5.1.7.3 Upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7.

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§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than twenty-one (21) days after the issuance of the Architect’s final Certificate for Payment.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Claims and disputes shall be resolved in accordance with Article 15 of AIA Document A201–2017.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:

§ 8.2.1 The Owner designates the individual listed below as its Senior Representative (“Owner’s Senior Representative”), which individual has the responsibility for and, subject to Section 7.2.1 of the General Conditions, the authority to resolve disputes under Section 15.6 of the General Conditions:

Name: Allison Hunt

Title: Executive Director

Address: 40 Patriots Point Road, Mount Pleasant, SC 29464

Telephone: 843-881-5920

Email: ahunt@patriotspoint.org

§ 8.2.2 The Owner designates the individual listed below as its Owner’s Representative, which individual has the authority and responsibility set forth in Section 2.1.1 of the General Conditions:

Name: L. David Coates

Title: Maintenance Director

Address: 40 Patriots Point Road, Mount Pleasant, SC 29464

Telephone: 843-901-1651

Email: dcoates@patriotspoint.org

§ 8.3 The Contractor’s representative:

§ 8.3.1 The Contractor designates the individual listed below as its Senior Representative (“Contractor’s Senior Representative”), which individual has the responsibility for and authority to resolve disputes under Section 15.6 of the General Conditions:

Name:

Title:
Address:
Telephone:
Email:

§ 8.3.2 The Contractor designates the individual listed below as its Contractor's Representative, which individual has the authority and responsibility set forth in Section 3.1.1 of the General Conditions:

Name:
Title:
Address:
Telephone:
Email:

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 The Architect's representative:

Name: Dan Campbell
Title: Senior Project Manager
Address: 2040 Savage Road, Charleston, SC 29406
Telephone: 843-447-0809
Email: dan.campbell@gel.com

§ 8.6 Insurance and Bonds

§ 8.6.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101®–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.6.2 The Contractor shall provide bonds as set forth in AIA Document A101®–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.7 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.8 Other Provisions:

§ 8.8.1 Additional requirements, if any, for the Contractor's Construction Schedule are as follows:

(Check box if applicable to this Contract)

The Construction Schedule shall be in a detailed precedence-style critical path management (CPM) or primavera-type format satisfactory to the Owner and the Architect that shall also (1) provide a graphic representation of all activities and events that will occur during performance of the Work; (2) identify each phase of construction and occupancy; and (3) set forth milestone dates that are critical in ensuring the timely and orderly completion of the Work in accordance with the requirements of the Contract Documents.

- .1 Upon review by the Owner and the Architect for conformance with milestone dates and Construction Time given in the Bidding Documents, with associated Substantial Completion date, the Construction Schedule shall be deemed part of the Contract Documents and attached to the Agreement as an Exhibit. If returned for non-conformance, the Construction Schedule shall be promptly revised by the Contractor in accordance with the recommendations of the Owner and the Architect and resubmitted.

Init.

- .2 The Contactor shall monitor the progress of the Work for conformance with the requirements of the Construction Schedule and shall promptly advise the Owner of any delays or potential delays. Whenever the Construction Schedule no longer reflects actual conditions and progress of the Work or the Contract Time is modified in accordance with the terms of the Contract Documents, the Contractor shall update the Construction Schedule to reflect such conditions.
- .3 In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to correct the delay, including overtime and/or additional labor, if necessary.
- .4 In no event shall any progress report constitute an adjustment in the Contract Time, any milestone date, or the Contract Sum unless any such adjustment is agreed to by the Owner and authorized pursuant to Change Order.

§ 8.8.2 The Owner's review of the Contractor's schedule is not conducted for the purpose of either determining its accuracy, completeness, or approving the construction means, methods, techniques, sequences or procedures. The Owner's review shall not relieve the Contractor of any obligations.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101®-2017, SCOSE Version Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101®-2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201®-2017, SCOSE Version General Conditions of the Contract for Construction
- .4 Form SE-390, Notice to Proceed – Construction Contract
- .5 Drawings

Number	Title	Date
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- .6 Specifications

Section	Title	Date	Pages
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- .7 Addenda, if any:

Number	Date	Pages
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Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

The Sustainability Plan:

Title	Date	Pages
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Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201®–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

- Form SE-310, Invitation for Construction Services**
- Instructions to Bidders (AIA Document A701-2018 OSE Version)**
- Form SE-330, Contractor’s Bid (Completed Bid Form)**
- Form SE-370, Notice of Intent to Award**
- Certificate of Procurement Authority issued by the State Fiscal Accountability Authority**
- Request for Contractor's Qualifications (AIA Document A304-2024)
- Contractor Qualification Statement (AIA Document 305-2020)
- Bid Bond (AIA Document A310-2010)
- Form SE-355, Performance Bond
- Form SE-357, Labor & Materials Payment Bond
- Form SE-380, Change Order to Design-Bid-Build Construction Contract

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This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)

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South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name, State Project Number, and location or address)

Pier Repairs
P36-9544-JR
40 Patriots Point Road, Mount Pleasant, SC 29464

THE OWNER:
(Name, legal status and address)

Patriots Point Development Authority
40 Patriots Point Road
Mount Pleasant, SC, 29464

The Owner is a Governmental Body of the State of South Carolina as defined by Title 11, Chapter 35 of the South Carolina Code of Laws, as amended.

THE CONTRACTOR:
(Name, legal status and address)

This version of AIA Document A101–2017 Exhibit A is modified by the South Carolina Division of Procurement, Office of State Engineer. Publication of this version of AIA Document A101 Exhibit A does not imply the American Institute of Architects' endorsement of any modification by the South Carolina Division of Procurement, Office of State Engineer.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201®–2017, General Conditions of the Contract for Construction, SCOSE Version.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Reserved

§ A.2.3.1 Reserved

§ A.2.3.1.1 Reserved

§ A.2.3.1.2 Reserved

§ A.2.3.1.3 Reserved

§ A.2.3.1.4 Reserved

§ A.2.3.2 Reserved

§ A.2.3.3 Reserved

§ A.2.4 Optional Insurance.

The Owner shall purchase and maintain any insurance selected below.

§ A.2.4.1 Other Insurance

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the

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Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.1.4 A failure by the Owner to either (i) demand a certificate of insurance or written endorsement required by Section A.3, or (ii) reject a certificate or endorsement on the grounds that it fails to comply with Section A.3, shall not be considered a waiver of Contractor's obligations to obtain the required insurance.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, for such other period for maintenance of completed operations coverage as specified in the Contract Documents, or unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than \$1,000,000 each occurrence, \$1,000,000 general aggregate, \$1,000,000 aggregate for products-completed operations hazard, \$1,000,000 personal and advertising injury, \$50,000 fire damage (any one fire), and \$5,000 medical expense (any one person) providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than \$1,000,000 per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability, Employers Liability, and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers. The umbrella policy limits shall not be less than \$3,000,000.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than \$100,000 each accident, \$100,000 each employee, and \$500,000 policy limit for claims, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks.

§ A.3.2.8 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.2.9 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than (\$) per claim and (\$) in the aggregate.

§ A.3.3 Required Property Insurance

§ A.3.3.1 The Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Contractor's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.3.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds.

§ A.3.3.1.1 **Causes of Loss.** The insurance required by this Section A.3.3.1 shall provide coverage for direct physical loss or damage and shall include the risks of fire (with extended coverage), explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, workmanship, or materials. *(Indicate below the cause of loss and any applicable sub-limit.)*

Causes of Loss	Sub-Limit
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§ A.3.3.1.2 **Specific Required Coverages.** The insurance required by this Section A.3.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. *(Indicate below the cause of loss and any applicable sub-limit.)*

§ A.3.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall replace the insurance policy required under Section A.3.3.1 with property insurance written for the total value of the Project.

§ A.3.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.3.3 is subject to deductibles or self-insured retentions, the Contractor shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.3.3.2 Occupancy or Use Prior to Substantial Completion. The Owner’s occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.3.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.3.3.3 If the Owner requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Contractor shall, if possible, include such insurance, and the cost thereof shall be charged to the Owner by appropriate Change Order.

§ A.3.3.4 Before an exposure to loss may occur, the Contractor shall file with the Owner a copy of each policy that includes insurance coverages required by this Section A.3.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project.

§ A.3.4 Contractor’s Other Insurance Coverage

§ A.3.4.1 Insurance selected and described in this Section A.3.4 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.4.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.4.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

§ A.3.4.2.1 Reserved

§ A.3.4.2.2 Insurance for physical damage to property while it is in storage and in transit to the construction site on an “all-risks” completed value form.

§ A.3.4.2.3 Property insurance on an “all-risks” completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

§ A.3.4.2.4 Boiler and Machinery Insurance
The Contractor shall purchase and maintain boiler and machinery insurance as required, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this

insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ A.3.5 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	100% of Contract Price
Performance Bond	100% of Contract Price

§ A.3.5.1 Before commencing any services hereunder, the Contractor shall provide the Owner with Performance and Payment Bonds, each in an amount not less than the Contract Price set forth in Article 4 of the Agreement. The Surety shall have, at a minimum, a "Best Rating" of "A" as stated in the most current publication of "Best's Key Rating Guide, Property-Casualty". In addition, the Surety shall have a minimum "Best Financial Strength Category" of "Class V", and in no case less than five (5) times the contract amount. The Performance Bond shall be written on Form SE-355, "Performance Bond" and the Payment Bond shall be written on Form SE-357, "Labor and Material Payment Bond", and both shall be made payable to the Owner.

§ A.3.5.2 The Performance and Labor and Material Payment Bonds shall:

- .1 be issued by a surety company licensed to do business in South Carolina;
- .2 be accompanied by a current power of attorney and certified by the attorney-in-fact who executes the bond on the behalf of the surety company; and
- .3 remain in effect for a period not less than one (1) year following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.

§ A.3.5.3 Any bonds required by this Contract shall meet the requirements of the South Carolina Code of Laws and Regulations, as amended.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

South Carolina Division of Procurement Services, Office of State Engineer Version of AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name, State Project Number, and location or address)

Pier Repairs
P36-9544-JR
40 Patriots Point Road, Mount Pleasant, SC 29464

THE OWNER:

(Name, legal status, and address)

Patriots Point Development Authority
40 Patriots Point Road
Mount Pleasant, SC, 29464

The Owner is a Governmental Body of the State of South Carolina as defined in S.C. Code Ann. § 11-35-310.

THE ARCHITECT:

(Name, legal status, and address)

GEL Engineering, LLC
2040 Savage Road
Charleston, SC, 29407

This version of AIA Document A201–2017 is modified by the South Carolina Division of Procurement, Office of State Engineer. Publication of this version of AIA Document A201 does not imply the American Institute of Architects' endorsement of any modification by South Carolina Division of Procurement, Office of State Engineer. A comparative version of AIA Document A201–2017 showing additions and deletions by the South Carolina Division of Procurement, Office of State Engineer is available for review on the State of South Carolina Web site.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

- .1 The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract.
- .2 A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect.
- .3 Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.
- .4 Any reference in this document to the Agreement between the Owner and Contractor, AIA Document A101, or some abbreviated reference thereof, shall mean the AIA A101-2017, Standard Form of Agreement Between Owner and Contractor, SCOSE Version.
- .5 Any reference in this document to the General Conditions of the Contract for Construction, AIA Document A201, or some abbreviated reference thereof, shall mean the AIA A201-2017, General Conditions of the Contract for Construction, SCOSE Version.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Reserved

§ 1.1.9 Notice to Proceed

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The Notice to Proceed is a document issued by the Owner to the Contractor directing the Contractor to begin prosecution of the Work in accordance with the requirements of the Contract Documents. The Notice to Proceed shall fix the date on which the Contract Time will commence and establish the initial date of the Substantial Completion.

§ 1.1.10 State Engineer

“State Engineer” means the person holding the position as head of the State Engineer’s Office. The State Engineer’s Office is created by S.C. Code Ann. § 11-35-830, and is sometimes referred to in the Contract Documents as “Office of State Engineer” or “OSE.” The State Engineer is also the Chief Procurement Officer for Construction, sometimes referred to in the Contract Documents as “CPOC”.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In the event of patent ambiguities within or between parts of the Contract Documents, the Contractor shall 1) provide the better quality or greater quantity of Work, or 2) comply with the more stringent requirement, either or both in accordance with the Architect’s interpretation.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, such determination shall not impair or otherwise affect the validity, legality, or enforceability of the remaining provision or parts of the provision of the Contract Documents, which shall remain in full force and effect as if the unenforceable provision or part were deleted.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as a violation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect’s consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to

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whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.6.3 Notice to Contractor shall be to the address provided in Section 8.3.2 of the Agreement. Notice to Owner shall be to the address provided in Section 8.2.2 of the Agreement. Either party may designate a different address for notice by giving notice in accordance with Section 1.6.1.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation, including in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, except as provided in Section 7.1.7. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's Representative noted in the Agreement.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen (15) days after receipt of a written request, information necessary and relevant for the Contractor to post Notice of Project Commencement pursuant to S.C. Code Ann. § 29-5-23.

§ 2.2 Reserved

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain a design professional lawfully licensed to practice, or an entity lawfully practicing, in the jurisdiction where the Project is located. The person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. Subject to the Contractor's obligations, including those in Section 3.2, the Contractor shall be entitled to rely on the accuracy of information furnished by the Owner pursuant to this Section but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services. However, the Owner does not warrant the accuracy of any such information requested by the Contractor that is not otherwise required of the Owner by the Contract Documents. Neither the Owner nor the Architect shall be required to conduct investigations or to furnish the Contractor with any information concerning subsurface characteristics or other conditions of the area where the Work is to be performed beyond that which is provided in the Contract Documents.

§ 2.3.6 The Owner shall furnish the Contract Documents to the Contractor in digital format.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect, including but not limited to providing necessary resources, with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's Representative noted in the Agreement.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

- .1 The Contractor acknowledges that it has investigated and satisfied itself as to the general and local conditions which can affect the Work or its cost, including but not limited to (a) conditions bearing upon transportation, disposal, handling, and storage of materials; (b) the availability of labor, water, electric power, and roads; (c) uncertainties of weather, river stages, tides, or similar physical conditions at the site; (d) the conformation and conditions of the ground; and (e) the character of equipment and facilities needed preliminary to and during work performance.
- .2 The Contractor also acknowledges that it has satisfied itself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is

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reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of this Contract.

- 3 Any failure of the Contractor to take the actions described and acknowledged in this Section will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to the Owner.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from latent errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction and provide its findings to the Owner. Unless the Owner objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

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§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect may consider requests for the substitution of products in place of those specified. The Owner and Architect may, but are not obligated to, consider only those substitution requests that are in full compliance with the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

- .1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the product specified;
- .2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;
- .3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be performed or changes as a result of the substitution, except for the Architect's re-design costs, and waives all claims for additional costs related to the substitution that subsequently become apparent;
- .4 agrees that it shall, if the substitution is approved, coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects; and
- .5 represents that the request includes a written representation identifying any potential effect the substitution may have on Project's achievement of a Sustainable Measure or the Sustainable Objective.

§ 3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements shall be considered defective. Unless caused by the Contractor or a subcontractor at any tier, the Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. The Contractor shall comply with the requirements of S.C Code Ann. Title 12, Chapter 8, regarding withholding tax for nonresidents, employees, contractors and subcontractors.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Pursuant to S.C. Code Ann. § 10-1-180, no local general or specialty building permits are required for state buildings. Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for all other permits, fees, and licenses by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect the difference between actual costs, as documented by invoices, and the allowances under Section 3.8.2.1.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent, acceptable to the Owner, and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

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§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Owner may notify the Contractor, stating whether the Owner has reasonable objection to the proposed superintendent. Failure of the Owner to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner has made reasonable and timely objection. The Contractor shall notify the Owner of any proposed change in the superintendent, including the reason therefore, prior to making such change. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. Subject to any additional requirements in the Contract Documents, the schedule shall contain detail appropriate for the Project, including at a minimum (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

- .1 The fire sprinkler shop drawings shall be prepared by a licensed fire sprinkler contractor and shall accurately reflect actual conditions affecting the required layout of the fire sprinkler system. The fire sprinkler contractor shall certify the accuracy of its shop drawings and submit the drawings and hydraulic calculations to the Architect's fire protection engineer (FPE) for review and approval.
- .2 The FPE will review, approve, and submit to the Office of State Fire Marshal (OSFM) the fire sprinkler shop drawings and FPE's certification indicating the shop drawings and hydraulic calculations have been reviewed and approved prior to OSFM review.
- .3 Unless authorized in writing by OSE, neither the Contractor nor subcontractor at any tier shall submit the fire sprinkler shop drawings directly to OSFM.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, who shall comply with reasonable requirements of the Owner regarding qualifications and insurance and whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to

the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.13.2 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the prior written consent of the Owner.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but

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only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents. Any reference in the Contract Documents to the Architect taking action or rendering a decision with a "reasonable time" is understood to mean no more than ten (10) days, unless otherwise specified in the Contract Documents or otherwise agreed to by the parties.

§ 4.2.2 The Architect will visit the site as necessary to fulfill its obligation to the Owner for inspection services, if any, and, at a minimum, to assure conformance with the Architect's design as shown in the Contract Documents and to observe the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) deviations from the Contract Documents, (2) deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Work completed and correlated with the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

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§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will, in the first instance, interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. Upon receipt of such request, the Architect will promptly provide the other party with a copy of the request. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, and will not show partiality to either. Except in the case of interpretations resulting in omissions, defects, or errors in the Instruments of Service or perpetuating omissions, defects or errors in the Instruments of Service, the Architect will not be liable for results of interpretations or decisions rendered in good faith. If either party disputes the Architect's interpretation or decision, that party may proceed as provided in Article 15. The Architect's interpretations and decisions may be, but need not be, accorded any deference in any review conducted pursuant to law or the Contract Documents.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents so as to avoid delay to the construction of the Project. The Architect's response to such requests will be made in writing with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information. Any response to a request for information must be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

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Unless issued pursuant to a Modification, supplemental Drawings or Specifications will not involve an adjustment to the Contract Sum or Contract Time.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, within fourteen (14) days after posting of the Notice of Intent to Award the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Owner may notify the Contractor whether the Owner has reasonable objection to any such proposed person or entity. Failure of the Owner to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner has made reasonable and timely objection. The Owner shall not direct the Contractor to contract with any specific individual or entity for supplies or services unless such supplies and services are necessary for completion of the Work and the specified individual or entity is the only source of such supply or service.

§ 5.2.3 If the Owner has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner makes reasonable objection to such substitution. The Contractor's request for substitution must be made to the Owner in writing, accompanied by supporting information.

§ 5.2.5 A Subcontractor identified in the Contractor's Bid pursuant to the subcontractor listing requirements of Section 7 of the Bid Form may only be substituted in accordance with and as permitted by the provisions of S.C. Code Ann. § 11-35-3021. A proposed substitute for a listed subcontractor shall also be subject to the Owner's approval as set forth in Section 5.2.3.

§ 5.2.6 A Contractor may substitute one prospective subcontractor for another, with the approval of the Owner as follows:

- .1 If the Contractor requests the substitution, the Contractor is responsible for all costs associated with the substitution.
- .2 If the Owner requests the substitution, the Owner is responsible for any resulting increased costs to the Contractor.

§ 5.3 Subcontractual Relations

§ 5.3.1 By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not

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prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise herein, or in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Without limitation on the generality of Section 5.3.1, each Subcontract agreement and each Sub-subcontract agreement shall include, and shall be deemed to include, the following Sections of these General Conditions: 3.2, 3.5, 3.18, 5.3, 5.4, 6.2.2, 7.1.6, 7.3.3, 7.5, 13.1, 13.9, 14.3, 14.4, and 15.1.7.

§ 5.3.3 Each Subcontract Agreement and each Sub-subcontract agreement shall exclude, and shall be deemed to exclude, Sections 13.2 and 13.5 and all of Article 15, except Section 15.1.7, of these General Conditions. In the place of these excluded sections of the General Conditions, each Subcontract Agreement and each Sub-subcontract may include Sections 13.2 and 13.5 and all of Article 15, except Section 15.1.7, of AIA Document A201-2007, Conditions of the Contract, as originally issued by the American Institute of Architects.

§ 5.3.4 The Contractor shall assure the Owner that all agreements between the Contractor and its Subcontractor incorporate the provisions of Section 5.3.1 as necessary to preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the work to be performed by Subcontractors so that the subcontracting thereof will not prejudice such rights. The Contractor's assurance shall be in the form of an affidavit or in such other form as the Owner may approve. Upon request, the Contractor shall provide the Owner or Architect with copies of any or all subcontracts or purchase orders.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.

§ 5.4.5 Each subcontract shall specifically provide that the Subcontractor agrees to perform portions of the Work assigned to the Owner in accordance with the Contract Documents.

§ 5.4.6 Nothing in this Section 5.4 shall act to reduce or discharge the Contractor's payment bond surety's obligations to claimants for claims arising prior to the Owner's exercise of any rights under this conditional assignment.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to

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those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term “Contractor” in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner’s own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Reserved

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor’s Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner’s or Separate Contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor’s delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor’s delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner’s Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 If a change in the Work provides for an adjustment to the Contract Sum, the amount of such adjustment must be computed and documented in writing. In order to facilitate evaluation of proposals or claims for increases and decreases to the Contract Sum, all proposals or claims, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and subcontracts. Labor and materials shall be itemized. Where major cost items are subcontracts, they shall be itemized also. The amount of the adjustment must approximate the actual cost to the Contractor and all costs incurred by the Contractor must be justifiably compared with prevailing industry standards. Except as provided in Section 7.1.5, all adjustments to the Contract Sum shall be limited to job specific costs and shall not include indirect costs, home office overhead or profit.

§ 7.1.5 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

- .1 For the Contractor, for Work performed by the Contractor's own forces, not to exceed seventeen (17%) percent of the Contractor's actual costs.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractors, not to exceed ten (10%) percent of each Subcontractor's actual costs (not including the Subcontractor's overhead and profit).
- .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, not to exceed seventeen (17%) percent of the Subcontractor's actual costs.
- .4 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.

The percentages cited above shall be considered to include all indirect costs including, but not limited to field and office managers, supervisors and assistants, incidental job burdens, small tools, and general overhead allocations.

§ 7.1.6 The procedures described in Sections 7.1.4 and 7.1.5 shall be used to calculate any adjustment in the Contract Sum, including without limitation an adjustment permitted under Articles 7, 9, 14, or 15.

§ 7.1.7 If a change in the Work requires an adjustment to the Contract Sum that exceeds the limits of the Owner's Construction Change Order Certification (reference Section 9.1.9 of the Agreement), then the Owner's agreement is not effective, and Work may not proceed until approved in writing by the OSE.

§ 7.1.8 Additional Work performed after the declaration of Substantial Completion must be approved by OSE, if the Change Order exceeds the Owner's Construction Change Order Certification.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument, using the OSE Construction Change Order form, prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, any adjustments to the Contract Sum or the Contract Time.

§ 7.2.2 At the Owner's request, the Contractor shall prepare a proposal to perform the work of a proposed Change Order setting forth the amount of the proposed adjustment, if any, in the Contract Sum; and the extent of the proposed adjustment, if any, in the Contract Time. Any proposed adjustment in the Contract Sum shall be prepared in accordance with Section 7.1.4 and 7.1.5. The Owner's request shall include any revisions to the Drawings or Specifications necessary to define any changes in the Work. Within fourteen (14) days of receiving the request, the Contractor shall submit the proposal to the Owner and Architect along with all documentation required by Section 7.5.

§ 7.2.3 If the Contractor requests a Change Order, the request shall set forth the proposed change in the Work and shall be prepared in accordance with Section 7.2.2. If the Contractor requests a change to the Work that involves a revision

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to either the Drawings or Specifications, the Contractor shall reimburse the Owner for any expenditure associated with the Architects' review of the proposed revisions, except to the extent the revisions are accepted by execution of a Change Order.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum if properly itemized and substantiating data is not available to permit evaluation;
- .2 Unit prices specified in the Contract Documents or subsequently agreed upon, subject to adjustment if any, as provided in Section 9.1.2;
- .3 Cost and a percentage fee, calculated as described in Sections 7.1.4 and 7.1.5;
- .4 in another manner as the parties may agree; or
- .5 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall make an initial determination, consistent with Section 7.3.3, of the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in Section 7.1.5. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others; and
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual cost including overhead and profit as confirmed by the Architect from the Schedule of Values.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The

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Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

§ 7.5 Pricing Data and Audit

§ 7.5.1 Cost or Pricing Data

Upon request of the Owner or Architect, Contractor shall submit cost or pricing data prior to execution of a Modification which exceeds \$500,000 [Reference S.C. Code Ann. §§ 11-35-1830 and 11-35-2220, and SC Code Ann. Reg 19-445.2120]. Contractor shall certify that, to the best of its knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of a mutually determined specified date prior to the date of pricing the Modification. Contractor's price, including profit, shall be adjusted to exclude any significant sums by which such price was increased because Contractor furnished cost or pricing data that was inaccurate, incomplete, or not current as of the date specified by the parties. Notwithstanding Subparagraph 9.10.4, such adjustments may be made after final payment to the Contractor.

§ 7.5.2 Cost or pricing data means all facts that, as of the date specified by the parties, prudent buyers and sellers would reasonably expect to affect price negotiations significantly. Cost or pricing data are factual, not judgmental; and are verifiable. While they do not indicate the accuracy of the prospective contractor's judgment about estimated future costs or projections, they do include the data forming the basis for that judgment. Cost or pricing data are more than historical accounting data; they are all the facts that can be reasonably expected to contribute to the soundness of estimates of future costs and to the validity of determinations of costs already incurred.

§ 7.5.3 Records Retention

As used in Section 7.5, the term "Records" means any books or records that relate to cost or pricing data of a Change Order that Contractor is required to submit pursuant to Section 7.5.1. Contractor shall maintain records for three years from the date of final payment, or longer if requested by the chief procurement officer. The Owner may audit Contractor's records at reasonable times and places.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

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§ 8.2.2 The Contractor shall not knowingly commence the Work prior to the effective date of surety bonds and insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time, the Contract Time shall be extended for such reasonable time as the Architect may determine, provided the delay:

- .1 is not caused by the fault or negligence of the Contractor or a subcontractor at any tier, and
- .2 is not due to unusual delay in the delivery of supplies, machinery, equipment, or services when such supplies, machinery, equipment, or services were obtainable from other sources in sufficient time for the Contractor to meet the required delivery.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

§ 9.2.1 The Contractor shall submit a schedule of values to the Architect within ten (10) days of full execution of the Agreement, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.2.2 As requested by the Architect, the Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible. The breakdown, being submitted on a uniform standardized format approved by the Architect and Owner, shall be divided in detail, using convenient units, sufficient to accurately determine the value of completed Work during the course of the Project. The Contractor shall update the schedule of values as required by either the Architect or Owner as necessary to reflect:

- .1 the description of Work (listing labor and material separately);
- .2 the total value of the Work;
- .3 the percent and value of the Work completed to date;
- .4 the percent and value of previous amounts billed; and
- .5 the current percent completed, and amount billed.

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§ 9.2.3 Any schedule of values or trade breakdown that fails to provide sufficient detail, is unbalanced, or exhibits "front-loading" of the value of the Work shall be rejected. If a schedule of values or trade breakdown is used as the basis for payment and later determined to be inaccurate, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work.

§ 9.3 Applications for Payment

§ 9.3.1 Monthly, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require (such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers), and shall reflect retainage as provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing, provided such materials or equipment will be subsequently incorporated in the Work. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site. The Contractor shall 1) protect such materials from diversion, vandalism, theft, destruction, and damage, 2) mark such materials specifically for use on the Project, and 3) segregate such materials from other materials at the storage facility. The Architect and the Owner shall have the right to make inspections of the storage areas at any time.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated in both the Application for Payment and, if required to be submitted, the accompanying current construction schedule, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means,

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methods, techniques, sequences, or procedures; or (3) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect shall withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. The Architect shall withhold a Certificate of Payment if the Application for Payment is not accompanied by the current construction schedule required by Section 3.10.1. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 Pursuant to S.C. Ann. §§ 29-6-10 through 29-6-60, the Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment to the Owner, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the time established in the Contract Documents, the amount certified by the Architect or awarded by final dispute resolution order, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive written list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect, the Owner, and any other party the Architect or the Owner choose, will make an inspection on a date and at a time mutually agreeable to determine whether the Work or designated portion thereof is substantially complete. The Contractor shall furnish access for the inspection and testing as provided in this Contract. The inspection shall include a demonstration by the Contractor that all equipment, systems and operable components of the Work function properly and in accordance with the Contract Documents.

- .1 If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.
- .2 If more than one Substantial Completion inspection is required, the Contractor shall reimburse the Owner for all costs of re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.
- .3 Representatives of the State Fire Marshal's Office and other authorities having jurisdiction may be present at the Substantial Completion inspection or otherwise inspect the completed Work and advise the Owner whether the Work meets their respective requirements for the Project.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner for its written acceptance of responsibilities assigned in the Certificate and a copy of the signed Certificate shall be delivered to the Contractor. Upon such acceptance, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 If the Architect and Owner concur in the Contractor's assessment that the Work or a portion of the Work is safe to occupy, the Owner and Contractor may arrange for a Certificate of Occupancy inspection by OSE. The Owner, Architect, and Contractor shall be present at OSE's inspection. Upon verifying that the Work or a portion of the Work is substantially complete and safe to occupy, OSE will issue, as appropriate, a Full or Partial Certificate of Occupancy.

§ 9.8.7 The Owner may not occupy the Work until all required occupancy permits, if any, have been issued and delivered to the Owner.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Unless the parties agree otherwise in the Certificate of Substantial Completion, the Contractor shall achieve Final Completion within thirty days after Substantial Completion. Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect, the Owner, and any other party the Architect or the Owner choose will make an inspection on a date and at a time mutually agreeable. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

- .1 If more than one Final Completion inspection is required, the Contractor shall reimburse the Owner for all costs of re-inspections or, at the Owner's option, the costs may be deducted from payments due to the Contractor.
- .2 If the Contractor does not achieve Final Completion within thirty days after Substantial Completion or the timeframe agreed to by the parties in the Certificate of Substantial Completion, whichever is

greater, the Contractor shall be responsible for any additional Architectural fees resulting from the delay.

- .3 If OSE has not previously issued a Certificate of Occupancy for the entire Project, the Parties shall arrange for a representative of OSE to participate in the Final Completion inspection.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect:

- .1 an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied,
- .2 a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect,
- .3 a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents,
- .4 consent of surety, if any, to final payment,
- .5 documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties,
- .6 if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner,
- .7 required Training Manuals,
- .8 equipment Operations and Maintenance Manuals,
- .9 any certificates of testing, inspection or approval required by the Contract Documents and not previously provided, and
10. one copy of the Documents required by Section 3.11.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is delayed 60 days through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those specific claims in stated amounts that have been previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

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- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance which was not discoverable as provided in Section 3.2.1 and not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons or serious loss to real or personal property resulting from such a material or substance encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition. Hazardous materials or substances are those hazardous, toxic, or radioactive materials or substances subject to regulations by applicable governmental authorities having jurisdiction, such as, but not limited to, the S.C. Department of Health and Environmental Control, the U.S. Environmental Protection Agency, and the U.S. Nuclear Regulatory Commission.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

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promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up. In the absence of agreement, the Architect will make an interim determination regarding any delay or impact on the Contractor's additional costs. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the rights of either party to disagree and assert a Claim in accordance with Article 15.

§ 10.3.3 The Work in the affected area shall be resumed immediately following the occurrence of any one of the following events: (a) the Owner causes remedial work to be performed that results in the absence of hazardous materials or substances; (b) the Owner and the Contractor, by written agreement, decide to resume performance of the Work; or (c) the Work may safely and lawfully proceed, as determined by an appropriate governmental authority or as evidenced by a written report to both the Owner and the Contractor, which is prepared by an environmental engineer reasonably satisfactory to both the Owner and the Contractor.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 In addition to its obligations under Section 3.18, the Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 Reserved

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. The Contractor shall immediately give the Owner and Architect notice of the emergency. This initial notice may be oral followed within five (5) days by a written notice setting forth the nature and scope of the emergency. Within fourteen (14) days of the start of the emergency, the Contractor shall give the Architect a written estimate of the cost and probable effect of delay on the progress of the Work.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Failure to Purchase Required Property Insurance. If the Contractor fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the

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Contract Documents, the Contractor shall inform the Owner in writing prior to commencement of the Work. Upon receipt of notice from the Contractor, the Owner may delay commencement of the Work and may obtain insurance that will protect the interests of the Owner in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall not be equitably adjusted. In the event the Contractor fails to procure coverage, the Contractor waives all rights against the Owner to the extent the loss to the Contractor (including Subcontractors and Sub-subcontractors) would have been covered by the insurance to have been procured by the Contractor. The cost of the insurance shall be charged to the Contractor by a Change Order. If the Contractor does not provide written notice, and the Owner is damaged by the failure or neglect of the Contractor to purchase or maintain the required insurance, the Contractor shall reimburse the Owner for all reasonable costs and damages attributable thereto.

§ 11.1.5 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner and all additional insureds of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Owner: (1) the Owner, upon receipt of notice from the Contractor, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall not be equitably adjusted; and (3) the Contractor waives all rights against the Owner to the extent any loss to the Contractor, Subcontractors, and Sub-subcontractors would have been covered by the insurance had it not expired or been cancelled. If the Owner purchases replacement coverage, the cost of the insurance shall be charged to the Contractor by an appropriate Change Order. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Reserved

§ 11.2.3 Reserved

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.3.3 Limitation on the Owner's Waiver of Subrogation

South Carolina law prohibits the State from indemnifying a private party. Accordingly, and notwithstanding anything in the Agreement to the contrary, including but not limited to Sections 11.3.1, 11.3.2, and 11.4, the Owner cannot and

does not waive subrogation to the extent any losses are covered by insurance provided by the South Carolina Insurance Reserve Fund.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§ 11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Contractors as fiduciary and made payable to the Contractor as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Contractor shall pay the Architect and Owner their just shares of insurance proceeds received by the Contractor, and by appropriate agreements the Architect and Owner shall make payments to their consultants and separate contractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Contractor shall notify the Owner of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Owner shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Owner does not object, the Contractor shall settle the loss and the Owner shall be bound by the settlement and allocation. Upon receipt, the Contractor shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Owner timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Contractor may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

§ 11.5.3 If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the requirements specifically expressed in the Contract Documents, including inspections of work-in-progress required by all authorities having jurisdiction over the Project, it must, upon demand of the Architect or authority having jurisdiction, be uncovered for observation/inspection and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense unless the condition was caused by the Owner or a Separate Contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

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- .1 If the Contractor, a Subcontractor, or anyone for whom either is responsible, uses or damages any portion of the Work, including, without limitation, mechanical, electrical, plumbing, and other building systems, machinery, equipment, or other mechanical device, the Contractor shall cause such item to be restored to "like new" condition at no expense to the Owner.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2 unless otherwise provided in the Contract Documents.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

§ 13.1.1 The Contract, any dispute, claim, or controversy relating to the Contract, and all the rights and obligations of the parties shall, in all respects, be interpreted, construed, enforced and governed by and under the laws of the State of South Carolina, except its choice of law rules.

§ 13.1.2 This Contract is formed pursuant to and governed by the South Carolina Consolidated Procurement Code and is deemed to incorporate all applicable provisions thereof and the ensuing regulations.

§ 13.2 Successors and Assigns

The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole, or in part, without written consent of the other and then only in accordance with and as permitted by Regulation 19-445.2180 of the South Carolina Code of Regulations, as amended. If either party attempts

to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.3 Rights and Remedies

§ 13.3.1 Unless expressly provided otherwise, duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.3.3 Notwithstanding Section 9.10.4, the rights and obligations which, by their nature, would continue beyond the termination, cancellation, rejection, or expiration of this contract shall survive such termination, cancellation, rejection, or expiration, including, but not limited to, the rights and obligations created by the following clauses:

- 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service;
- 3.5 Warranty
- 3.17 Royalties, Patents and Copyrights
- 3.18 Indemnification
- 7.5 Pricing Data and Audit
- A.3.2.2 Contractor's Liability Insurance (A101, Exhibit A)
- A.3.5 Performance and Payment Bond (A101, Exhibit A)
- 15.1.7 Claims for Listed Damages
- 15.1.8 Waiver of Claims Against the Architect
- 15.6 Dispute Resolution
- 15.6.5 Service of Process

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Owner and Architect timely notice of when and where tests and inspections are to be made so that they may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

- .1 Inspection, Special Inspections, and testing requirements, if any, as required by the ICC series of Building Codes shall be purchased by the Owner.
- .2 Contractor shall schedule and request inspections in an orderly and efficient manner and shall notify the Owner whenever the Contractor schedules an inspection. Contractor shall be responsible for the cost of inspections scheduled and conducted without the Owner's knowledge and for any increase in the cost of inspections resulting from the inefficient scheduling of inspections.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Owner and Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense and shall be deducted from future Applications of Payment.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due to the Contractor and unpaid under the Contract Documents shall bear interest only if and to the extent allowed by S.C. Code Ann. §§ 29-6-10 through 29-6-60. Amounts due to the Owner shall bear interest at the rate of one percent a month or a pro rata fraction thereof on the unpaid balance as may be due.

§ 13.6 Procurement of Materials by Owner

The Contractor accepts assignment of all purchase orders and other agreements for procurement of materials and equipment by the Owner that are identified as part of the Contract Documents. The Contractor shall, upon delivery, be responsible for the storage, protection, proper installation, and preservation of such Owner purchased items, if any, as if the Contractor were the original purchaser. The Contract Sum includes, without limitation, all costs and expenses in connection with delivery, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. Unless the Contract Documents specifically provide otherwise, all Contractor warranty of workmanship and correction of the Work obligations under the Contract Documents shall apply to the Contractor's installation of and modifications to any Owner purchased items.

§ 13.7 Interpretation of Building Codes

As required by S.C. Code Ann. § 10-1-180, OSE shall determine the enforcement and interpretation of all building codes and referenced standards on state buildings. The Contractor shall refer any questions, comments, or directives from local officials to the Owner and OSE for resolution.

§ 13.8 Reserved

§ 13.9 Illegal Immigration

Contractor certifies and agrees that it will comply with the applicable requirements of Title 8, Chapter 14 of the South Carolina Code of Laws and agrees to provide to the State upon request any documentation required to establish either: (a) that Title 8, Chapter 14 is inapplicable both to Contractor and its subcontractors or sub-subcontractors; or (b) that Contractor and its subcontractors or sub-subcontractors are in compliance with Title 8, Chapter 14. Pursuant to Section 8-14-60, "A person who knowingly makes or files any false, fictitious, or fraudulent document, statement, or report pursuant to this chapter is guilty of a felony and, upon conviction, must be fined within the discretion of the court or imprisoned for not more than five years, or both." Contractor agrees to include in any contracts with its subcontractor's language requiring its subcontractors to (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractor's language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at www.procurement.sc.gov)

§ 13.10 Drug-Free Workplace

The Contractor must comply with the Drug-Free Workplace Act, S.C. Code Ann. §§ 44-107-10, et seq. The Contractor certifies to the Owner that Contractor will provide a Drug-Free Workplace, as defined by S.C. Code Ann. § 44-107-20(1).

§ 13.11 False Claims

According to S.C. Code Ann. § 16-13-240, "a person who by false pretense or representation obtains the signature of a person to a written instrument or obtains from another person any chattel, money, valuable security, or other property, real or personal, with intent to cheat and defraud a person of that property is guilty" of a crime.

§ 13.12 Prohibited Acts

It is unlawful for a person charged with disbursements of state funds appropriated by the General Assembly to exceed the amounts and purposes stated in the appropriations. (§ 11-9-20) It is unlawful for an authorized public officer to enter into a contract for a purpose in which the sum is in excess of the amount appropriated for that purpose. It is unlawful for an authorized public officer to divert or appropriate the funds arising from any tax levied and collected for any one fiscal year to the payment of an indebtedness contracted or incurred for a previous year. (§ 11-1-40)

§ 13.13 Open Trade (Jun 2015)

During the contract term, including any renewals or extensions, Contractor will not engage in the boycott of a person or an entity based in or doing business with a jurisdiction with whom South Carolina can enjoy open trade, as defined in S.C. Code Ann. § 11-35-5300.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 45 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires substantially all Work to be stopped; or
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents and the Contractor has stopped work in accordance with Section 9.7.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has persistently failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials, or otherwise fails to prosecute the Work, or any separable part of the Work, with the diligence, resources and skill that will ensure its completion within the time specified in the Contract Documents, including any authorized adjustments;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the Contract Documents and the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 If, after termination for cause, it is determined that the Owner lacked justification to terminate under Section 14.2.1, or that the Contractor's default was excusable, or that the termination for cause was affected by any other error, then Owner and Contractor agree that the termination shall be conclusively deemed to be one for the convenience of the Owner, and the rights and obligations of the parties shall be the same as if the termination had been issued for in Section 14.4.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. The Owner shall give notice of the termination to the Contractor specifying the part of the Contract terminated and when termination becomes effective.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work;
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders; and
- .4 complete the performance of the Work not terminated, if any.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and any other adjustments otherwise set forth in the Agreement.

§ 14.4.4 Contractor's failure to include an appropriate termination for convenience clause in any subcontract shall not (i) affect the Owner's right to require the termination of a subcontract, or (ii) increase the obligation of the Owner beyond what it would have been if the subcontract had contained an appropriate clause.

§ 14.4.5 Upon written consent of the Contractor, the Owner may reinstate the terminated portion of this Contract in whole or in part by amending the notice of termination if it has been determined that:

- .1 the termination was due to withdrawal of funding by the General Assembly, Governor, or State Fiscal Accountability Authority or the need to divert project funds to respond to an emergency as defined by Regulation 19-445.2110(B) of the South Carolina Code of Regulations, as amended;

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- .2 funding for the reinstated portion of the Work has been restored;
- .3 circumstances clearly indicate a requirement for the terminated Work; and
- .4 reinstatement of the terminated work is advantageous to the Owner.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. A voucher, invoice, payment application or other routine request for payment that is not in dispute when submitted is not a Claim under this definition. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Reserved

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Architect. Such notice shall include sufficient information to advise the Architect and other party of the circumstances giving rise to the Claim, the specific contractual adjustment or relief requested and the basis of such request. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later except as stated for adverse weather days in Section 15.1.6.2. By failing to give written notice of a Claim within the time required by this Section, a party expressly waives its Claim.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Architect is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, including any administrative review allowed under Section 15.6, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Architect's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. Claims for an increase in the Contract Time shall be based on one additional calendar day for each full calendar day that the Contractor is prevented from working.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

- .1 Claims for adverse weather shall be based on actual weather conditions at the job site or other place of performance of the Work, as documented in the Contractor's job site log.

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- 2 For the purpose of this Contract, a total of five (5) days per calendar month (non-cumulative) shall be anticipated as "adverse weather" at the job site, and such time will not be considered justification for an extension of time. If, in any month, adverse weather develops beyond the five (5) days, the Contractor shall be allowed to claim additional days to compensate for the excess weather delays only to the extent of the impact on the approved construction schedule and days the Contractor was already scheduled to work. The remedy for this condition is for an extension of time only and is exclusive of all other rights and remedies available under the Contract Documents or imposed or available by law.
- 3 The Contractor shall submit monthly with their pay application all Claims for adverse weather conditions that occurred during the previous month. The Architect shall review each monthly submittal in accordance with Section 15.5 and inform the Contractor and the Owner promptly of its evaluation. Approved days shall be included in the next Change Order issued by the Architect. Adverse weather conditions not claimed within the time limits of this Subparagraph shall be considered to be waived by the Contractor. Claims will not be allowed for adverse weather days that occur after the scheduled (original or adjusted) date of Substantial Completion.

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the work, and the number of days increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.7 Claims for Listed Damages

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor and Owner waive Claims against each other for listed damages arising out of or relating to this Contract.

§ 15.1.7.1 For the Owner, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) costs suffered by a third party unable to commence work, (vi) attorney's fees, (vii) any interest, except to the extent allowed by Section 13.5 (Interest), (viii) lost revenue and profit for lost use of the property, (ix) costs resulting from lost productivity or efficiency.

§ 15.1.7.2 For the Contractor, listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest, except to the extent allowed by Section 13.5 (Interest); (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. Without limitation, this mutual waiver is applicable to all damages due to either party's termination in accordance with Article 14.

§ 15.1.7.3 Nothing contained in this Section shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

§ 15.1.8 Waiver of Claims Against the Architect

Notwithstanding any other provision of the Contract Documents, including Section 1.2.1, but subject to a duty of good faith and fair dealing, the Contractor waives all claims against the Architect and any other design professionals who provide design and/or project management services to the Owner, either directly or as independent contractors or subcontractors to the Architect, for listed damages arising out of or relating to this Contract. The listed damages are (i) lost revenue and profit, (ii) losses resulting from injury to business or reputation, (iii) additional or escalated overhead and administration expenses, (iv) additional financing costs, (v) attorney's fees, (vi) any interest; (vii) unamortized equipment costs; and, (viii) losses incurred by subcontractors for the types of damages the Contractor has waive as against the Owner. This mutual waiver is not applicable to amounts due or obligations under Section 3.18 (Indemnification).

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§ 15.2 Reserved

§ 15.3 Reserved

§ 15.4 Reserved

§ 15.5 Claim and Disputes - Duty of Cooperation, Notice, and Architects Initial Decision

§ 15.5.1 Contractor and Owner are fully committed to working with each other throughout the Project to avoid or minimize Claims. To further this goal, Contractor and Owner agree to communicate regularly with each other and the Architect at all times notifying one another as soon as reasonably possible of any issue that if not addressed may cause loss, delay, and/or disruption of the Work. If Claims do arise, Contractor and Owner each commit to resolving such Claims in an amicable, professional, and expeditious manner to avoid unnecessary losses, delays, and disruptions to the Work.

§ 15.5.2 Claims shall first be referred to the Architect for initial decision. An initial decision shall be required as a condition precedent to resolution pursuant to Section 15.6 of any Claim arising prior to the date of final payment, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered, or after all the Architect's requests for additional supporting data have been answered, whichever is later. The Architect will not address Claims between the Contractor and persons or entities other than the Owner.

§ 15.5.3 The Architect will review Claims and within ten days of the receipt of a Claim (1) request additional supporting data from the claimant or a response with supporting data from the other party or (2) render an initial decision in accordance with Section 15.5.5.

§ 15.5.4 If the Architect requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Architect when the response or supporting data will be furnished or (3) advise the Architect that all supporting data has already been provided. Upon receipt of the response or supporting data, the Architect will render an initial decision in accordance with Section 15.5.5.

§ 15.5.5 The Architect will render an initial decision in writing; (1) stating the reasons therefor; and (2) notifying the parties of any change in the Contract Sum or Contract Time or both. The Architect will deliver the initial decision to the parties within two weeks of receipt of any response or supporting data requested pursuant to Section 16.4 or within such longer period as may be mutually agreeable to the parties. If the parties accept the initial decision, the Architect shall prepare a Change Order with appropriate supporting documentation for the review and approval of the parties and the Office of State Engineer. If either the Contractor, Owner, or both, disagree with the initial decision, the Contractor and Owner shall proceed with dispute resolution in accordance with the provisions of Section 15.6.

§ 15.5.6 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.6 Dispute Resolution

§ 15.6.1 If a Claim is not resolved pursuant to Section 15.5 to the satisfaction of either party, both parties shall attempt to resolve the dispute at the field level through discussions between Contractor's Representative and Owner's Representative. If a dispute cannot be resolved through Contractor's Representative and Owner's Representative, then the Contractor's Senior Representative and the Owner's Senior Representative, upon the request of either party, shall meet as soon as conveniently possible, but in no case later than twenty-one (21) days after such a request is made, to attempt to resolve such dispute. Prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving their dispute. The meetings required by this Section are a condition precedent to resolution pursuant to Section 15.6.2.

§ 15.6.2 If after meeting in accordance with the provisions of Section 15.6.1, the Senior Representatives determine that the dispute cannot be resolved on terms satisfactory to both the Contractor and the Owner, then either party may submit the dispute by written request to South Carolina's Chief Procurement Officer for Construction (CPOC). Except as otherwise provided in Article 15, all Claims, or controversies relating to the Contract shall be resolved exclusively by the appropriate Chief Procurement Officer in accordance with Title 11, Chapter 35, Article 17 of the

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South Carolina Code of Laws, or in the absence of jurisdiction, only in the Court of Common Pleas for, or in the absence of jurisdiction a federal court located in, Richland County, State of South Carolina. Contractor agrees that any act by the State regarding the Contract is not a waiver of either the State's sovereign immunity or the State's immunity under the Eleventh Amendment of the United States Constitution.

§ 15.6.3 If any party seeks resolution to a dispute pursuant to Section 15.6.2, the parties shall participate in non-binding mediation to resolve the Claim. If the Claim is governed by Title 11, Chapter 35, Article 17 of the South Carolina Code of Laws as amended and the amount in controversy is \$100,000.00 or less, the CPOC shall appoint a mediator, otherwise, the mediation shall be conducted by an impartial mediator selected by mutual agreement of the parties, or if the parties cannot so agree, a mediator designated by the American Arbitration Association ("AAA") pursuant to its Construction Industry Mediation Rules. The mediation will be governed by and conducted pursuant to a mediation agreement negotiated by the parties or, if the parties cannot so agree, by procedures established by the mediator.

§ 15.6.4 Without relieving any party from the other requirements of Sections 15.5 and 15.6, either party may initiate proceedings in the appropriate forum prior to initiating or completing the procedures required by Sections 15.5 and 15.6 if such action is necessary to preserve a claim by avoiding the application of any applicable statutory period of limitation or repose.

§ 15.6.5 Service of Process

Contractor consents that any papers, notices, or process necessary or proper for the initiation or continuation of any Claims, or controversies relating to the Contract; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on Contractor by certified mail (return receipt requested) addressed to Contractor at the address provided for the Contractor's Senior Representative or by personal service or by any other manner that is permitted by law, in or outside South Carolina. Notice by certified mail is deemed duly given upon deposit in the United States mail.

ARTICLE 16 PROJECT-SPECIFIC REQUIREMENTS AND INFORMATION

Bidder's work must not affect museum activities. Bidder may not store or leave materials or equipment unattended on the pier when not actively being used. Bidder's repairs at the pier deck must be completed after normal museum business hours. Bidders may not conduct any work or repairs from July 1, 2026 to July 8, 2026.

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AIA[®] Document A304[™] – 2024

Request for Contractor's Qualifications

In accordance with the requirements set forth in this Request for Qualifications ("RFQ"), you are invited to submit an AIA Document A305[®]-2020, Contractor's Qualification Statement ("Qualification Statement") for the Project described below.

ARTICLE 1 GENERAL INFORMATION

§ 1.1 Requester

(Insert name, legal status, address, and other information of requesting entity.)

Patriots Point Development Authority, 40 Patriots Point Road, Mount Pleasant 29464

§ 1.2 Owner

(If different from Requester, insert name, legal status, address, and other information.)

N/A

§ 1.3 Project Type and Scope

(Describe the Project in terms of building use, location, scope, project objectives, budget, and schedule, or reference exhibit(s).)

Repairs to the approach pier and original pier head at the Patriots Point Naval and Maritime Museum. Scope of work includes performing concrete repairs, demolition of a timber dock, and replacement of deck joint material.

§ 1.4 Agreement and Project Delivery Method

§ 1.4.1 The form of agreement to engage the contractor for the Project is as follows:

(If known, identify the form of agreement by AIA document number and name, or attach as an exhibit.)

SE-390, Notice to Proceed – Design-Bid-Build Contract

§ 1.4.2 If the form of agreement is not identified above, the intended Project Delivery Method is as follows:

- Design-Bid-Build
- Construction Manager as Constructor
- Construction Manager as Advisor
- Design-Build
- Other Information *(stipulate a project delivery method not identified above, compensation structure, etc.)*

§ 1.5 Project Participants

(List known Project participants such as the architect(s), consultants, contractor(s), owner's representative, or program manager, and any restrictions regarding contact during the RFQ process.)

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A305[®]-2020, Contractor's Qualification Statement.

L. David Coates, Maintenance Director, Patriots Point Development Authority
Dan Campbell, P.E., GEL Engineering, LLC

§ 1.6 Prequalification Conference

§ 1.6.1 The Prequalification Conference is:

- Mandatory
- Not Mandatory
- Not Applicable

§ 1.6.2 The date, time, and location of the Prequalification Conference is as follows:

(If applicable, insert the date, time, physical and/or virtual location, and other pertinent information.)

N/A

To request an accommodation or for inquiries about accessibility, contact the party identified in Section 1.7.1.

§ 1.7 Inquiries and Clarifications

§ 1.7.1 Inquiries related to this RFQ shall be submitted in writing, with specific reference to the section(s) of this RFQ or Qualification Statement. Direct inquiries to:

(Insert requirements for submitting inquiries such as name, title, and email address of the recipient.)

L. David Coates, Maintenance Director, dcoates@patriotspoint.org

§ 1.7.2 Inquiries shall be submitted not later than:

5 business days prior to bid document submission.

§ 1.7.3 Clarifications shall be issued as follows:

Clarifications and responses will be posted to www.patriotspoint.org/about/board/solicitations.

§ 1.8 Submission Requirements

§ 1.8.1 Submit the Qualification Statement including the exhibits selected below, along with all required attachments. Incomplete submissions may not be evaluated.

- A305–2020 Exhibit A – General Information
- A305–2020 Exhibit B – Financial and Performance Information
- A305–2020 Exhibit C – Project-Specific Information
- A305–2020 Exhibit D – Past Project Experience
- A305–2020 Exhibit E – Past Project Experience (Continued)

§ 1.8.2 The Qualification Statement shall be submitted not later than:

The Qualification Statement should be submitted along with all other bid documents

§ 1.8.3 Method of submission, and any requirements pertaining to the method of submission, are as follows:

Hand-delivery to pier sentry (gatehouse) or mail service other than USPS general mail addressed to:

L. David Coates

40 Patriots Point Road
Mount Pleasant, South Carolina 29464

§ 1.9 Selection Process

Each contractor that submits a Qualification Statement will be notified whether or not selected for further consideration. The selection process is set forth as follows:

(Identify the process and schedule for contractor selection.)

A Contractor will be selected based on their submitted bid and qualifications as required in Article 3.

ARTICLE 2 MISCELLANEOUS PROVISIONS

§ 2.1 **Modification or Withdrawal.** Prior to the date and time the Qualification Statement is due, a contractor may withdraw or resubmit its Qualification Statement by submitting written notice to the party identified in Section 1.7.1.

§ 2.2 Reservation of Rights

The Requester, in its sole discretion, reserves the right to: (i) reject any or all Qualification Statement submissions; or (ii) withdraw this RFQ. The Requester shall have no liability for any costs incurred by a contractor related to this RFQ. The Requester is not required to disclose any reason for rejection or acceptance of a submitted Qualification Statement.

ARTICLE 3 ADDITIONAL INFORMATION AND REQUIREMENTS

(If applicable, list attachments pertaining to this RFQ and stipulate page limits and other Qualification Statement requirements or limitations.)

Qualification Criteria

- A. Bidder must demonstrate the following to the satisfaction of Owner:
- a. Proper license under the laws and regulation governing their respective trade(s).
 - b. Capacity to provide Performance Bond, Labor and Material Payment Bond, and Insurance in a form acceptable to Owner in amounts adequate to bond the Work based on the scope indicated in the Invitation to Bid.
 - c. Applicable experience of firm as described in the Contractor's Qualification Statement, including one or more of the following:
 - i. Experience of Firm: The firm in its current organization shall have successfully completed a minimum of 3 (three) projects of similar type, quality, and scope, each with a value in excess of \$850,000 (eight hundred fifty thousand dollars), including a minimum of two within the last three years. The firm shall have records of project completion, credit record, record of judgement claims, arbitration proceedings, and suits pending or outstanding acceptable to Owner.
 - ii. Experience of Firm Officers: The firm officers shall have personal record of project completion acceptable to Owner.
 - iii. Experience of Project and Firm Management Staff to be committed by the bidder to carry out the work: The assigned project manager and field superintendent must have successfully completed minimum of three projects of similar type, quality, and scope.
 - iv. For purposes of this submittal, reference to "key personnel" as described in the Contractor's Qualification Statement shall be understood to mean the principal in charge, the project manager(s), and the project field superintendent(s) committed by the bidder to carry out the work of this project. Bidder by submitting qualifications of key individuals agrees that Owner reserves the right to approve or reject subsequent reassignment of key individuals.
 - v. For purposes of this submittal, "successful competition" shall be understood to mean completion of project within project schedule and budget. Provide additional information indicating reasons why any referenced project did not meet project schedule or project budget.
 - vi. For purposes of this Qualification, "similar project" shall be understood to include one or more of the following project elements:
 1. Marine environments including:

- a. Coastal and shoreline.
 - b. Marsh and wetland.
 - c. Harbors and ports.
 - d. Offshore and deepwater.
2. Marine Structures including:
 - a. Seawalls/Bulkheads
 - b. Piers/Docks/Berths
 - c. Bridges and bridge piers
 3. Repairs to structural concrete.
- vii. Adequate financial resources, including ability to secure materials and labor necessary for completion of the work and other work in hand, within the anticipated contract times, and reflecting the anticipated retainage from progress payments.
 - viii. Work in hand capacity, such that the bidder demonstrates adequate work under contract to continue its business operations at least at their current level, at the same time indicating the capability to carry out Owner's proposed work.
 - ix. Adequate organization to complete work of the scope anticipated, including firm management, project management, field superintendence, and field quality control.
 - x. Acceptable past performance as indicated by firm's references, including ability to meet contract time and to monitor, manage, and communicate interim scheduling requirements, to carry out required quality control activities, to properly prepare interim and final payment requests, and to successfully complete project closeout requirements.
 - xi. Acceptable documentation of firm's employee screening practices.

SE-355 PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____
Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: Patriots Point Development Authority
Address: 40 Patriots Point Road
Mount Pleasant, South Carolina 29464

hereinafter referred to as “Agency”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: Pier Repairs
State Project Number: P36-9544-JR
Brief Description of Awarded Work: Repairs to the approach pier and original pier head at the Patriots Point Naval and Maritime Museum. Scope of work includes performing concrete repairs, demolition of a timber dock, and replacement of deck joint material.

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GEL Engineering, LLC
Address: 2040 Savage Road
Charleston, South Carolina 29407

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____, **2** _____
(shall be no earlier than Date of Contract)

BOND NUMBER _____

CONTRACTOR

SURETY

By: _____
(Seal)

By: _____
(Seal)

Print Name: _____

Print Name: _____

Print Title: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

Witness: _____

(Additional Signatures, if any, appear on attached page)

SE-355**PERFORMANCE BOND****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency for the full and faithful performance of the contract, which is incorporated herein by reference.
2. If the Contractor performs the contract, the Surety and the Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. The Surety's obligation under this Bond shall arise after:
 - 3.1 The Agency has notified the Contractor and the Surety at the address described in paragraph 10 below, that the Agency is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If the Agency, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Agency's right, if any, subsequently to declare a Contractor Default; or
 - 3.2 The Agency has declared a Contractor Default and formally terminated the Contractor's right to complete the Contract.
4. The Surety shall, within 15 days after receipt of notice of the Agency's declaration of a Contractor Default, and at the Surety's sole expense, take one of the following actions:
 - 4.1 Arrange for the Contractor, with consent of the Agency, to perform and complete the Contract; or
 - 4.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Agency for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Agency and the contractor selected with the Agency's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the Agency the amount of damages as described in paragraph 7 in excess of the Balance of the Contract Sum incurred by the Agency resulting from the Contractor Default; or
 - 4.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and:
 - 4.4.1 After investigation, determine the amount for which it may be liable to the Agency and, within 60 days of waiving its rights under this paragraph, tender payment thereof to the Agency; or
 - 4.4.2 Deny liability in whole or in part and notify the Agency, citing the reasons therefore.
5. Provided Surety has proceeded under paragraphs 4.1, 4.2, or 4.3, the Agency shall pay the Balance of the Contract Sum to either:
 - 5.1 Surety in accordance with the terms of the Contract; or
 - 5.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
 - 5.3 The balance of the Contract Sum due either the Surety or another contractor shall be reduced by the amount of damages as described in paragraph 7.
6. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond 15 days after receipt of written notice from the Agency to the Surety demanding that the Surety perform its obligations under this Bond, and the Agency shall be entitled to enforce any remedy available to the Agency.
 - 6.1 If the Surety proceeds as provided in paragraph 4.4 and the Agency refuses the payment tendered or the Surety has denied liability, in whole or in part, then without further notice the Agency shall be entitled to enforce any remedy available to the Agency.
 - 6.2 Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the Dispute Resolution process defined in the Contract Documents and the laws of the State of South Carolina.
7. After the Agency has terminated the Contractor's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Agency shall be those of the Contractor under the Contract, and the responsibilities of the Agency to the Surety shall be those of the Agency under the Contract. To a limit of the amount of this Bond, but subject to commitment by the Agency of the Balance of the Contract Sum to mitigation of costs and damages on the Contract, the Surety is obligated to the Agency without duplication for:
 - 7.1 The responsibilities of the Contractor for correction of defective Work and completion of the Contract; and
 - 7.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and
 - 7.3 Damages awarded pursuant to the Dispute Resolution Provisions of the Contract. Surety may join in any Dispute Resolution proceeding brought under the Contract and shall be bound by the results thereof; and
 - 7.4 Liquidated Damages, or if no Liquidated Damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. The Surety shall not be liable to the Agency or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Sum shall not be reduced or set-off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Agency or its heirs, executors, administrators, or successors.
9. The Surety hereby waives notice of any change, including changes of time, to the contract or to related subcontracts, purchase orders and other obligations.
10. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the address shown on the signature page.
11. Definitions
 - 11.1 Balance of the Contract Sum: The total amount payable by the Agency to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts to be received by the Agency in settlement of insurance or other Claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.
 - 11.2 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform the Contract or otherwise to comply with the terms of the Contract.

SE-357
LABOR & MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that *(Insert full name or legal title and address of Contractor)*

Name: _____
Address: _____

hereinafter referred to as “Contractor”, and *(Insert full name and address of principal place of business of Surety)*

Name: _____
Address: _____

hereinafter called the “surety”, are jointly and severally held and firmly bound unto *(Insert full name and address of Agency)*

Name: Patriots Point Development Authority
Address: 40 Patriots Point Rpad
Mount Pleasant, South Carolina 29464

hereinafter referred to as “Agency”, or its successors or assigns, the sum of _____ (\$ _____), being the sum of the Bond to which payment to be well and truly made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Agency to construct

State Project Name: Pier Repairs
State Project Number: P36-9544-JR
Brief Description of Awarded Work: Repairs to the approach pier and original pier head at the Patriots Point Naval and Maritime Museum. Scope of work includes performing concrete repairs, demolition of a timber dock, and replacement of deck joint material.

in accordance with Drawings and Specifications prepared by *(Insert full name and address of A/E)*

Name: GEL Engineering, LLC
Address: 2040 Savage Road
Charleston, South Carolina 29407

which agreement is by reference made a part hereof, and is hereinafter referred to as the Contract.

IN WITNESS WHEREOF, Surety and Contractor, intending to be legally bound hereby, subject to the terms stated herein, do each cause this Labor & Material Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative.

DATED this _____ **day of** _____, **2** _____ **BOND NUMBER** _____
(shall be no earlier than Date of Contract)

CONTRACTOR

By: _____
(Seal)

Print Name: _____

Print Title: _____

Witness: _____

SURETY

By: _____
(Seal)

Print Name: _____

Print Title: _____
(Attach Power of Attorney)

Witness: _____

(Additional Signatures, if any, appear on attached page)

SE-357**LABOR & MATERIAL PAYMENT BOND****NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Agency to pay for all labor, materials and equipment required for use in the performance of the Contract, which is incorporated herein by reference.
 2. With respect to the Agency, this obligation shall be null and void if the Contractor:
 - 2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants; and
 - 2.2 Defends, indemnifies and holds harmless the Agency from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract.
 3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
 4. With respect to Claimants, and subject to the provisions of Title 29, Chapter 5 and the provisions of §11-35-3030(2)(c) of the SC Code of Laws, as amended, the Surety's obligation under this Bond shall arise as follows:
 - 4.1 Every person who has furnished labor, material or rental equipment to the Contractor or its subcontractors for the work specified in the Contract, and who has not been paid in full therefore before the expiration of a period of ninety (90) days after the date on which the last of the labor was done or performed by him or material or rental equipment was furnished or supplied by him for which such claim is made, shall have the right to sue on the payment bond for the amount, or the balance thereof, unpaid at the time of institution of such suit and to prosecute such action for the sum or sums justly due him.
 - 4.2 A remote claimant shall have a right of action on the payment bond upon giving written notice by certified or registered mail to the Contractor within ninety (90) days from the date on which such person did or performed the last of the labor or furnished or supplied the last of the material or rental equipment upon which such claim is made.
 - 4.3 Every suit instituted upon a payment bond shall be brought in a court of competent jurisdiction for the county or circuit in which the construction contract was to be performed, but no such suit shall be commenced after the expiration of one year after the day on which the last of the labor was performed or material or rental equipment was supplied by the person bringing suit.
 5. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 5.1 Send an answer to the Claimant, with a copy to the Agency, within sixty (60) days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 5.2 Pay or arrange for payment of any undisputed amounts.
 - 5.3 The Surety's failure to discharge its obligations under this paragraph 5 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a claim. However, if the Surety fails to discharge its obligations under this paragraph 5, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs to recover any sums found to be due and owing to the Claimant.
 6. Amounts owed by the Agency to the Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the Contractor furnishing and the Agency accepting this Bond, they agree that all funds earned by the contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Agency's prior right to use the funds for the completion of the Work.
 7. The Surety shall not be liable to the Agency, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Agency shall not be liable for payment of any costs or expenses of any claimant under this bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
 8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
 9. Notice to the Surety, the Agency or the Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the Agency or the contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
 10. By the Contractor furnishing and the Agency accepting this Bond, they agree that this Bond has been furnished to comply with the statutory requirements of the South Carolina Code of Laws, as amended, and further, that any provision in this Bond conflicting with said statutory requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
 11. Upon request of any person or entity appearing to be a potential beneficiary of this bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
 12. Any dispute, suit, action or proceeding arising out of or relating to this Bond shall be governed by the laws of the State of South Carolina.
- 13. DEFINITIONS**
- 13.1 Claimant: An individual or entity having a direct contract with the Contractor or with a Subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the Contractor and the Contractor's Subcontractors, and all other items for which a mechanic's lien might otherwise be asserted.
 - 13.2 Remote Claimant: A person having a direct contractual relationship with a subcontractor of the Contractor or subcontractor, but no contractual relationship expressed or implied with the Contractor.
 - 13.3 Contract: The agreement between the Agency and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

SE-380

CHANGE ORDER NO.: _____

CHANGE ORDER TO DESIGN-BID-BUILD CONTRACT

AGENCY: Patriots Point Development Authority

PROJECT NAME: Pier Repairs

PROJECT NUMBER: P36-9544-JR

CONTRACTOR: _____

This Contract is changed as follows: *(Insert description of change in space provided below.)*

ADJUSTMENTS IN THE CONTRACT SUM:

1. Original Contract Sum:		\$
2. Change in Contract Sum by previously approved Change Orders:		
3. Contract Sum prior to this Change Order:		\$ 0.00
4. Amount of this Change Order:		
5. New Contract Sum, including this Change Order:		\$ 0.00

ADJUSTMENTS IN THE CONTRACT TIME:

1. Initial Date for Substantial Completion:		
2. Sum of previously approved increases and decreases in Days:		Days
3. Change in Days for this Change Order:		Days
4. Total Number of Days added to this Contract including this Change Order:	0 Days	
5. New Date for Substantial Completion:		

AGENCY ACCEPTANCE AND CERTIFICATION:

I certify that the Agency has authorized, unencumbered funds available for obligation to this contract.

BY: _____ **Date:** _____
(Signature of Representative)

Print Name of Representative: _____

Change is within Agency Construction Contract Change Order Certification of: \$ _____ Yes No

APPROVED BY: _____ **DATE:** _____
(OSE Project Manager)

SUBMIT THE FOLLOWING TO OSE

- SE-380, completed and signed by the Agency.
- SE-380, Page 2, completed and signed by the Contractor, A/E and Agency, with back-up information to support request.

CHANGE ORDER REQUEST SUMMARY – DESIGN-BID-BUILD

AGENCY: Patriots Point Development Authority

PROJECT NAME: Pier Repairs

PROJECT NUMBER: P36-9544-JR

CONTRACTOR: _____

This Contract is requested to be changed as follows: *(Insert description of change in space provided below.)*

ADJUSTMENTS IN THE CONTRACT TIME: Requested Change in Days for this Change Order: _____ Days

			(1) Contractor	(2) Subcontractor	(3) TOTAL
Direct Costs (Provide back-up, including hourly rates, invoices, manhours, etc.)	1.	Labor			
	2.	Materials (including Sales Tax)			
	3.	Rental Charges			
	4.	Subtotal Direct Costs (sum lines 1 – 3)	\$ 0.00	\$ 0.00	\$ 0.00
Contractor Markup (per AIA A201, Section 7.1.5)	5.	Contractor OH&P (not to exceed 17% of line 4, col 1)			
	6.	Subcontractor’s OH&P (not to exceed 17% of line 4, col 2)			
	7.	Contractor markup on Subcontractor (not to exceed 10% of line 4, col 2)			
	8.	Total Contractor Markup (sum lines 5 – 7)	\$ 0.00	\$ 0.00	\$ 0.00
Additional Bonding, Insurance and Permit Costs Associated with Change Order	9.	Bonds			
	10.	Insurance			
	11.	Permits, Licenses or Fees			
	12.	Subtotal (sum lines 9 – 11)	\$ 0.00	\$ 0.00	\$ 0.00
TOTAL	13.	Change Order Cost (sum lines 4, 8, 12, col 3)			\$ 0.00

ADJUSTMENTS IN THE CONTRACT SUM: Amount of this Change Order Request: \$ _____

CONTRACTOR ACCEPTANCE:

BY: _____ Date: _____
(Signature of Representative)

Print Name of Representative: _____

A/E RECOMMENDATION FOR ACCEPTANCE:

BY: _____ Date: _____
(Signature of Representative)

Print Name of Representative: _____

AGENCY ACCEPTANCE:

BY: _____ Date: _____
(Signature of Representative)

Print Name of Representative: _____

Instruction to Contractor: Attach documentation as needed to justify the requested change to the contract and submit to A/E or Agency.

SECTION 03 01 00
MAINTENANCE OF CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Construction Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Sections:
 - 1. Section 03 10 00: Concrete Formwork:
 - 2. Section 03 20 00: Concrete Reinforcement and Embedded Assemblies:
 - 3. Section 03 30 00: Structural Concrete:

1.2 SUMMARY

- A. Section includes:
 - 1. Removal of unsound and, as necessary to complete repairs, sound concrete; and surface preparation, including full-depth, partial-depth, and shallow-depth concrete spall repairs.
 - 2. Surface preparation of reinforcing steel and installation of supplemental reinforcement.
 - 3. Installation of adhesive-embedded dowels.
 - 4. Cast-in-place concrete for spall repair applications, including but not limited to formwork; proprietary spall repair materials; batching, mixing, and placement procedures; finishing; and curing.
 - 5. Spall Repair Materials and Placement Procedures:
 - a. Full depth spall repairs cast-in-place from top surface.
 - b. Formed-and-poured partial depth concrete spall repairs on horizontal, vertical and overhead surfaces.
 - c. Dry packed vertical and overhead partial depth spall repairs.
 - d. Trowel-applied shallow-depth spall repairs at vertical and overhead surfaces.
 - 6. Concrete strengthening using externally bonded systems.

1.3 DEFINITIONS

- A. Abrasive – Any hard, strong substance, such as rocks, sand, water, or minerals, that will cut, scour, pit, erode, or polish another substance.
- B. Adhesion – The bonding of two surfaces through internal effects such as molecular (valence) forces or interlocking action, or both.

- C. Admixture – A material other than water, aggregates, hydraulic cement, or fiber reinforcement, added to concrete, mortar, or grout, during batching or mixing to enhance plastic or hardened material properties, or both.
- D. Aggregate – Granular materials, such as sand, gravel, and crushed stone, commonly used in concrete, mortar, or grout.
- E. Bond – Adhesion and grip of a material to other surfaces against which it is placed.
- F. Cathodic Protection – A form of corrosion protection for reinforced concrete wherein a sacrificial metal is caused to corrode in preference to the reinforcement, thereby protecting the reinforcement from corrosion.
- G. Cofferdam – A temporary structure enclosing all or part on a construction area so that construction or repair can proceed in the dry.
- H. Cohesion - The state in which the constituents of a mass of material are held together by chemical and physical forces.
- I. Consolidation – The process whereby the volume of freshly placed mortar or concrete is reduced to the minimum practical space and voids are eliminated, usually by vibration, rodding, tamping, or some combination of these actions.
- J. Corrosion – Degradation of concrete or steel reinforcement caused by electrochemical or chemical attack.
- K. Cure – The process by which a compound attains its intended performance properties by means of evaporation, chemical reaction, heat, radiation, or combinations thereof.
- L. Degradation – A detrimental change in the physical and/or chemical properties of a material.
- M. Delamination – A separation along a plane parallel to a surface.
- N. Deterioration – Physical manifestation of failure of a material (including, but not limited to, cracking, delamination, flaking, pitting, scaling, spalling, staining) caused by service conditions or internal autogenous influences.
- O. Erosion – Progressive disintegration of a solid by the abrasive or cavitation action of gases, fluids or solids in motion.
- P. Form – A temporary structure, or mold, to support a material while it is curing and gaining sufficient strength to be self-supporting.
- Q. Grout – A mixture of cementitious material and water, with or without aggregate, proportioned to produce a pourable consistency without segregation of the

constituents.

- R. Keyway – A recess or groove in a concrete substrate which is filled with material to provide increased shear strength along the interface.
- S. Proprietary – Made and marketed by one having the exclusive right to manufacture and distribute.
- T. Reinforcement – Bars, wires, strands, fibers, or other slender members which are embedded in concrete primarily to improve tensile strength.
- U. Sacrificial Anodes – Chemically active metals such as zinc, aluminum, and magnesium which, when electrically connected to the reinforcing bar, will provide the energy needed to cathodically protect the reinforcing bar.
- V. Saturated Surface-Dry – Condition of an aggregate particle or other porous solid when the permeable voids are filled with water and no water is on the exposed surfaces.
- W. Segregation – The differential concentration of the components of mixed concrete, aggregate, or the like, resulting in nonuniform proportions in the mass.
- X. Shrinkage – A decrease in one or more dimensions of an object or material.
- Y. Slump – A measure of consistency of freshly mixed concrete.

1.4 REFERENCE STANDARDS

- A. Requirements, abbreviations and acronyms for reference standards are defined in Section 01095
- B. ACI 117: Specification for Tolerances for Concrete Construction and Materials and Commentary
- C. ACI 207.1R: Guide to Mass Concrete
- D. ACI 222R: Protection of Metals in Concrete Against Corrosion
- E. ACI 301: Specifications for Concrete Construction
- F. ACI 305R: Guide to Hot Weather Concreting
- G. ACI 306R: Guide to Cold Weather Concreting
- H. ACI 309: Guide for Consolidation of Concrete
- I. ACI 315: Guide to Presenting Reinforcing Steel Design Details
- J. ACI 318: Building Code Requirements for Structural Concrete and Commentary

- K. ACI 347: Guide to Formwork for Concrete
- L. ACI 355.4: Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary
- M. ASTM A276: Standard Specification for Stainless Steel Bars and Shapes
- N. ASTM A615: Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- O. ASTM A706: Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
- P. ASTM C31: Standard Practice for Making and Curing Concrete Test Specimens in the Field
- Q. ASTM C33: Standard Specification for Concrete Aggregates
- R. ASTM C39: Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- S. ASTM C42: Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- T. ASTM C94: Standard Specification for Ready-Mixed Concrete
- U. ASTM C109: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50 mm Cube Specimens)
- V. ASTM C114: Standard Test Methods for Chemical Analysis of Hydraulic Cement
- W. ASTM C138: Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- X. ASTM C143: Standard Test Method for Slump of Hydraulic-Cement Concrete
- Y. ASTM C150: Standard Specification for Portland Cement
- Z. ASTM C157: Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
- AA. ASTM C171: Standard Specification for Sheet Materials for Curing Concrete
- BB. ASTM C172: Standard Practice for Sampling Freshly Mixed Concrete
- CC. ASTM C185: Standard Test Method for Air Content of Hydraulic Cement Mortar
- DD. ASTM C191: Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle

- EE. ASTM C231: Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- FF. ASTM C260: Standard Specification for Air-Entraining Admixtures for Concrete
- GG. ASTM C266: Standard Test Method for Time of Setting of Hydraulic-Cement Paste by Gillmore Needles
- HH. ASTM C309: Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- II. ASTM C403: Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
- JJ. ASTM C469: Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
- KK. ASTM C494: Standard Specification for Chemical Admixtures for Concrete
- LL. ASTM C496: Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- MM. ASTM C618: Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- NN. ASTM C856: Standard Practice for Petrographic Examination of Hardened Concrete
- OO. ASTM C1012: Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution
- PP. ASTM C1064: Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
- QQ. ASTM C1152: Standard Test Method for Acid-Soluble Chloride in Mortar and Concrete
- RR. ASTM C1171: Standard Test Method for Quantitatively Measuring the Effect of Thermal Shock and Thermal Cycling on Refractories
- SS. ASTM C1202: Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
- TT. ASTM C1218: Standard Test Method for Water Soluble Chloride in Mortar and Concrete
- UU. ASTM C1260: Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar Bar Method)
- VV. ASTM C1293: Standard Test Method for Determination of Length Change of Concrete

Due to Alkali Silica Reaction

- WW. ASTM C1315: Standard Specifications for Liquid Membrane Forming Curing Compounds and Curing and Sealing Compounds.
- XX. ASTM C1439: Standard Test Methods for Evaluating Latex and Powder for use in Hydraulic Cement Concrete and Mortar.
- YY. ASTM C1524: Standard Test Method for Water Extractable Chloride in Aggregate (Soxhlet Method)
- ZZ. ASTM C1602: Standard Specification For Mixing Water in Hydraulic Cement Concrete
- AAA. ASTM C1611: Standard Test Method for Slump Flow of Self-Consolidating Concrete
- BBB. ASTM C1621: Standard Test Method for Passing Ability of Self Consolidating Concrete by JRing
- CCC. AWS D1.1/1.1M: Structural Welding Code-Reinforcing Steel (latest edition)
- DDD. Concrete Reinforcing Steel Institute (CRSI): Manual of Standard Practice
- EEE. AC308: Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements
- FFF. Technical Guideline No. 310.1R Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.
- GGG. Technical Guideline No. 310.2 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
- HHH. SSPC Painting Manual, Volume 2, Systems and Specifications.
- III. CRD-C 39: Test Method for Coefficient of Linear Thermal Expansion of Concrete.

1.5 DESCRIPTIONS

- A. Abrasive Blast Cleaning: Surface preparation of substrates by abrasive propelled at high speed.
- B. Concrete Spall Repair: Repairing or restoring deteriorated, damaged, or otherwise unsound concrete.
- C. Corrosion: The oxidation or eating away of a metal or other material by exposure to chemical or electrochemical action.
- D. Feather Edging: Reducing the thickness along the edge of a material to create a smooth transition from the repaired area to the existing adjacent area.
- E. Full-Depth Concrete Spall Repair: Reinforced concrete repair that encompasses the

full section of an existing concrete element.

- F. Overlay: A layer of non-structural construction material, such as cementitious mortar, placed over an existing structural element or substrate to improve aesthetics, provide function and/or add protection.
- G. Partial-Depth Concrete Spall Repair: Reinforced concrete repair that extends past, at least, the first layer of reinforcing of an existing concrete element.
- H. Quality Assurance Inspector: Certified and/or qualified individual(s) responsible for inspecting and/or testing Work such as conditions, materials, installations, applications, etc. to verify Work is performed in accordance with applicable specifications and requirements.
- I. Shallow-Depth Concrete Spall repair: Concrete repair that is less than 2 inches deep with no reinforcing bars exposed.
- J. Welding Specialist: A Certified Welding Inspector (CWI) as per the AWS D1.1/D1.1M:(latest edition).

1.6 SUBMITTALS

- A. Pre-Award Submittals: Submitted with Bid
 - a. Contractor and Subcontractor Qualifications
 - b. Ready-Mix Concrete Supplier Qualifications
 - c. Qualifications for Installer of Adhesive-Grouted Dowels
 - d. Intent to Warrant Documentation
- B. Pre-Construction Submittals: Submitted prior to performing Work.
 - 1. Quality Control Plan / Work Plan
 - a. To be submitted as part of Quality Control System.
 - 2. Product Data / Safety Data
 - a. List of proposed materials, including aggregates for extension, and additives.
 - b. Technical data sheets for each type of manufactured material and product indicated, including but not limited to:
 - 1) Spall repair materials.
 - 2) Reinforcing bar mechanical splices.
 - 3) Reinforcement supports.
 - 4) Corrosion-inhibiting coating.
 - 5) Adhesive for grouted dowels.
 - 6) Curing blanket.
 - 7) Curing compound.

- c. Safety Data Sheets.
 - d. Written verification from proprietary spall repair material manufacturer of aggregate extension requirements.
3. Shop Drawings:
- a. Steel Reinforcement: Details of fabrication, bending, and placement, prepared in accordance with ACI 315. Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
 - b. Welding: Description of reinforcing bar weld locations, welding procedure specifications and AWS welder certification when welding is permitted.
 - c. Structural Formwork: Detailing of fabrication, assembly, and support of formwork prepared by, or under supervision by a professional engineer licensed in State of Virginia.
4. Material Manufacturer Written Certification for Proprietary Spall Repair Material Indicating:
- a. Lot numbers of materials for Project have been tested and meet or exceed material properties published in product data sheets, including compressive strength, slump during lot testing, and amount of water used during mixing.
 - b. Contractor's foremen and laborers have been trained in use of spall repair products.
 - c. Proposed alternate proprietary spall repair materials, include supplemental pre-qualification information and test reports. Include notice if tests indicate concrete or mortar is not in conformance with product data sheets
5. Design Mixes for each Ready-Mix Concrete:
- a. Indicate amount of mix water to be withheld for later addition at Site without adversely affecting hardened concrete.
 - b. Indicate dosage range for all admixtures, including retarding, accelerating, and water reducing admixtures that may potentially be added on site or at the batch plant, and the anticipated effects on mix set time, slump retention, and air content.
 - c. For proposed alternate mix designs, include supplemental pre-qualification information and test reports.
6. Concrete Placement Plan, including control measures for ensuring SSD prior to placement and limiting effects due to temperature and humidity during placement, finishing, and curing.
7. Batch Tickets for all Ready-Mix Concrete.

8. Weld Procedure Specification (WPS) for Welding Reinforcing Bars:

a. AWS D1.1/D1.1M:(latest edition); including but not limited to:

- 1) If chemical analysis and carbon equivalent of reinforcing bars is not known, use pre-heat temperature of 300 to 500 degrees F and E7018 electrodes.
- 2) Minimum preheat, welding process, and filler metal.
 - a) If oxyacetylene torch is used to achieve preheat, clean steel surface with grinder or wire brush before welding.
- 3) Tension and macroetch test results for welds other than fillet welds, using maximum reinforcing bar size approved by Engineer of Record; unless specifically waived by Engineer of Record.

C. Closeout Submittals: Submitted upon completion of Work prior to final payment.

1. Record documentation of Work performed such as:

- a. Red-line Drawings, Specifications and/or Sketches.
- b. Construction Photos.
- c. Quality Assurance Inspection and Quality Control Reports.

D. Executed Warranty(s)

1.7 QUALITY ASSURANCE AND QUALITY CONTROL

A. Contractor Qualifications:

1. Experienced with successful installations of specified materials in similar environments and on similar structures in use for minimum of 5 years.
2. Foremen with minimum of 5 years of experience as foremen on similar projects, who are fluent in English, to be on site at all times during Work. Do not change foremen during course of Project except for reasons beyond control of Contractor; inform Owner in advance of any changes.
3. Foremen and at least 50 percent of laborers must be trained by material manufacturers in use of specific products to be used.

B. Qualifications for Installer of Adhesive-Grouted Dowels:

1. ACI-CRSI certified Adhesive Anchor Installer and/or installers who are qualified by the product manufacturer.
2. Foreman or laborer with minimum 5 years of experience performing similar Work to be on site at all times during Work. Do not change foreman or laborer during course of Project except for reasons beyond control of dowel Installer; inform Owner in advance of any changes.

- C. Ready-Mix Concrete Supplier Qualifications:
 - 1. ASTM C94; Certification of Production Facilities and Delivery Vehicles by National Ready Mixed Concrete Association.

- D. Adhesive for Adhesive-Grouted Dowels:
 - 1. Provide samples of adhesive to Owner and/or Quality Assurance Inspector for observation of set and compression testing.
 - 2. Provide minimum of 3 samples per shift during first 4 shifts of adhesive use on project.
 - 3. Make samples by placing adhesive in 3/8-inch-diameter test tubes to height of approximately 1 inch so that after trimming cylinder of 3/8-inch diameter and 3/4-inch length can be obtained.

- E. Pre-Construction Meeting:
 - 1. Review requirements for concrete spall repair Work, including but not limited to:
 - a. Schedule.
 - b. Availability of materials and Contractor's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Site use, access, staging, and set-up location limitations, including on-site testing laboratory and sample storage.
 - d. Limitations due to Owner's use of facility.
 - e. Procedures for concrete spall repair Work, including but not limited to:
 - 1) Removal of unsound and sound concrete.
 - 2) Surface preparation.
 - 3) Coating of exposed reinforcing steel.
 - 4) Installation of supplemental reinforcement.
 - 5) Installation of adhesive-grouted dowels.
 - 6) Spall repair material placement: including but not limited to formwork; proprietary spall repair materials; batching, mixing, and placement procedures; finishing; and curing.
 - f. Approved mockup requirements and procedures.
 - g. Testing and inspection requirements.
 - h. Site protection measures and protection of adjacent surfaces.
 - i. Governing regulations.
 - 2. Contractor's site superintendent/foremen, Contractor's quality control representative, Owner, Engineer of Record, representatives of other trades directly affected by Work and/or other stakeholders must attend.

- F. Pre-Placement Meeting (Required for projects requiring ready-mix concrete only):

1. Conduct meeting at Project site before concrete placements.
 2. Review requirements for specific concrete spall repair placement, including but not limited to:
 - 1) Materials and Contractor's personnel, equipment, and facilities that will be used for placement.
 - b. Site use, access, and staging.
 - c. Coordination with Owner's use of facility.
 - d. Procedures for concrete spall repair placement, including but not limited to:
 - 1) Prewetting concrete substrate.
 - 2) Batching, mixing, and placement procedures.
 - 3) Finishing.
 - 4) Curing.
 - 5) Special procedures related to temperature and humidity during placement, finishing, and curing, and thermal/mass concrete effects.
 - e. Testing and inspection requirements.
 - f. Site safety and protection measures, including but not limited to protection of adjacent surfaces.
 - g. Criteria for formwork stripping and shoring removal.
 3. Contractor's site superintendent/foremen, Engineer of Record, Owner, Quality Assurance Testing and Inspection Representative(s) and representatives of other trades directly affected by Work must attend.
- G. Contractor's Quality Control System:
1. Contractor's quality control system is the means of assurance that construction complies with the requirements of the Engineer of Record and/or specification. Controls must be adequate to cover all construction operations.
 2. Establish a Quality Control system and perform sufficient inspection and tests of all items of Work, including that of subcontractors, to ensure conformance to the specification for materials, workmanship, construction, finish, functional performance, and identification.
 3. Maintain records of all inspections and tests performed, instructions received from Owner, Engineer of Record or Quality Assurance Inspector(s), and actions taken as a result of those instructions. These records must include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken. Contractor must document inspections and tests as required by this section.
 4. Testing and Inspection: Include a comprehensive schedule of Work requiring testing or inspection, including the following:

- a. Contractor-performed tests and inspections including subcontractor performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - b. Owner-performed tests and inspections.
 5. Materials and fabrication procedures are subject to inspection. Tests in the mill, shop, or field must be conducted by a qualified Inspection Agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 6. Contractor must promptly remove and replace materials or fabricated components that do not comply with the specified requirements at no cost to the Owner.
- H. Field Quality Control and Quality Assurance Testing:
 1. Quality Assurance Testing Agency: As required by the Engineer of Record, the Owner or Contractor (only at the request of the Owner) will provide qualified third-party Quality Assurance Testing and Inspection to perform inspections and tests and submit reports during Work. Reports will be provided to Owner and Contractor. See drawings for required inspections and testing.
 - a. Quality Assurance Testing and Inspection must be performed, supervised and/or reviewed by a professional engineer licensed in the State in which the Work is performed unless otherwise permitted by Owner.
 2. Sampling of materials must be in accordance with ASTM C172 and will be performed on grade. Sampling must generally comply with the following requirements:
 - a. When pumping, the spall repair material will be directed to a wheelbarrow or other suitable means for testing agency to acquire sufficient materials for testing and casting all specimens (approximately 2-1/2 cubic feet).
 - b. Collect first test sample at beginning of placement, and subsequent samples at frequency noted in Table 1 of this Specification.
 - c. Samples from proprietary spall repair material must be taken from the second batch prepared. If two or more mixers are used, ensure that samples are obtained from mixers in an alternating fashion.
 3. Test Sample Set:
 - a. Six 3-inch diameter by 6-inch long cylinders, or six 4-inch diameter by 8-inch long cylinders should the coarse aggregate size exceed 3/4 inches will be made and cured in accordance with ASTM C31. The number of required sets must be in accordance with the Table 1 of this Specification.
 - b. Slump in accordance with ASTM C143.
 - c. For Self-Consolidating Concrete: Slump flow in accordance with ASTM C1611.

- d. Air content in accordance with ASTM C231
 - e. Concrete and air temperature in accordance with ASTM C1064.
4. Cylinders will be cured under field conditions for 1 day; then transported to testing laboratory and cured for remaining period until testing.
 5. For each test sample set, 2 cylinders will be tested in compression at 3 days, 2 cylinders at 7 days and 2 cylinders at 28 days. Compression tests will be performed in accordance with ASTM C39 and must be an average of 2 samples at a given age. Owner may adjust required number of sample test sets and/or frequency of testing upon Contractor request and/or based on schedule and need.
 6. For proprietary spall repair materials, Contractor must record material bag weights for minimum of 10 percent of planned bags per lot of material. The average bag weight must be used to determine amount of water to be used, proportional to manufacturer's product data based on the measured bag weight.
 7. Test reports for each test sample will include following information:
 - a. Specimen number.
 - b. Portion of structure represented by material tested.
 - c. Date cast.
 - d. Date tested.
 - e. Slump or slump flow and visual stability index.
 - f. Air content.
 - g. Concrete and air temperature.
 - h. Individual cylinder strength and type of failure.
 - i. Spall repair material strength on product data sheet.
 - j. Notice if test indicates spall repair material does not conform with following criteria:
 - 1) Spall repair material strength will be considered satisfactory if average of two 28-day test results meets or exceeds the specified 28-day strength and neither 28-day test results is below 90% of the specified 28-day strength.
 - 2) Proprietary spall repair materials must be within 1 inch of the manufacturer's specified slump or slump flow. Spall repair material may be rejected if slump or slump flow not within specified limits or if segregation is visible at leading edge of spread. Manufacturer must provide slump or slump flow if not reported on typical product data sheet.
 - k. Non-Conforming Spall Repair Material:
 - 1) If tests indicate that spall repair material is not in conformance with criteria above, remove and replace non-conforming spall repair material or perform additional testing, acceptable to Owner and/or Engineer of Record, to verify conformance with Specification, at no

- cost to Owner.
- 2) For Additional Contractor Performed testing:
 - a) Procure core samples in accordance with ASTM C42.
 - b) If tests indicate that slump, air entrainment, or other requirements have not been met, examine core samples petrographically, according to ASTM C856, to evaluate hardened concrete characteristics.
 - c) If compressive-strength tests do not meet acceptance requirements, procure 3 core samples from each portion of structure represented by unsatisfactory tests, and test in compression. Strength of spall repair material in area represented by core tests is satisfactory if average of 3 compressive strength tests equals or exceeds 85 percent of specified 28-day compressive strength and no compressive-strength test value is less than 75 percent of specified 28-day compressive strength. If strength acceptance criteria are not met, remove and replace non-conforming spall repair material areas at no cost to Owner.
 - 3) Perform additional inspection and testing and inspecting, at no cost to Owner, to determine compliance of replaced or additional Work with specified requirements.
 - 4) Contractor is responsible for any schedule delays, costs and related items resulting from non-conforming materials or additional testing of suspected non-conforming materials.
8. Cast additional cylinders to verify spall repair material strength to determine when shoring or formwork may be removed as required. Cast cylinders with final placement of day and field cure adjacent to spall repair location until tested. Contractor to pay for cost of sampling and testing.
9. Contractor Responsibilities:
- a. Contractor must Coordinate Work schedule to allow inspections and testing.
 - b. Provide access to Work in timely manner for inspections and testing.
 - c. Record lot numbers, expiration dates, and use dates of materials.
 - d. Maintain record of locations and quantities of Work installed.
10. Inspections:
- a. Inspections are to be performed at critical steps throughout the spall repair process. Unless indicated otherwise, a qualified Quality Assurance Inspector and/or Engineer of Record must perform inspections.
 - b. Contractor's Quality Control representative must perform initial inspections and correct any items not in conformance with specification prior to requesting inspection. Subsequent inspections will be performed if required by the Owner and/or Engineer of Record.

- c. Do not proceed with Work that may make hold point inspections difficult or impossible to perform until inspection has been completed and deficiencies corrected, unless Engineer of Record and/or Owner waives specific inspection requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials according to manufacturer's recommendations and in such manner as to prevent damage to materials and structure.
- B. Keep materials dry and do not allow materials to be exposed to moisture during transportation, storage, handling, or installation. Reject and remove from Site new materials which exhibit evidence of moisture during application or which have been exposed to moisture.
- C. Deliver materials to Project site in original, unopened containers, labeled with manufacturer's name, product brand name and type, date of manufacture, lot number, and directions for storing and mixing with other components.
- D. Store materials in original, undamaged containers in clean, dry, protected location on raised platforms with weather-protective coverings, within temperature range required by manufacturer. Protect stored materials from direct sunlight.
- E. Store aggregate stockpile in manner to avoid segregation or contamination with foreign matter. Store away from normal drainage paths and cover with canvas or plastic if necessary to keep dry.
- F. If containers become torn or otherwise damaged prior to use, dispose of affected materials.
- G. Limit stored materials on structures to safe loading of structure at time materials are stored and to avoid permanent deck deflection.
- H. Conspicuously mark unlabeled, damaged, or opened containers or containers with contaminated materials and remove from site as soon as possible.
- I. Remove and replace materials that cannot be applied within stated shelf life.

1.9 CHANGES IN WORK

- A. It must be the responsibility of the Contractor to notify Owner of any conflicts, obstructions, discrepancies, damage, deterioration and similar items at variance with the Contract Document content, specifications, instructions, field conditions, weather, etc. that could jeopardize integrity or performance of coating systems promptly upon discovery by means of a formally submitted Request for Information (RFI).

- B. Contractor must submit proposed changes relating to Work including but not limited to scope, execution, materials, schedule, etc. to Owner by means of a formally submitted RFI.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ready-Mix Concrete Materials:

1. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mixes or field-test data, according to ACI 301.
2. Aggregate and Paste Materials:
 - a. Source Limitations: Obtain each type or class of cementitious material of same brand from same manufacturer's plant, each aggregate from single source.
 - b. Cement: ASTM C150, Type II or V.
 - c. Fly Ash: ASTM C618, Type F. Include 20 to 30 percent by mass of total cementitious materials, as cement replacement, unless otherwise approved.
 - d. Aggregates: ASTM C33, including Table 3; from single source with documented record of at least 10 years of satisfactory service using similar aggregates and cementitious materials in similar applications and service conditions.
 - 1) Coarse Aggregates: Uniformly graded; Maximum size of coarse aggregate per ACI 318 unless noted otherwise; Class 4S.
 - e. Water: ASTM C1602; potable; free from substances known to be harmful to Portland cement; and with less than 0.05 percent chloride ions.
 - f. Maximum Water-Cementitious Materials Ratio, by weight: 0.45.
3. Admixtures:
 - a. General:
 - 1) No more than 0.05 percent chloride ions.
 - 2) Admixture manufacturer must certify that admixtures meet requirements and are compatible with other concrete mixture components.
 - 3) Use admixtures according to manufacturer's written instructions.
 - 4) No chlorides must be intentionally introduced into concrete mix.
 - 5) Obtain admixtures from single manufacturer.
 - b. Air-Entraining Admixture: ASTM C260. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content recommended by ACI 318 for moderate exposure, unless otherwise indicated. Use one of following:

- 1) Air Mix, Eucon Air 40; Euclid Chemical Company.
 - 2) Daravair 1000; Chryso Saint-Gobain
 - 3) MasterAir AE 200; Master Builders Solutions.
 - 4) Sika Air; Sika Corporation.
 - 5) Approved Equal
- c. Water-Reducing Admixture: ASTM C494, Type A. Products that may be incorporated in the work include, but are not limited to, the following:
- 1) Eucon WR 75; Euclid Chemical Company.
 - 2) WRDA PN 20; Chryso Saint-Gobain.
 - 3) MasterPolyheed 1020; Master Builders Solutions.
 - 4) Sika Plastocrete -10 N; Sika Corporation.
 - 5) Approved Equal
- d. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or Type G. Products that may be incorporated in the work include, but are not limited to, the following:
- 1) Eucon 37; Euclid Chemical Company.
 - 2) Daracem 19; GCP Applied Technologies.
 - 3) MasterRheobuild 1000; Master Builders Solutions.
 - 4) Sika ViscoCrete 2100; Sika Corporation.
 - 5) Approved Equal
- e. Water-Reducing, Non-Corrosive, Non-Chloride Accelerating Admixture: ASTM C494, Type C or E. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least 1 year duration) using an acceptable accelerated corrosion test method, such as electrical potential measures. Products that may be incorporated in the work include, but are not limited to, the following:
- 1) Eucon AcN 200; Euclid Chemical Company.
 - 2) PolarSet; W. R. Chryso Saint-Gobain.
 - 3) MasterSet FP 20; Master Builders Solutions.
 - 4) SikaSet NC; Sika Corporation.
 - 5) Approved Equal
- f. Water-Reducing, Retarding Admixture: Products that may be incorporated in the work include, but are not limited to, the following:
- 1) Eucon Retarder 75; Euclid Chemical Company.
 - 2) Daratard 17; GCP Applied Technologies.
 - 3) MasterSet R 100; Master Builders Solutions.
 - 4) Plastiment ES; Sika Corporation.
 - 5) Approved Equal
- g. Anti-Microbial Admixture: For use in H₂S and microbial-induced corrosion

environments. Must has documented performance of 10 (min) applications in service for 5 years (min) with minimal-to-no deterioration in H₂S environments averaging 50ppm (min). Products that may be incorporated in the work include, but are not limited to, the following:

- 1) Con^{mic}Shield® HD.
- 2) Approved Equal.

h. Crystalline Waterproofing Admixture: Chloride content must be no greater than 0.1%. Must be capable of sealing cracks up to 0.4mm. Must have a minimum 50% reduction in concrete permeability per CRD-C 48. Products that may be incorporated in the work include, but are not limited to, the following:

- 1) Xypex Admix C-500/C-500 NF; Xypex Chemical Corporation.
- 2) Crystal-X AdMix; Waterline Renewal Technologies Inc.
- 3) Approved Equal.

i. Hardening Admixture: Products that may be incorporated in the work include, but are not limited to, the following:

- 1) Hard-Cem; Kryton International Inc.
- 2) Approved Equal.

B. Proprietary Concrete Spall Repair Materials:

1. Must contain no calcium chloride or added gypsum.
2. Water-Cementitious Materials Ratio: 0.45 maximum.
3. Aggregate Materials:

a. Aggregates: Use the + No. 170 mesh fraction obtained by wet sieving according to ASTM C1171 for the tests specified in the section titled "Methods of Sampling and Testing" of ASTM C33. If aggregate(s) is added to product as an extender, each additional aggregate is to be tested per ASTM C33 requirements. Pea gravel or other coarse aggregate added as an extension must meet requirements of Table 3, Class 3S. ASTM C1260 test results for the + No. 170 mesh fraction, as well as each additional aggregate must be reported to Owner and/or Engineer of Record for approval.

b. Obtained from single source with documented record of at least 10 years of satisfactory service using similar aggregates and cementitious materials in similar applications and service conditions; acceptable to proprietary concrete manufacturer.

c. Extension of products with aggregate:

- 1) Pre-packaged material may only be extended in strict accordance with the manufacturer's guidance.
- 2) Obtain written verification of product extension requirements from the manufacturer. Submit written verification to Owner and

Engineer of Record for approval.

- 3) Aggregate used for extension must be clean, rounded, 3/8-inch pea gravel, or as approved by product manufacturer. Aggregate must be thoroughly washed and/or saturated surface dry as recommended by manufacturer. Aggregates for extension must meet ASTM C33 requirements including deleterious materials as described below.
- 4) Maximum aggregate extension must be in keeping with manufacturer's recommendations. In no case must total coarse aggregate content exceed 50 percent of the total spall repair product weight including the aggregate extension.

C. Compressive Strength:

1. Compressive Strength: 4,000 psi minimum, or as shown on Construction Drawings.

D. Concrete Spall Repair Mixes:

1. General:

- a. For applications exposed to H₂S and microbial-induced corrosion, at least one of the following must be incorporated into the Work:

- 1) Incorporate anti-microbial admixture into the concrete spall repair material.
- 2) Utilize surface applied coatings and/or materials designed to protect concrete surfaces from exposure to H₂S.

2. Formed-and-poured partial-depth concrete spall repairs on horizontal, vertical and overhead surfaces:

- a. Mix 1: Proprietary silica-fume or polymer-modified concrete or cementitious mortar with 3/8-inch aggregate added, per manufacturer's recommendations, with high electrical resistivity (greater than 15,000 ohm-cm).

- 1) Sikacrete 211 SCC Plus; Sika Corporation.
- 2) Eucocrete; Euclid Chemical Company.
- 3) SikaTop 111 Plus; Sika Corporation.
- 4) Approved Equal

3. Trowel-applied (drypacked) vertical and overhead partial and shallow-depth spall repairs with lift thickness not to exceed 1-1/2 inches (vertical) / 1-inch (overhead), unless otherwise specified by manufacturer:

- a. Mix 2: Proprietary silica-fume- or polymer-modified cementitious, non-sag mortar with high electrical resistivity (greater than 15,000 ohm-cm).

- 1) MasterEmaco N 420Cl; Master Builders Solutions.
 - 2) SikaTop 123 Plus; Sika Corporation.
 - 3) Verticoat Supreme; Euclid Chemical Company.
 - 4) EucoRepair V100; Euclid Chemical Company.
 - 5) DuralTop Gel; Euclid Chemical Company.
 - 6) Approved Equal
4. Horizontal shallow-depth spall repairs:
- a. Mix 4: Proprietary silica-fume- or polymer-modified cementitious, mortar with high electrical resistivity (greater than 15,000 ohm-cm).
 - 1) SikaTop 122 Plus; Sika Corporation.
 - 2) Approved Equal.
5. Other Materials and Products:
- a. Hydraulic Cement: Rapid-setting crystalline hydraulic cement for plugging and sealing active leaks.
 - 1) Krystol Plug; Kryton International Inc.
 - 2) Xypex Patch'N Plug; Xypex Chemical Corporation.
 - 3) Vandex Plug; Euclid Chemical Company.
 - 4) Approved Equal.
 - b. Reinforcing Bars: Grade of reinforcing bars must be Grade 60 minimum and based on the original design with sizes to match existing unless otherwise shown in Contract Documents.
 - 1) Use ASTM A706 reinforcement where reinforcing bars are welded.
 - c. Reinforcing Bar Mechanical Splices: Mechanical butt splices utilizing lock-shear bolts and internal serrated grip rails within the coupling sleeve capable of developing twice the tensile capacity of reinforcing bars. Use one of the following:
 - 1) Standard Reinforcement:
 - a) Lenton Lock B-Series; Erico International Corporation.
 - b) Approved Equal.
 - 2) Epoxy-Coated Reinforcement:
 - a) Lenton Lock B-Series (Epoxy Coated); Erico International Corporation.
 - b) Approved Equal.
 - d. Stainless Steel Wire: For shallow-depth spall repair.
 - 1) 16 Gauge Stainless Steel Type 316 for shallow depth concrete spall

repair.

- e. Tie Wire: Wire used to secure reinforcing bars during concrete placement.
 - 1) Standard (uncoated) Reinforcing: 16 gauge black annealed wire reinforcing.
 - 2) Epoxy-Coated Reinforcing: 16 gauge PVC coated wire.
- f. Corrosion-Inhibiting Coating Materials: Use material specifically intended for reinforcing steel embedded in concrete; use one of following:
 - 1) Cementitious Coating: Sika Armatec 110 EpoCem; Sika Corporation.
 - 2) Cementitious Coating: Duralprep A.C.; Euclid Chemical Company.
 - 3) Approved Equal.
- g. Adhesive-Grouted Dowels:
 - 1) Dowels:
 - a) ASTM A615, Grade 60, uncoated steel bars, cut true to length with ends square and free of burrs.
 - b) ASTM A276, Type 316 stainless steel threaded rods.
 - 2) Adhesive Grout for Dowels: Tested and evaluated for cracked concrete according to ACI 355.4 or ICC-ES AC308; use one of the following
 - a) HIT-RE 500 V3 Epoxy Adhesive; Hilti, Inc.
 - b) HIT-HY 200 Epoxy Adhesive; Hilti, Inc.
 - c) Approved Equal
- h. Helical Concrete Anchors for shallow depth spall repair:
 - 1) Stainless steel Grade 316 helical PatchPin; Helifix
 - 2) Approved Equal.
- i. Helical Concrete Anchors for core hole spall repair:
 - 1) 3/8-inch diameter Heli-Tie Helical Wall Ties; Simpson Strong-Tie Company, Inc.
 - 2) Approved Equal.
- j. Concrete screws for shallow depth spall repair:
 - 1) 1/4-inch (min) diameter Stainless Steel Type 316.

6. Forms:

- a. Forms for surfaces exposed to view must be constructed of a new 1-inch, Plyform Grade B-B EXT-APA Class 1 exterior plywood of concrete-form grade or equal. Plywood may be reused for formed surfaces exposed to view as long

as it is in good condition. Plywood may be 3/4-inch or less provided it can maintain position and shape and meet the deflection criteria in ACI 347 during placement of the concrete. Steel forms are acceptable for curved surfaces.

- b. Forms are to provide finish-to-match finish and profile of existing finish of adjacent material.
- c. The use of form release or form oil is not permitted unless approved by Owner and/or Engineer of Record.

7. Curing Materials:

a. Moisture-Retaining Cover: ASTM C171, white burlap-polyethylene sheet:

- 1) Sika UltraCure; Sika Corporation.
- 2) Approved Equal.

b. Water: Potable.

c. Dissipating Membrane-Forming Curing Compound: ASTM C309, Type 1, 1-D, or 2; VOCs less than 2.9 lbs/gal (350 g/L):

- 1) Kurez DR VOX; Euclid Chemical Company.
- 2) Cure R; L&M Construction Chemicals, Inc.
- 3) 1100-Clear; W.R. Meadows, Inc.
- 4) Approved Equal.

d. Solvent-Based Membrane-Forming Curing Compound: ASTM C309, Type 1, Class A & B; ASTM C1315, Type 1, Class A; VOCs less than 2.9 lbs/gal (350 g/L):

- 1) Super Diamond Clear 350; Euclid Chemical Company.
- 2) Approved Equal.

E. Crack Repair Materials:

1. Epoxy pressure injection of cracks:

a. Crack and injection port seal:

- 1) Sikadur 33; Sika Corporation.
- 2) Approved Equal.

b. Crack injection material:

- 1) Sikadur 35 Hi Mod LV; Sika Corporation.
- 2) Approved Equal.

2. Gravity feed repair of cracks:

a. Crack repair material:

- 1) Sikadur 35 Hi Mod LV; Sika Corporation.

2) Approved Equal.

PART 3 - EXECUTION

3.1 PROJECT CONDITIONS

- A. Verify existing dimensions and details prior to concrete spall repair Work. Notify Owner and/or Engineer of Record immediately in writing of conditions found to be different than those indicated in the Contract Documents. Owner and/or Engineer of Record will review condition and inform Contractor of required changes or resolutions.
- B. Environmental Limitations: Install materials at temperatures, humidity, and other environmental conditions recommended by material manufacturer.
- C. Handle and install materials in strict accordance with safety requirements of material manufacturers, Safety Data sheets, and local, state, federal and regulatory requirements.
- D. Maintain adequate ventilation during surface preparation, mixing and placement of materials.

3.2 EXAMINATION

- A. Examine substrates and conditions with representatives of proprietary concrete spall repair manufacturers for compliance with requirements and other conditions affecting performance of concrete spall repair Work.
- B. Ensure that Work done by other trades is complete and ready to receive concrete spall repair material.
- C. Verify that areas and conditions under which concrete spall repair Work is to be performed permit proper and timely completion of concrete spall repair Work.
- D. Notify Owner and/or Engineer of Record in writing of conditions which may adversely affect concrete placement or performance. Do not proceed with concrete placement until these conditions have been corrected and reviewed by Owner and/or Engineer of Record.

3.3 PROTECTION

- A. Protect pedestrians, motorized traffic, mechanical, electrical, and plumbing equipment, surrounding construction, project site, landscaping, and surrounding buildings from damage or injury resulting from concrete rehabilitation work.
 - 1. Construct dust and debris barriers surrounding repair work perimeter to control dust and to protect and control construction traffic.
 - 2. Dispose of runoff from wet demolition or surface preparation operations in

accordance with all local ordinances. Disposal methods must avoid soil erosion, avoid undermining pavements and foundations, damage to landscaping and vegetation, and minimize water penetration through other parts of buildings.

3. Collect and neutralize alkaline wastes and acid wastes and dispose in accordance with local, state, and federal regulations.
4. Comply with local noise ordinances during demolition operations.
5. Perform demolition work and surface preparation work in a manner that minimizes disturbances of operations. Coordinate work with the Owner.
6. Construction debris must not be allowed to fall into waterways or marsh. The Contractor must take care to ensure that all construction debris removed during the Work is collected and removed from the site in accordance with all federal, state, and local regulations.
7. Submit a proposed protection plan for review and approval by the Owner.

3.4 COORDINATION

- A. Coordinate Work to ensure that adjacent areas are not adversely affected. Coordinate with:
 1. Owner and/or Owner's designated representative.
 2. Other trades with Work in progress to ensure proper sequencing and satisfactory completed construction.
 3. Other trades to avoid or minimize Work on, or in immediate vicinity of, concrete spall repair Work in progress. Ensure that Work from other operations will not adversely affect quality of completed installation.

3.5 CRACK REPAIR

- A. Preparation
 1. General Requirements
 - a. Clean all cracks in accordance with the paragraph titled *Concrete Removal and Surface Preparation* below.
 - b. Do not repair cracks when the temperature of the concrete is below freezing and moisture conditions indicate the possibility of ice on the internal surfaces of the crack.
 - c. Do not install repair materials if the temperature of the concrete is not within the range of application temperatures recommended by the material manufacturer.
 - d. Refer to Contract Documents for additional information.
 2. Crack Routing
 - a. Inspect surfaces along/adjacent to crack to receive repair material. If deteriorated, route a V-groove section at the crack face until sound concrete

is reached.

3. Sealing

- a. For epoxy injection, apply a surface seal over all exterior faces of the crack that can be reached to contain the injection adhesive in the crack.
- b. For gravity fill of horizontal cracks, apply a surface seal along the bottom/underside surface of the element that can be reached to contain the repair material in the crack.

B. Application

1. Epoxy Injection

- a. Install the injection entry and venting ports using flush mounted or drilled fittings per proprietary manufacturer's instructions.
- b. Space the ports per manufacturer's instructions.
- c. Inject the epoxy using material manufacturer's recommended equipment.
- d. Apply recommended manufacturer's injection pressure.
- e. For vertical or inclined cracks, apply injection by pumping epoxy into entry ports at the lowest elevation, cap, and move upward.
- f. For horizontal cracks, apply injection by proceeding from one end of the crack to the other until the crack is fully sealed.
- g. Remove ports and remove the surface seal by chipping, grinding, or other acceptable means after the injected epoxy has cured.

2. Gravity Fill

- a. Mix resin or monomer per material manufacturer's instructions.
- b. Pre-fill cracks at least 0.125 in. wide with aggregate.
- c. Pour resin or monomer onto the surface, over the cracks and spread with brooms, rollers, or squeegees.
- d. Work material back and forth over the cracks to maximize fill in crack.
- e. Allow at least 20 minutes for material to penetrate cracks.
- f. Remove all excess material once cracks have been filled to refusal.
- g. Broadcast 1 to 2 lbs per square yard of sand.
- h. Allow material to cure per material manufacturer's recommendations.
- i. Remove sealant and grind smooth.

C. Quality Control

1. Conduct quality and control tests for metering accuracy and mixing effectiveness of the continuous mixing pump in accordance with ACI 503.7.
2. Qualify the test injection procedures in accordance with ACI 503.7.

3.6 CONCRETE REMOVAL AND SURFACE PREPARATION

- A. Prior to Concrete Removal Work:
 - 1. Develop plan for confining and disposing of broken concrete and other debris from removal Work.
 - 2. Coordinate with Owner and remove or temporarily shore existing plumbing, mechanical, and/or electrical lines and associated fixtures that interfere with Work. Reattach removed items at completion of Work.
 - 3. Install structural shoring as required and/or specified by Contract Documents Owner and/or Engineer of Record.
- B. Equipment: Use following or approved equal.
 - 1. Pneumatic Chipping Hammers:
 - a. Nominal 30-lb class or less for removal of concrete at spall repair areas.
 - b. Nominal 15-lb class or less for detail work adjacent to and beneath reinforcing steel.
 - 2. Saws capable of cutting concrete to specified depth.
 - 3. Abrasive blasting equipment capable of removing and cleaning laitance, dirt, loose pieces of concrete, and surface contaminants from exposed concrete surfaces and rust, concrete, and surface contaminants from exposed steel surfaces.
 - 4. High-pressure, oil-free compressed air equipment capable of removing dust and dirt from exposed concrete removal areas.
- C. Identification of Extent of Concrete Removal
 - 1. At the locations specified within the Contract Documents, the Contractor must perform visual inspection and hammer tapping, chain drag sounding, or other methods acceptable by the Owner or Owner's representative to identify extents of cracked, delaminated, spalled, disintegrated, and otherwise unsound concrete for removal.
 - 2. Clearly and neatly mark all boundaries of repair areas before beginning concrete removal.
- D. For partial depth spall repair, remove unsound concrete and, as necessary, sound concrete to create minimum removal depth of 1-inch behind all exposed reinforcing bars as shown in the Contract Documents. Refer to ICRI Technical Guideline No. 310.1R. Reinforcing bars must be considered exposed if 25 percent of the surface area is visible along any given 1 foot length.
 - 1. Exercise care to avoid cracking underlying sound concrete, punching through member, or damaging embedments such as utilities or conduit.

2. Limit chipping hammer size and impact angle to minimize damage to sound concrete. Impact angle must be no more than 60 degrees to surface.
- E. Concrete Removal Geometry:
1. Slope removal of substrate to avoid abrupt changes in removal thickness.
 2. Configure geometry of removal area to maximize the use of right-angle geometry, avoiding reentrant corners, to obtain uniformity of depth, ensuring orthogonal edges; repair area extents with non-orthogonal edges are not permitted and will be rejected.
 3. Remove concrete at a 45-degree-angle to eliminate re-entrant corners.
 4. Extend concrete removal at least 1-inches beyond edge of unsound concrete.
 5. Create rounded or square edges at removal areas by core-drill or sawcut. Provide 1-inch minimum depth at top surface removal areas. Adjust depth of sawcut to avoid sawing into reinforcing steel, embedded electrical conduits, or other embedments.
- F. The perimeter of the repair areas must be saw cut to a depth of 0.50 in. The sawcut must be perpendicular to the concrete surface.
- G. Notify Owner and/or Engineer of Record of embedded electrical conduit, utilities or similar encountered in removal areas. Proceed as directed by Owner and/or Engineer of Record. Unless otherwise directed, remove abandoned embedded materials in removal area.
- H. Inspect and sound concrete surfaces in and around removal areas. Remove additional unsound concrete and concrete contaminated with oil or other materials. Sawcut, or core-drill, and chip removal area perimeter and corners as necessary to provide square configuration. Limit abrupt changes in geometry to prevent re-entrant corners.
- I. Abrasive blast clean surfaces of removal area, including vertical edges, to remove surface contaminants, loose pieces of concrete, and concrete that is bruised or micro-fractured and to roughen surfaces. Clean removal area surfaces with dry, oil-free compressed-air jet.
- J. Achieve final surface profile of CSP 7 or higher according to ICRI Guideline No. 310.2.

3.7 REINFORCEMENT PREPARATION

- A. Leave existing reinforcing in place unless otherwise directed by Owner and/or Engineer of Record.
- B. Notify Owner and/or Engineer of Record of reinforcing bars that are incorrectly located or have less than 2 inches of concrete cover; damaged; fractured; or have lost more than 20 percent of their original cross-sectional area at any point. Owner and/or

Engineer of Record will determine if remedial action is required.

- C. Abrasive blast clean exposed steel surfaces, including but not limited to existing reinforcement and embedments, to SSPC-SP 5 (White Metal Blast Cleaning)/NACE No. 1 (SSPC Painting Manual, Volume 2), Commercial Blast Cleaning, finish, with minimal rust or concrete debris. Clean steel surfaces with dry, oil-free compressed-air jet. Exercise care to clean undersides of reinforcing bars.
- D. Prior to placement, reinforcement must be free of materials deleterious to bond.
- E. Place, support, and fasten reinforcement as indicated in Contract Documents and/or by Owner and/or Engineer of Record. Do not exceed tolerances specified in ACI 117.
- F. Unless otherwise specified, concrete cover for reinforcement must conform to requirements specified within Table 20.5.1.3.1 – *Specified Concrete Cover for Cast-in-Place Nonprestressed Concrete Members* in ACI 318. Concrete cover tolerances must comply with ACI 117. Position tie ends away from exposed surfaces. Build out concrete spall repair as needed to achieve minimum cover.
- G. Unless otherwise permitted, furnish and use templates for placement of column dowels.
- H. Field bending or straightening: When permitted, bend, or straighten reinforcing bars embedded in concrete (black steel only). Reinforcing bar sizes No. 3 through 5 may be bent cold the first time, provided bar temperature is above 32°F. For other bar sizes, preheat reinforcing bars before bending.
- I. Preheating: Apply heat by methods that do not harm reinforcing bar material or cause damage to concrete. Preheat length of reinforcing bar equal to at least five bar diameters in each direction from center of bend but do not extend preheating below concrete surface. Do not allow temperature of reinforcing bar at concrete interface to exceed 500°F. Preheat temperature of reinforcing bar must be between 1100 and 1200°F. Maintain preheat temperature until bending or straightening is complete. Unless otherwise permitted, measure preheat temperature by temperature measurement crayons or contact pyrometer. Do not artificially cool heated reinforcing bars until bar temperature is less than 600°F.
- J. Field cutting reinforcement: Field cut reinforcement only when specifically permitted using cutting methods specified by or acceptable to Owner and/or Engineer of Record.
- K. Reinforcement through expansion joint: Do not continue reinforcement or other embedded metal items through expansion joints, unless permitted and/or specified by Owner and/or Engineer of Record.
- L. Apply corrosion-inhibiting material on exposed steel surfaces in accordance with

manufacturer's requirements. Corrosion-inhibiting material not required for embedded steel items that are galvanized or otherwise coated with a corrosion-inhibiting coating. Protect existing galvanized and/or coated embedded items during abrasive blasting.

1. Batch, mix, and apply material according to recommendations of material supplier.
 - a. Minimum dry film thickness: 10 to 12 mils.
 2. Exercise care to coat difficult-to-reach surfaces, such as undersides of reinforcing bars.
 3. Minimize spillage on concrete surfaces. Remove materials that will act as bond breaker by chipping or other means.
- M. Provide and install supplemental reinforcement as specified herein or as directed by Contract Documents and/or Owner and/or Engineer of Record.
1. Where existing reinforcement has lost 10 percent or more of its original cross-sectional area, add supplement bars of same size as existing bars, unless smaller sized bars are approved by Owner and/or Engineer of Record. An engineering analysis may be performed to determine if repairs are needed.
 - a. Develop supplement reinforcement by lap splice with existing bars, as shown in Contract Documents. If lap splices are not feasible, develop with mechanical reinforcing bar splices. If mechanical splices are not feasible, notify Owner and/or Engineer of Record and, if approved by Owner and/or Engineer of Record, develop by welding supplement bars to existing bars using approved WPS.
 2. Remove additional sound concrete to properly position bars with minimum concrete and full encasement by spall repair material; and to develop supplemental reinforcement beyond areas of deteriorated existing bars. At welded splices, expose full circumference of existing reinforcing bars for at least 3-inches beyond weld.
- N. 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.
- O. Do not weld reinforcement unless specifically approved by Owner and/or Engineer of Record.
- P. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.8 EMBEDDED ITEMS

- A. Place and secure items to be embedded in concrete spall repair placement including, but not limited to, discrete galvanic anodes.

3.9 INSTALLATION OF ADHESIVE-GROUTED STEEL DOWELS

- A. Equipment:
 - 1. Percussive or rotary drilling equipment for making holes in concrete substrate for dowel installation.
- B. Dowels:
 - 1. Install dowels at locations and in sizes specified in Contract Documents or as directed by Owner and/or Engineer of Record.
 - 2. Dowels to be installed in the adhesive must be clean, oil-free, and free of loose rust, paint, or other coatings.
 - 3. Install in concrete removal areas on vertical and overhead surfaces that do not include exposed reinforcing bars, as shown in Contract Documents or as directed by Owner and/or Engineer of Record to mechanically anchor spall repair material. Install dowels in 12-inch grid pattern.
- C. Remove unsound concrete and install dowels in sound concrete.
- D. Install dowels in accordance with adhesive manufacturer's instructions.
- E. Dry drill holes with rotary impact hammer drill or rock drill perpendicular to concrete surface.
 - 1. Locate existing reinforcement and embedded items with reinforcing bar locator and position holes to avoid existing reinforcement.
 - 2. Do not damage existing reinforcement.
 - 3. Make hole diameter at least 1/8-inch larger than dowel diameter, unless otherwise recommended by adhesive manufacturer.
- F. Clean holes with stiff brush and dry, oil-free compressed-air jet to remove loose concrete, dust, and debris. Hole must be clean of all dust, debris, etc. prior to injecting adhesive.
- G. Inject adhesive with tube into back of hole and fill hole to front, withdrawing tube.
 - 1. Unless otherwise indicated by manufacturer, adhesive must be dispensed through a tube or cartridge extension, beginning at the maximum depth of the hole and withdrawn as adhesive is injected, followed by insertion and rotating the dowel to the specified depth. Where necessary, spaces around anchors at the surface must be sealed at horizontal to vertical overhead locations to prevent loss

- of the adhesive during curing.
2. Carefully proportion and mix 2-part epoxies according to manufacturer's directions. Scrape out entire contents of both containers to assure accurate proportions.
 3. Mix adhesive per manufacturer requirements. Move stirrer up and down and around sides of mixing container until even, streak-free color is attained. Do not whip in air.
 4. Install sufficient material to completely fill annular space around dowel.
- H. Insert dowel to bottom of hole and secure in center of hole, perpendicular to surface, until adhesive has set. Provide 2-inch minimum clear cover from concrete surface.
- I. Promptly remove excess adhesive.
- J. Apply corrosion-inhibiting material on exposed steel surfaces in accordance with manufacturer requirements. Corrosion-inhibiting material is not required for embedded steel items that are galvanized, stainless steel, or otherwise coated with a corrosion-inhibiting coating.

3.10 SHALLOW DEPTH SPALL REPAIR PROCEDURE

- A. For spall repairs with no exposed reinforcing steel, perform shallow depth concrete spall repair as shown in Contract Documents.
- B. Wet substrate thoroughly and then remove standing water.
- C. Place shallow-depth spall repair materials by troweling toward edges of spall repair area to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch.
- D. For vertical patching, place material in lifts in accordance with manufacturer requirements. Do not feather edge.
- E. For overhead patching, place material in lifts in accordance with manufacturer requirements. Do not feather edge.
- F. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
- G. Allow surfaces of lifts that are to remain exposed to become firm and then finish to a smooth surface with a wood or sponge float.
- H. If 25 percent or more of the surface area of the reinforcement is exposed along a 1-foot length, remove concrete to a depth of 1-inch behind reinforcing bar and perform partial depth spall repair.

3.11 FORMWORK

- A. Formwork must be in accordance with applicable provisions of ACI 347. Forms must be of wood, metal, structural hardwood or other suitable material that will produce the required surface finish.
- B. Construct formwork so final appearance and shape of spall repair material matches adjacent existing concrete, and so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
 - 1. Limit abrupt or gradual concrete surface irregularities to ACI 347 Class C, 1/2-inch.
 - 2. Provide 3/4-inch chamfer at exterior corners and edges of permanently exposed concrete.
 - 3. Construct forms tight enough to prevent loss of concrete mortar.
- C. Notify Owner and/or Engineer of Record of spall repairs on overhead and vertical surfaces where reinforcement has less than 2 inches of clear cover.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Do not allow metal tools to come into contact with concrete surfaces. Kerf wood inserts for forming keyways, reglets, and recesses, for easy removal.
- E. Arrange form ties such that metal is at least 2 inch below concrete surfaces exposed to weather. Lugs, cones, washers, and other devices must not leave depression or hole larger than 2 inches in diameter.
- F. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical (1.5:1).
- G. Do not use form-release oil unless approved by Owner and/or Engineer of Record.
- H. Provide temporary openings for cleanouts, air relief holes, and inspection ports as required. 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. Spall repair all cored air relief holes as specified herein.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris immediately before placing concrete.
- J. Retighten forms and bracing before placing concrete to prevent mortar leaks and maintain proper alignment.
- K. Removing and Reusing Forms: Formwork, for sides of beams, walls, columns, and similar parts of Work, that does not support weight of concrete, may be removed after cumulatively curing at not less than 50 degree F for 24 hours after placing concrete, provided concrete is hard enough not to be damaged by form-removal

operations and provided curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of 28-day design compressive strength.
2. Clean and repair surfaces of forms to be reused in Work. Do not use split, frayed, delaminated, or otherwise damaged form-facing material, or patched forms, for exposed surfaces.

3.12 MIXING AND PLACEMENT

A. Concrete Mixing:

1. Ready- Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94.
 - a. Deliver concrete to Site and discharge within 90 minutes or before 300 revolutions of mixer drum, whichever comes first, after introduction of mix water. Concrete that exceeds specified time limit will be rejected without prior approval from Owner and/or Engineer of Record. Alternate mixing or discharge times, may be approved by the Owner and/or Engineer of Record depending on the approved mix design and the environmental conditions during placement.
 - b. Temperature: If the measured concrete temperature at delivery is not within the limits specified below or as otherwise specified, a check test will be performed immediately at a new location in the sample. If the check test fails, the concrete is considered to have failed to meet the requirements of this Specification.
 - c. Concrete temperature: When the average of the highest and lowest ambient temperature from midnight to midnight is expected to be less than 40°F for more than three successive days, deliver concrete to meet the following minimum temperatures immediately after placement:
 - 55°F for sections less than 12 in. in the least dimension
 - 50°F for sections 12 to 36 in. in the least dimension
 - 45°F for sections 36 to 72 in. in the least dimension
 - 40°F for sections greater than 72 in. in the least dimension

The temperature of concrete as placed must not exceed these values by more than 20°F. These minimum requirements may be terminated when temperatures above 50°F occur during more than half of any 24-hour duration. Unless otherwise specified or permitted by Owner and/or Engineer of Record, the temperature of concrete as delivered must not exceed 95°F.

- d. Do not add water-reducing or high-range, water-reducing admixture indiscriminately to increase slump.
- e. Introduce high-range, water-reducing admixture at Site with additional mixing

- per manufacturer's recommendations.
 - f. Reject concrete that arrives at Site with slump exceeding maximum specified slump.
 - g. Water may not be added to mix on site.
2. Project-Site Mixing: Measure, batch, and mix concrete materials according to manufacturer's written instructions and ASTM C94.
- a. Develop batching and mixing operations so that quality control is assured.
 - b. Designate one or two individuals to batch and mix concrete. Fully instruct these individuals on batching and mixing procedures.
 - c. Maintain accurate mix proportions. Batch materials by weight on basis of whole bags of proprietary material. Maintain calibrated scale at site during concrete placement operations. Batching by volume is permitted if weight-volume relationship for each material is verified on daily basis, and aggregate moisture content is measured at least once daily and aggregate volume is adjusted for bulking.
 - d. Combine and mix ingredients to uniform consistency.
 - e. Mix concrete materials in appropriate paddle-type mortar/plaster mixer(s) in lieu of volumetric-type mixer(s), unless otherwise permitted by Owner and/or Engineer of Record.
 - 1) For mixer capacity of 1 cubic yard or smaller, mix at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer.
 - 2) For mixer capacity larger than 1 cubic yard, increase mixing time by 15 seconds for each additional 1 cubic yard.
 - 3) Provide sufficient number of mixers, including reserve mixers, so that concrete placement operations will proceed uninterrupted, and each area is completely cast before material achieves initial set.
- B. Concrete and Mortar Placement, General:
- 1. Use bonding procedure recommended by material manufacturer.
 - a. If saturated-surface-dry condition is required, soak concrete surface at least 4-hours prior to concrete or mortar placement.
 - 2. Convey concrete from mixer to place of deposit in manner such that no segregation or loss of materials occurs. If pumping, minimize length of pipeline.
 - 3. Place concrete continuously until spall repair section is completed, with no cold joints.
 - a. Do not allow concrete to disturb or displace reinforcing bars, floor drains, or other embedments.
 - b. Dispose of concrete that has partially set prior to placement or that has been

contaminated by foreign material.

C. Concrete Placement, Top- and Vertical-Surface Spall repairs:

1. Place concrete as near as possible to its final position to avoid segregation due to re-handling or flowing.
2. Avoid or minimize vertical fall. Do not allow concrete to fall vertical distance greater than 4-feet from point of discharge to point of deposit.
3. Place concrete at rate so that concrete is plastic and flows readily into corners of forms and into spaces around reinforcing bars.
4. Consolidate concrete in accordance with requirements herein, except for self-consolidating concrete and unless otherwise specified by material manufacturer.
 - a. Concrete must be consolidated by mechanical vibrators. The vibrators must be internal type and must at all times be adequate in number of units and power of each unit to properly consolidate all concrete as specified in ACI 309. The frequency must be not less than 8000 cycles per minute when the vibrator is submerged in concrete.
 - b. The duration of vibration must be limited to the time necessary to produce satisfactory consolidation without causing objectionable segregation. In consolidating each layer of concrete, the vibrator must be operated in a near vertical position, be inserted at uniformly spaced locations no farther apart than the visible effectiveness of vibrator and the vibrating head must be allowed to penetrate under the action of its own weight.
 - c. Do not use vibrators to transport concrete.
 - d. If internal vibrators will not fit in formed spall repair void, external vibration of forms is permitted.

D. Concrete Placement, Overhead Spall repairs:

1. Place concrete as near as possible to its final position.
2. Consolidate concrete with metal rod, taking care to fill corners and around reinforcing bars and to avoid segregation.

E. Mortar Placement, Trowel-Applied Spall repairs:

1. Apply mortar firmly with trowel.
2. Place mortar in lifts if recommended by material manufacturer. Where multiple lifts are used, score surface of lift with trowel to roughen surface for application of subsequent lift. Allow lift to reach final set before placing subsequent lift.
3. Allow surfaces to remain exposed to become firm and then finish to smooth surface with wood or sponge float.

F. Cold-Weather Placement:

1. Protect concrete work from physical damage or reduced strength due to frost,

freezing, or low temperatures. Comply with ACI 306R and as follows.

- a. When air temperature has fallen or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement. Mix water and aggregates together before adding cement. Do not add cement if temperature of water/aggregate mixture exceeds 70 degrees F.
- b. Do not use frozen materials or materials containing ice or snow.
- c. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix design.

G. High Evaporation Conditions:

1. When high evaporative conditions necessitate protection of concrete immediately after placing or finishing, make provisions in advance of concrete placement for windbreaks, shading, fogging, sprinkling, ponding, or wet covering.

H. Hot-Weather Placement

1. Protect concrete work from physical damage or reduced strength due to rapid evaporation or overheating of concrete. Refer to ACI 305R for hot-weather conditions that may adversely affect concrete placement, finishing, and curing. Do not allow temperature of concrete at time of placement to exceed 95 degrees F. When hot-weather conditions exist, use 1 or more of following procedures:
 - a. Place concrete at night or early in morning.
 - b. Cool ingredients before mixing to maintain concrete temperature below 95 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature; include water equivalent of ice in mixing water quantity. Use liquid nitrogen to cool concrete at Contractor's option.
 - c. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - d. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
 - e. Provide windbreaks or sunshades, or both.
 - f. Cool pump pipelines by shading, running cool water over, or other means as necessary.

I. Mass Concreting

1. Protect concrete work from physical damage or reduced strength due to thermal effects of mass concreting, per ACI 207.1R.

3.13 FINISHING AND CURING

A. Finishing Top Surfaces:

1. Float and broom finish:

- a. Float finish: Consolidate surface with power-driven float or by hand floating if area is small or inaccessible to power driven float. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with uniform, smooth, granular texture.
- b. Medium-Broom Finish: Apply medium-broom finish, perpendicular to traffic flow, on top surfaces subjected to vehicular or pedestrian traffic.
- c. Do not wet concrete surfaces or add cement.

2. Tined Finish:

- a. Texture and tine freshly placed pavement as soon as possible after floating.
- b. Use a rake with individual 1/8-inch wide tines spaced uniformly 5/8-inches on center. For machine work, use a 10-foot rake drawn transversely across the full pavement width without overlapping passes.

3. Float and trowel finish:

- a. Float finish: Consolidate surface with power-driven float or by hand floating if area is small or inaccessible to power driven float. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with uniform, smooth, granular texture.
- b. Trowel finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
- c. Do not wet concrete surfaces or add cement.

4. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

5. Hot-Weather Conditions: Fog surface with water if hot, dry, or windy conditions cause moisture loss approaching 0.2 pounds per square foot per hour, as estimated by Figure 4.2 in ACI 305R, before or during finishing operations.

B. Finishing Formed Surfaces:

1. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas addressed. All fins, runs, drips or projections must be removed from surfaces which remain exposed. Form marks and chamfer

edges must be smoothed by grinding and/or dry rubbing. Remove fins and other projections exceeding 1/2-inch.

C. Concrete Curing:

1. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete above 55-degree F and in moist condition for at least 7 days after placing.
 - a. For polymer-modified and silica-fume-modified materials, follow curing regimen recommended by manufacturer or developed in preconstruction testing.
 - b. Protect concrete from falling below 55 degrees F with insulating blankets or heated enclosures.
2. Unformed Top Surface: Begin curing immediately after finishing concrete. Use water-saturated, moisture-retaining cover, or other approved procedures.
 - a. Place cover in widest practicable width, with sides and ends lapped at least 12-inches.
 - b. Seal sides and ends of cover by holding down with soil, concrete pieces, or some other weight, or by using waterproof tape or adhesive.
 - c. Immediately repair holes or tears in cover during curing period using cover material and waterproof tape.
 - d. Re-wet concrete surface at least twice daily as necessary to ensure that surface remains moist.
3. Unformed Vertical and Overhead Surfaces: Apply 2 coats of curing compound uniformly in continuous operation by power spray or roller according to manufacturer's written instructions and recommended coverage rate. Recoat areas subjected to heavy rainfall within 3-hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Formed Surfaces:
 - a. Maintain form surfaces in moist condition.
 - b. Moist cure concrete after forms are stripped to achieve 7-day total cure period.

D. Stripping of Forms and Removal of Shoring:

1. Strip forms 24-hours minimum after concrete is placed unless otherwise directed by Contract Documents, Owner and/or Engineer of Record.
2. Remove shoring 24-hours minimum after concrete is placed and after spall repair concrete has achieved minimum compressive strength of 75 percent of the specified 28-day compressive strength, unless otherwise directed by Contract Documents, Owner and/or Engineer of Record.

3.14 DEFECTIVE CONCRETE SPALL REPAIR

- A. Spall repair defective areas designated by Owner and/or Engineer of Record. Remove and replace concrete that cannot be repaired to satisfaction of Owner and/or Engineer of Record.
- B. Surface defects on exposed surfaces include:
 - 1. Voids, such as spalls, air bubbles, honeycomb, rock pockets, and form-tie voids, more than 1/2-inch in any dimension in solid concrete but not less than 1 inch deep.
 - 2. Cracks at least 1/8 inch wide. Notify Owner and/or Engineer of Record of cracks that penetrate through section.
 - 3. Fins and other projections exceeding 1/2-inch.
 - 4. High or low spots in repaired areas that create areas of standing water that are at least 1/2-inch deep and at least 9 square feet in area.
- C. Spall repair defects on concealed surfaces that affect concrete's durability and structural performance as determined by Owner and/or Engineer of Record.
- D. As soon as possible, cut out spalls, air bubbles, honeycombs, rock pockets, and voids. Make edges of cuts perpendicular to concrete surface. Clean voids and fill with spall repair mortar according to manufacturer's recommendations. Use polymer- or silica fume-modified, cementitious, non-sag mortar that is specifically intended for this application. Use one of following:
 - 1. SikaTop 123 Plus; Sika Corporation.
 - 2. Verticoat Supreme; Euclid Chemical Company.
 - 3. Approved Equal.
- E. Fill cracks with high-molecular-weight methacrylate or low-viscosity methyl methacrylate. Use one of following:
 - 1. SikaPronto 19 TF; Sika Corporation.
 - 2. Approved Equal.
- F. After concrete has gained sufficient strength to be unaffected by grinding, grind off fins, other projections, and high areas.

3.15 CLEANING

- A. Remove and legally dispose of concrete and steel debris, abrasive blast materials, and excess materials.

3.16 CONCRETE STRENGTHENING USING EXTERNALLY BONDED SYSTEMS

- A. Steel Plates

1. Bond steel plates to concrete using the methods and materials specified in the Contract Documents.
 2. For bonding steel plates to concrete using an epoxy resin, follow the requirements and procedures of ACI 548.12.
 3. For bonding steel plates to concrete using mechanical or adhesive anchors, follow the procedures provided by the material manufacturer.
- B. Fiber-reinforced Polymer (FRP) Laminates
1. The following procedures are general procedures used for the installation of FRP laminates. If the FRP system specified within the Contract Documents requires conflicting procedures, consult with the Owner or Owner's representative before proceeding.
 - a. Insure that all surfaces that will receive FRP are clean, dry, and free of contaminants.
 - b. Insure that the workplace is well ventilated and that the repair material is applied at a time when the air temperature, concrete surface temperature, and the relative humidity are as required by the repair material manufacturer.
 - c. Temporary protection of the Work area is required during installation and until the resins have cured. If temporary shoring is required, the FRP system must be fully cured before removing the shoring and allowing the structural member to carry the design loads.
 - d. If a primer is required, the primer must be applied uniformly to all areas on the concrete surface where the FRP system is to be placed at the manufacturer's specified rate of coverage. Protect the primer from dust, moisture, and other contaminants before applying the FRP system.
 - e. Putty must be used in an appropriate thickness and sequence with the primer as recommended by the FRP manufacturer. The system-compatible putty must be used only to fill voids and smooth surface discontinuities before the application of other materials. Rough edges or trowel lines of cured putty must be ground smooth before continuing the installation. Allow the putty to cure as specified by the FRP system manufacturer before proceeding.
 - f. Proportion, mix, and apply resins components in accordance with the FRP system manufacturer's recommended procedures.
 - g. Install and cure the FRP system per the manufacturer's recommendations.
 - h. During installation of wet layout FRP systems, entrapped air between layers must be released or rolled out before the resin sets. Sufficient saturating resin must be applied to achieve full saturation of the fibers. Furthermore, successive layers of saturating resin and fiber materials must be placed before the complete cure of the previous layer of resin. If previous layers are cured, interlayer surface preparation, such as light sanding or solvent application as recommended by the system manufacturer, is required.
 - i. Follow the FRP material manufacturer's recommendations for the application

of protective coatings. Do not clean the installed FRP with a solvent before a protective coating is installed.

C. Quality Control

1. The cured FRP system must be evaluated for delaminations or air voids between multiple plies or between the FRP system and the concrete. Methods such as acoustic sounding (hammer sounding), ultrasonics, and thermography can be used to detect delaminations. The following requirements apply to wet layup systems:
 - a. Small delaminations less than 2 square inch each are permissible as long as the delaminated area is less than 5 percent of the total laminate area and there are no more than 10 such delaminations per 10 square feet.
 - b. Large delaminations, greater than 25 square inch, can affect the performance of the installed FRP and must be repaired by selectively cutting away the affected sheet and applying an overlapping sheet patch of equivalent plies.
 - c. Delaminations less than 25 square inch must be repaired by resin injection or ply replacement.
2. For other FRP systems, delamination must be evaluated and repaired in accordance with the material manufacturer direction. Upon completion of the Work, the laminate must be reinspected to verify that the repair was properly accomplished.

3.17 TABLES

Table 1: QUALITY CONTROL TESTING

Spall repair Material	Quality Assurance Testing	Quality Control Material Testing				
	Compression Strength (ASTM C39)	Slump (ASTM C143) or Slump flow (ASTM C1611)	Unit Weight (ASTM C138)	Air Content (ASTM C231)	Concrete and Air Temp (ASTM C1064)	Additional Items (1/placement or material type)
Proprietary Spall repair Material	1 set / 75 cu. ft. 1 set = 6 cylinders (2 - 3 days, 2 - 7 days, 2 - 28 days)	1 test / placement 1 test / material	1 test/ placement 1 test / material	1/placement 1/material	1 test /placement 1 test / material	Lot number Powder/water temp Weight of product bag Weight of water Mix time
Ready-Mix Spall repair Material	1 set / 20 cu. yd. min* 1 set = 6 cylinders (2 - 3 day, 2 - 7 days, 2 - 28 days)	1 test / truck*	1test / truck	1 test / truck	1 test / truck	Mix number Batch number Water added*

* 1 additional set/test for each time water is added to mix on-site

END OF SECTION 030100

SECTION 03 10 00
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes formwork and related accessories for concrete work in Section 033000 "Structural Concrete." Section Includes:
 - 1. The furnishing and erecting formwork for cast-in-place structural concrete, with shoring, bracing, and anchorage.
 - 2. Form accessories
 - 3. Form stripping
- B. Related Sections:
 - 1. Section 024116 "Structure Demolition"
 - 2. Section 032000 "Concrete Reinforcement and Embedded Assemblies"
 - 3. Section 033000 "Structural Concrete"

1.3 REFERENCE STANDARDS

- A. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 – Standard Specifications for Structural Concrete.
- C. ACI 318 – Building Code Requirements for Reinforced Concrete
- D. ACI 347R – Guide to Formwork for Concrete

1.4 QUALITY ASSURANCE AND QUALIFICATIONS

- A. Perform work in accordance with ACI 301, 318, and 347.
- B. Work of this Section shall be performed by a company which specializes in the type of concrete formwork work required for this Project, with a minimum of 10 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.
 - 1. Work shall be performed in compliance with Owner's insurance underwriters' requirements.
- C. Owners' Testing Laboratory Services: Required as specified in Section 014000/Quality

Requirements, and heriein.

1.5 SUBMITTALS

- A. Submit the following according to Conditions of the Construction Contract and Division 01 Specification Sections.
- B. Shop Drawings: Sealed and signed by a Professional Engineer registered in the state of South Carolina. Review is for general conformance to member dimensional requirements and architectural applications and features only. Shop drawings shall clearly indicate but not be limited to:
 - 1. Size, type and quality of form materials including conditions at tops and ends of walls. (If wood is used, indicate species.)
 - 2. Form construction indicating structural stability and jointing including special form joints or reveals required by Contract Documents.
 - 3. Location and pattern of form tie placement, and other items that affect the appearance of concrete that will remain exposed to view.
 - 4. Form finish clearly indicating proper locations and full coordination with concrete finishes required by Contract Documents.
- C. Product Data: Copies of manufacturers' product data and installation instructions for proprietary materials used in exposed concrete work, including form liners, release agents, manufactured form systems, ties, and accessories.
- D. Compatibility Certification: Contractor shall certify that form release agent used is compatible with subsequent architectural finish materials applied to concrete surfaces. Submit with manufacturer's data.
- E. Installation Certificate: Contractor shall certify that formwork meets requirements of Contract Documents including allowable tolerances.
- F. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- G. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB).

1.6 DELIVERY, HANDLING, STORAGE

- A. Comply with General Conditions and Section 016000 "Product Requirements," including the following:
 - 1. Store forms and form materials clear of ground and protect from damage.

1.7 WARRANTY

- A. Comply with General Conditions, agreeing to repair or replace specified materials or Work that has failed within the warranty period. Failures include but are not limited to the following:
 - 1. Discoloration of concrete scheduled to remain exposed to view.
 - 2. Damage of concrete finishes caused by forms.
 - 3. Non-compliance with form finishes required for designated architectural finishes.
 - 4. Non-compatibility of form release agent with subsequent architectural finish materials applied to concrete surfaces.
 - 5. Excessive and/or noticeable bowing in placed concrete members caused by deflection of formwork during concrete placement.

1.8 COORDINATION

- A. Coordinate this Section with other sections of work which require attachment of components to formwork.
- B. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, the Contractor shall provide corrective measures for the Owner's review.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

- A. Materials and products required for work of this Section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Owner.

2.2 ACCEPTABLE MANUFACTURERS

- A. Products of the manufacturers specified in this Section establish the minimum functional, aesthetic and quality standards required for work of this Section.
- B. Substitutions: Comply with General Conditions and Section 016000 "Product Requirements."

2.3 FORMWORK DESIGN

- A. Design Requirements:
 - 1. Forms shall be designed for fabrication and erection in accordance with Architect/Engineer's design requirements and recommendations of ACI 301, 318 and 347R. Design formwork for loads and lateral pressures outlined in Section 2.2 ACI 347R, and wind loads as specified by controlling local building code. This includes loads imposed during construction, including weight of construction equipment, and temporary imbalance or discontinuity of building components.
 - 2. Formwork shall meet construction safety regulations for locality in which this Project is located.

3. Forms shall be removable without impact, shock or damage to concrete surfaces, the structure and adjacent materials.
 4. Forms shall be tight-fitting, designed and fabricated for required finishes and to withstand concrete weight and maintain tolerances as specified in ACI 117 for the following designations:
 - a. Concrete surfaces exposed to view at exterior faces of building are designated Class A.
 - b. All surfaces designated Class C.
 5. Provide 3/4-inch chamfers at corners of all exposed concrete beams and columns, unless otherwise noted.
 6. Furnish forms in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings, using form materials with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
 7. Butt Joints: Shall be solid and complete with backup material to prevent leakage of cement paste.
 8. Design of Formwork and Shoring: Design of formwork, shoring and reshoring and its removal is the Contractor's responsibility.
 - a. Design formwork in a manner such that existing or new construction is not overloaded.
 - b. Do not remove shores or reshores earlier than recommended by ACI 301 and ACI 347R.
- B. Form Finishes for Exposed Surfaces:
1. Type: Straight, smooth, free of cement paste leaks at butt-joints, surface imperfections and other irregularities detrimental to appearance of finished concrete, fully coordinated with requirements for required finish material.
- C. Form exposed arises of columns, beams, ledges, balcony fascias to achieve true alignment and level soffit of spandrel beams and concrete edges. All such arises must be sharp, straight and true to line and level. Spandrel beams and concrete canopies and ledges must have adequate shoring to prevent any visible amount of sag and sufficient bracing to prevent any lateral movement during construction.
- D. Camber bottom forms at cantilever balconies as indicated on the drawings. Whenever forms are cambered, screeded levels for establishing top of concrete must be cambered to the same amount and to the same approximate profiles. Check camber and adjust forms before initial set as required to maintain camber.
- 2.4 FORM MATERIALS
- A. General: Plywood, fiberglass, metal, metal-framed plywood faced, or other acceptable panel-type materials.
1. Provide materials with sufficient strength to prevent warpage.
- B. Plywood: Douglas Fir or Southern Yellow Pine species; of grade suitable for intended use,

- sound undamaged sheets with clean true edges, minimum 5/8" thick, complying with U.S. Product Standard PS- 1.
1. Other Acceptable Sheet Materials: 14 gauge sheet steel or fibrous glass reinforced resin.
- C. Lumber: Southern Yellow Pine species; #2 grade with grade stamp clearly visible without loose knots or other defects.
1. Use only where entire width can be covered with one board 11-1/4" or less in width.
- D. Forms for Cylindrical Columns and Supports: Metal, glass-fiber reinforced plastic, or paper or fiber tubes that will produce smooth surfaces without joint indications.
1. Provide units with sufficient wall thickness to resist wet concrete loads without deformation.
- E. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to support weight of placed concrete without deformation.
- F. Fillets for Form Corners:
1. Types: Chamfer strips of wood, metal, PVC or rubber fabricated to produce smooth form lines and tight edge joints, 3/4" size, maximum possible lengths.
 2. Required for all corners of beam and column forms.
- G. Form Ties:
1. Type: Factory-fabricated galvanized metal, adjustable length, designed to prevent form deflection and to prevent spalling concrete upon removal.
 2. Ties shall not leave metal closer than 1-1/2" to exposed surface.
 3. When removed, ties shall not leave holes larger than 1" diameter in concrete surface.
 4. Removable Ties: Use type with tapered cones, 1" outside diameter, for concrete walls which will remain exposed to view and scheduled for architectural finishes.
 5. Snap-Off Ties: Use for concrete walls below grade and walls which will not remain exposed to view and are not scheduled for architectural finishes.
 6. Wire Ties: Not acceptable.
- H. Nails, Spikes, Lag Bolts, Thru-Bolts, Anchorages:
1. Type: Of size, strength and quality to meet the required quality of formwork.
- I. Form Release Agent:
1. Type: Commercial formulation form release agent with a maximum of 350 g/L volatile organic compounds (VOC's) of non-emulsifiable type which will not bond with, stain, or adversely affect concrete surfaces, and be compatible with subsequent architectural finish materials applied to concrete surfaces.
 2. For Steel Forms: Non-staining rust-preventative type.

- J. Reglets: Provide sheet metal reglets formed of same type and gauge as flashing metal, unless indicated otherwise on Drawings. Where resilient or elastomeric sheet flashing, or bituminous membranes are terminated in reglets, provide reglets of not less than 26 gauge galvanized sheet metal. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- K. Coordinate with materials as specified in Section 032000/Concrete Reinforcement and Embedded Assemblies.

PART 3 - EXECUTION

3.1 FORMWORK

A. General:

1. Inspect areas to receive formwork.
 - a. Immediately report to Architect/Engineer in writing the conditions that will adversely affect the Work.
2. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures.
3. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, drips, bevels, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in the Work.
4. Comply with shop drawings, ACI 301, 318, 347R and Contract Documents.
5. Maintain formwork and finished work construction tolerances complying with ACI 301 and 117.
6. Erect forms for easy removal without hammering or prying against concrete surfaces.
7. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.
8. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
9. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
10. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce smooth lines and tight edge joints.
11. Design, erect, support, brace and maintain formwork and shoring to support loads until such loads can be safely supported by the concrete structure.
12. Uprturned beams, curbs and similar members in connection with slabs shall be formed so that they can be poured integrally with slabs.

B. Concrete Accessories and Embedded Items:

1. Install into forms concrete accessories, sleeves, inserts, anchor bolts, anchorage devices and other miscellaneous embedded items furnished by other trades or that are required

for other work that is attached to or supported by cast-in-place concrete.

- a. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached.
 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
 3. Install dovetail anchor slots in concrete structures as indicated on drawings.
 4. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces.
 - a. Provide and secure units to support screed strips using strike-off templates or compacting- type screeds.
 5. Coordinate with Section 032000 "Concrete Reinforcement and Embedded Assemblies."
 6. Install straight, level, plumb and secure in place to prevent displacement by concrete placement.
 7. Embeds: Set and secure embedded plates, bearing plates, and anchor bolts per approved setting drawings and in such a manner to prevent movement during placement of concrete.
 8. Install waterstops at construction joints as indicated on the Contract Drawings in sizes to suit joint.
- C. Temporary Openings:
1. Locate temporary openings in forms at inconspicuous locations.
 2. For clean-outs and inspection before concrete placement, locate temporary openings where interior area of formwork is inaccessible.
 3. For cleaning and inspections, locate openings at bottom of forms to allow flushing water to drain.
 4. Securely brace temporary openings and set tightly in forms to prevent loss of concrete.
 5. Close temporary openings with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be noticeable on exposed concrete surfaces.
- D. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades.
1. Determine size and location of openings, recesses, chases, offsets, openings, depressions, and curbs from trades providing such items.
 2. Accurately place and securely support items built into forms.
- E. Cleaning:
1. Thoroughly clean forms and adjacent surfaces to receive concrete.
 2. Remove chips, wood, sawdust, dirt or other debris just before placing concrete.
 3. Retighten forms and bracing before placing concrete, as required, to prevent mortar

leaks and maintain proper alignment.

4. Flush with water or use compressed air to remove remaining foreign matter.
 5. Verify that water and debris can drain from forms through clean-out ports.
- F. Form-Coatings:
1. Before placing reinforcing steel and miscellaneous embedded items, coat contact surfaces of forms with an approved non-residual, low-VOC form-coating compound in accordance with manufacturer's published instructions.
 2. Do not allow release agent to accumulate in forms or come into contact with reinforcement or concrete against which fresh concrete will be placed.
 - a. Coat steel forms with nonstaining, rust-preventative material.
 - b. Rust-stained formwork is not acceptable.
 3. Remove form-coating and residue from reinforcement or surfaces not requiring form coating.
- G. Before Placing Concrete:
1. Inspect and check completed formwork, shoring and bracing to ensure that work is in accordance with formwork requirements of this section and Contract Documents, and that supports, fastenings, wedges, ties, and parts are secure.
 - a. Make necessary corrections or adjustment to form work to meet tolerance requirements.
 2. Form joints in all exposed concrete surfaces shall be securely taped or sealed by other approved means to prevent leakage and loss of paste during placement of concrete.
 3. Retighten forms and bracing before concrete placement to prevent mortar leaks and maintain proper alignment.
 4. When formwork is complete and clean, notify the Owner's Testing Laboratory 24 hours prior to placing concrete for inspection of forms.
- H. During Concrete Placement: Maintain a check on formwork to ensure that forms, shoring, ties and other parts of formwork have not been disturbed by concrete placement methods or equipment.
- I. During Cold Weather:
1. Remove ice and snow from within forms.
 2. Do not use de-icing salts.
 3. Do not use water to clean out completed forms, unless formwork and concrete construction proceed within heated enclosure.
 4. Use compressed air or other means to remove foreign matter.
- J. Surface Defects: Install forms substantially free of surface defects.

3.2 SHORES AND SUPPORTS

- A. Comply with ACI 347R for shoring and reshoring in multistory construction as specified herein.
 - 1. Extend shoring at least three floors under floor or roof being placed for structures over four stories. Shore floor directly under floor or roof being placed so that loads from construction above will transfer directly to the shores. Space shoring in stories below this level in such a manner that no floor or member will be excessively loaded.

3.3 REMOVING FORMS

- A. Do not remove forms, shores or bracing until concrete has gained sufficient strength to carry its own weight, and construction and design loads which are liable to be imposed upon it.
 - 1. Verify strength of concrete by compressive test results.
- B. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 F (10 C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and providing curing and protection operations are maintained.
- C. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75% of design minimum compressive strength at 28 days or in accordance with the Structural Drawings.
 - 1. Provide backshores/reshores as required per ACI 347R.
 - 2. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- D. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.
- E. Remove formwork progressively and in accordance with code requirements and using methods to prevent shock loads or unbalanced loads from being imposed on structure.
 - 1. Comply with ACI 347R.
- F. Loosen forms carefully.
 - 1. Do not wedge pry bars, hammers, or tools against concrete surfaces.
- G. Reshore structural members where required due to design requirements or construction requirements or construction conditions and as required to permit progressive construction.
 - 1. Coordinate with design requirements.

2. Reshore on same day shoring and forms are removed.

3.4 REUSING FORMS

- A. Before forms can be re-used, surfaces that will be in contact with freshly poured concrete must be thoroughly clean, damaged areas repaired, and projecting nails withdrawn.
- B. Clean and repair surfaces of forms to be reused in the Work.
 1. Split, frayed, delaminated or otherwise damaged form-facing material will not be acceptable for exposed surfaces.
 2. Apply new form coating compound as specified for new formwork.
- C. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints.
 1. Align and secure joints to avoid offsets.
- D. Forms for exposed concrete may be reused only if the surfaces have not absorbed moisture and have not splintered, warped, discolored, stained, rusted or peeled, subject to Architect's acceptance. The Architect reserves the right to require the Contractor to remove and reconstruct such formwork as will produce subsequent areas that are acceptable. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.5 FIELD QUALITY CONTROL

- A. General: The Owner's Testing Laboratory shall inspect concrete formwork as Work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate Architect for final acceptance.
- B. Testing Laboratory shall provide qualified personnel at site to inspect formwork using the latest Drawings and approved shop drawings as follows:
 1. Prior to placement of reinforcement, inspect formwork for grade, quality of material, absence of foreign matter, and other imperfections that might affect suitability of concrete placement and tolerances stated herein.
 2. Inspect forms for location, configuration, compliance with specified tolerances, block outs, camber, shoring ties, seal of form joints and compliance with Contract Documents.
 3. Verify condition of bond surfaces, locations and sizes of all accessories, embedment items, and anchorage for prevention of displacement.
 4. Verify proper use/application of form release agents.
 5. Inspect form stripping for conformance with requirements of Section 033000 "Structural Concrete."
- C. Submit inspection, observation, and/or test reports to the Architect/Engineer and provide an evaluation statement in each report stating whether or not concrete formwork conforms to the requirements of Specifications and Drawings. Specifically note deviations.

D. Report deficiencies to Contractor immediately.

END OF SECTION 031000

SECTION 03 20 00
CONCRETE REINFORCEMENT AND EMBEDDED ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes reinforcing steel, accessories, and miscellaneous anchorage accessories, joint fillers, and waterstops for cast-in-place concrete work in Section 033000 "Structural Concrete."
- B. Related Sections:
 - 1. Section 024116- "Structure Demolition"
 - 2. Section 031000- "Concrete Form Work"
 - 3. Section 033000- "Structural Concrete"

1.3 REFERENCES STANDARDS

- A. Requirements, abbreviations and acronyms for reference standards are defined in Section 01095
- B. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.
- C. ACI 301 – Standard Specifications for Structural Concrete.
- D. ACI 315 – Details and Detailing of Concrete Reinforcement.
- E. ACI 318 – Building Code Requirements for Reinforced Concrete.
- F. ASTM A 82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- G. ASTM 108 - Standard Specification for Steel bars, Carbon, Cold-Finished, Standard Quality.
- H. ASTM A 123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- I. ASTM A 143 – Standard Practices for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedures for Detecting Embrittlement.
- J. ASTM A 185 – Standard Specifications for Steel Welded Wire Fabric, Plain, For Concrete Reinforcement.
- K. ASTM A 307 – Standard Specification for Carbon Steel Bolts and Studs, 60,0000 PSI Tensile Strength.

- L. ASTM A 496 – Standard Specification for Steel Wire, Deformed, for Concrete Reinforcement.
- M. ASTM A 497 – Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
- N. ASTM A 615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- O. ASTM A 706 – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
- P. ASTM A 767 – Standard Specification for Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.
- Q. ASTM A 775 – Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- R. ASTM A 884 – Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement.
- S. ASTM B 633 – Standard Specification for Electrodeposited Coating of Zinc on Iron and Steel.
- T. ASTM C 758 – Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- U. ASTM D 994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- V. ASTM D 1751 – Standard Specification for Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Type).
- W. ASTM D 1752 – Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- X. AWS D1.1 – Structural Welding Code-Steel.
- Y. AWS D1.4 – Structural Welding Code-Reinforcing Steel.
- Z. AWS D12.1 – Recommended Practices for Welding Reinforcing Steel Metal Inserts, and Connections in Reinforced Concrete Construction.
- AA. CRD-C572 – Specification for Polyvinylchloride Waterstops.
- BB. CRSI – Manual of Standard Practice.
- CC. CRSI – Placing Reinforcing Bars.

1.4 QUALITY ASSURANCE AND QUALIFICATIONS

- A. Perform work in accordance with CRSI 63, 65 and CRSI Manual of Practice, ACI 301, ACI SP-66, and ACI 318.

- B. Work of this Section shall be performed by a fabricator specializing in reinforcing steel fabrication of type for cast-in-place concrete work required for this Project, with a minimum of 10 years of documented successful experience, and have the facilities capable of meeting all requirements of Contract Documents.
 - 1. Welders shall be qualified in accordance with AWS D1.1, within 12 months before starting the work.
 - a. Make qualification records available to Engineer upon request.
 - 2. Work shall be performed in compliance with Owner's insurance underwriters' requirements.
- C. Manufacturers shall specialize in manufacturing the types of concrete accessories required for cast-in-place concrete work, with a minimum of 10 years of documented successful experience and shall have the facilities capable of meeting all requirements of Contract Documents as a single-source responsibility and warranty for each type of accessory.
- D. Coordinate and schedule the following quality related items in a timely manner with the Owner's Testing Laboratory:
 - 1. Verify reinforcing steel for quantity, size, location and support.
 - 2. Verify proper reinforcing steel concrete coverage.

1.5 SUBMITTALS

- A. Submit the following according to Conditions of the Construction Contract and Section 013300 "Submittal Procedures."
- B. Schedule of shop drawing submittals: Develop and submit for Engineer's review a minimum of 30 days in advance of the first submittal. Submit shop drawings only in conformance with an agreed-upon schedule.
- C. Shop Drawings: Shall include but not be limited to:
 - 1. All details, dimensions and information required for fabrication and placement of concrete reinforcement in accordance with Contract Documents, prepared in accordance with ACI 315 recommendations.
 - 2. Elevations, plans, sections, and dimensions of concrete work with required reinforcement clearances.
 - 3. Lodges, brackets, openings, sleeves and items of other trades including interference with reinforcing materials.
 - 4. Sizes, grade designations, spacing, locations, and quantities of wire fabric, reinforcing steel, temperature and shrinkage reinforcement dowels.
 - a. Do not use dimensions scaled from Contract Drawings to determine bar lengths.
 - b. Hooks and bends not specifically dimensioned shall be detailed per ACI 318.

5. Bending and cutting schedules, assembly diagrams, splicing and connection requirements, details, and laps.
 6. Each type of supporting and spacing devices, including miscellaneous accessories.
 7. Construction joint type, details and locations.
 8. Placement drawings of concrete accessories and embedded items, including fabrication details of items to be placed.
 9. Reproduction of structural drawings is not permitted.
- D. Product Data: Shall be clearly marked to indicate all technical information which specifies full compliance with this section and Contract Documents, including published installation instructions and I.C.B.O. reports, where applicable, for products of each manufacturer specified in this section.
- E. Mill Reports: Provide copy for record only. Mill Reports will not be reviewed or returned. Required as specified in Section 014000 "Quality Requirements." Reinforcing bars to be welded, except for ASTM A 706, require report of material properties necessary to conform to welding procedures.
- F. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- G. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyl (PCB).

1.6 DELIVERY, HANDLING, STORAGE

- A. Comply with General Conditions and Section 016000 "Product Requirements," including the following:
1. Deliver reinforcing steel to Project site bundled, tagged and marked.
 - a. Use weatherproof tags indicating bar sizes, lengths and other information corresponding to markings shown on placement diagrams.
 2. During construction period, properly store reinforcing steel and accessories to assure uniformity throughout the Project.
 3. Deliver and store welding electrodes in accordance with AWS D1.4.
 4. Immediately remove from site materials not complying with Contract Documents or determined to be damaged.
 5. Store reinforcing steel above ground so that it remains clean.
 - a. Maintain steel surfaces free from materials and coatings that might impair bond.
 - b. Keep covered.
 - c. Protect against corrosion or deterioration of any kind.

1.7 WARRANTY

- A. Comply with General Conditions, agreeing to repair or replace specified materials or Work that has failed within the warranty period. Failures include but are not limited to the following:
 - 1. Bars with kinks or bends not indicated on drawings or on approved shop drawings.
 - 2. Bars damaged due to bending, straightening or cutting.
 - 3. Bars heated for bending.

1.8 QUALIFICATIONS

- A. Design reinforcement under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of South Carolina.

1.9 COORDINATION

- A. Coordinate with placement of formwork, formed openings and other work.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

- A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyl (PCB) or other hazardous materials identified by the Owner.

2.2 ACCEPTABLE MANUFACTURERS

- A. Products of the manufacturers specified in this section establish the minimum functional and quality standards required for work of this section.
- B. Substitutions: Comply with General Conditions using form in Section 012500 "Substitution Procedures."

2.3 REINFORCEMENT

- A. Reinforcing Steel:
 - 1. Type: Deformed billet steel bars, ASTM A 615, Grade 60.
 - 2. Size: As indicated on structural drawings.
 - 3. Where indicated on drawings, reinforcing steel shall be hot-dipped galvanized after fabrication in accordance with ASTM A 767, Class II, with galvanizing material protected from embrittlement during galvanizing process in accordance with ASTM A 143.
 - a. Galvanized finish shall meet the bend and shear test requirements of ASTM A 615.
 - 4. Epoxy-Coated: ASTM A 775.
 - 5. Weldable reinforcement: ASTM A 706.
- B. Reinforcing Wire Fabric:

1. Type: steel wire, plain finish, ASTM A 82.
 2. Type: steel wire, deformed, ASTM A 496.
 3. Size: As indicated on structural drawings.
 4. Where indicated on drawings, reinforcing wire fabric shall be hot-dipped galvanized after fabrication in accordance with ASTM A 767, Class II, with galvanizing material protected from embrittlement during galvanizing process in accordance with ASTM A 143.
 - a. Galvanized finish shall meet the bend and shear test requirements of ASTM A 615.
 5. Plain Steel Welded Wire Fabric: ASTM A 185.
 6. Deformed Steel Welded Wire Fabric: ASTM A 497.
 7. Epoxy-Coated Welded Wire Fabric: ASTM A 884, Class A.
- C. Shear Reinforcement at Slab-Column Connections:
1. Type: Steel shear stud/rail assemblies for shear reinforcement at the slab-column connection shall be DECON STUDRAILS supplied by DECON USA, Medford New Jersey.
 - a. Shear studs shall be in accordance with ASTM A108, Grade C1015.
 - b. Rails shall be low carbon steel Type 44W.
 - c. Studs shall be welded in accordance with AWS D1.1, latest edition.
 2. Size: As indicated on structural drawings.
 3. Installation: Per manufacturer's instructions
 4. Supports: Use plastic molded plastic chairs as provided by the manufacturer to maintain the bottom rebar cover as specified on the drawings.

2.4 ACCESSORIES

A. Tie Wire:

1. Type: Minimum 16 gauge annealed steel wire, ASTM A 82.
2. Wire Bar Type: Comply with CRSI.

B. Splicing System:

1. Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire in accordance with requirements of ACI 318 for minimum lap of spliced bars.
2. For mechanical tension and compression splices of reinforcing steel where specifically detailed on drawings, use Cadweld (C-series) splice, Dayton BAR-GRIP, NMB splice sleeve or Erico Lenton splices installed in strict compliance with manufacturer's requirements.
3. For welded splices, comply with ACI 318.
4. Tensile splicers shall be capable of developing 125% of the reinforcing steel ASTM specified minimum yield strength.
5. Compression splicers shall be the mechanical type such that the compression stress is transmitted by end bearing held in concentric contact.

C. Supports for Reinforcement:

1. Types: Bolsters, chairs, spacers, clips, chair bars, and other devices for properly placing, spacing, supporting, and fastening the reinforcement, hot-dip galvanized after fabrication in accordance with ASTM A 123.
2. For Contact with Forms: Use types with not less than 3/32-inch of plastic between metal and concrete surface.
 - a. Plastic tips shall extend not less than 1/2-inch on metal legs.
3. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion.
4. Unless otherwise indicated on drawings, bottom reinforcing bars in footings shall be supported by precast concrete bricks or individual high chairs with welded sand plates on bottom.
5. For Slabs on Grade: Use supports with sand plates or horizontal runners where base material will not support chair legs.

D. Deformed Bar Anchors:

1. Type: Automatic end welded, ASTM A 496 quality.
2. Size and Grade: As indicated on structural drawings.

E. Anchoring System for reinforcing dowels into existing concrete:

1. Type: Adhesive for dowels in existing concrete shall be either EPCON C6 Epoxy adhesive supplied by ITW Ramset/Red Head, HIT HY-150 injectable adhesive supplied by Hilti, Inc., Tulsa, Oklahoma, or Power-Fast Epoxy Injection Gel, supplied by Powers Rawl, Inc., New Rochelle, N.Y.

2.5 ANCHORAGE ACCESSORIES

A. General: Miscellaneous anchorage accessories for anchoring structural, Architectural, electrical, and mechanical items to poured concrete shall include but not be limited to the following:

1. Concrete Anchors: Headed or bent studs or deformed anchors, ASTM A 108/Grade 1015 through 1020, minimum yield strength of 50,000 psi, minimum tensile strength of 60,000 psi flux cored, conforming to AWS D1.1.
2. Anchor Bolts: ASTM A 307, unless noted otherwise on drawings.
3. Threaded Inserts: Manufactured by Dayton/Richmond Screw Anchor Co.
4. Wedge Inserts: Peerless type manufactured by Dayton/Richmond Screw Anchor Co.
5. Chemical Anchorage System: Manufactured by Hilti Corp/Tulsa, Oklahoma.
6. Expansion Bolts: Manufactured by Hilti Corp/Tulsa, Oklahoma.
7. Inserts and Coil Rods: Yield strength 65,000 psi, ASTM B 633, manufactured by Acrow-Richmond Limited or Dayton Superior Corp/Miamisburg, Ohio.

8. Welding Electrodes: AWS 5.5, Series E70.
 9. Welded Deformed Bar Anchors: Welded by full-fusion process, as furnished by TRW Nelson Stud Welding Division or equivalent.
- B. Chemical Bond Anchor Bolt:
1. Provide sizes and types of bolts as indicated on the drawings.
 2. Provide one of the following embedded anchor systems:
 - a. HIT HY-200 injectable adhesive supplied by Hilti, Inc.
- C. HIT RE-500 injectable adhesive supplied by Hilti, Inc.
- D. Types and Sizes: Each type of anchor shall be manufactured of structural quality steel, designed for cast- in-place concrete applications and be of sizes to suit Project conditions and requirements, complete with washers, nuts, plates and miscellaneous accessories required to meet Contract Document requirements.
1. Strength: Not less than 4 times the required load capacity.
- E. Dovetail Anchor Slots:
1. Type: Formed 22 gauge galvanized steel manufactured by Heckmann Building Products/Chicago, Illinois or Hohmann and Barnard/Hauppauge, New York.
 2. Location of Use: Continuous installation of anchor slots, full height of masonry walls, where masonry walls abut poured concrete walls.
 3. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- F. Finish: Hot-dip galvanized or zinc-plated steel.
1. Stainless steel anchors are acceptable.

2.6 JOINT FILLERS

- A. Permanent Compressible Joint Filler:
1. Type: BASD/Shakopee, Minnesota "SONOFLEX F" polyethylene closed-cell expansion joint filler, ultraviolet stable, extremely low moisture absorption, non-impregnated, nonstaining and nonbleeding, inert and compatible with cold-applied sealants.
 2. Location of Use: Slabs and curbs as indicated on drawings or required.
 3. Thickness: As indicated on drawings or required.
 4. Other Acceptable Brands:
 - a. "Flexcell" by Celotex Corporation.
 - b. "Ceramar Flexible Foam Expansion Joint Filler" by W.R. Meadows/Elgin, Illinois.
- B. Temporary Compressible Joint Filler:

1. Type: White molded polystyrene beadboard.
2. Location of Use:
 - a. In slabs, curbs, and walls which must be removed prior to joint sealant installation.
 - b. Vertically to isolate walls from columns or other walls.
- C. Noncompressible Joint Filler:
 1. Type: Dow Chemical's "STYROFOAM 40" rigid closed-cell extruded polystyrene board, square edges, 40 psi compressive strength, ASTM C 578, Type IV.
 2. Thickness: As indicated on drawings.
 3. Location of Use: As indicated on drawings or required.
- D. Asphalt-Impregnated Joint Filler:
 1. Type: W.R. Meadows/Elgin, Illinois "SEALTIGHT" Asphalt Expansion Joint Filler, preformed, ASTM D 994.
 2. Thickness: As indicated on drawings or required.
 3. Location of Use: Sidewalks at foundation walls and as indicated on drawings or required.
- E. Asphalt-impregnated fiberboard expansion joint filler for interior work:
 1. Type: ASTM D1751.
- F. Self-expanding cork board expansion joint filler for exterior work:
 1. Type: ASTM D1752.
- G. Earth Dams:
 1. Type: W.R. Meadows/Elgin, Illinois "SEALTIGHT" Premolded Membrane - #740.
- H. Construction Joints:
 1. Type: Tongue and groove type profile of galvanized steel, with knock-out holes at 6" on center to receive dowelling, complete with anchorage.

2.7 WATERSTOPS

- A. Preformed Bentonite Waterproofing Strips:
 1. Type: "WATERSTOP-RX" especially formulated for concrete cold joints at footings, walls, or slabs and manufactured by American Colloid Company/Arlington Heights, Illinois.
 2. Size: 3/4" by 3/8" strips, 25 ft. long, and weighing at least 0.165 lbs/ft.
 3. Location of Use: Concrete cold joints at footings, walls and slab joints.
- B. Preformed Bituminous Plastic Gaskets:
 1. Type: "SYNKO-FLEX J-1078" free of asbestos and PCB, non-oxidizing, non-evaporating, chemically-resistant characteristics, free of solvents, irritating fumes, and obnoxious

odors, with high adhesive and cohesive properties, manufactured by Synko-Flex Products Inc/Houston, Texas.

C. Polyvinyl Chloride Waterstops:

1. Type: CRD C 572.

2.8 FABRICATION

A. Reinforcing Steel Fabrication:

1. Fabricate in accordance with approved shop drawings, ACI 315 and Contract Documents.
2. Bending and Straightening: Except for #3 dowel bars as approved by Engineer, will not be permitted after partial embedment in concrete.
3. Heating of Reinforcement: Will be permitted only with specific prior approval of Engineer.
4. Welding: Comply with ANSI/AWS D1.4; use E9018 electrodes or approved electrodes.
5. Tolerances: Comply with ACI 117.
6. Unacceptable Materials: Reinforcement with any of following defects will not be permitted in Work.
 - a. Bar lengths, depths, and bends exceeding ACI fabrication tolerances.
 - b. Bends or kinks not indicated on Drawings or final shop drawings.
 - c. Bars with reduced cross-section due to excessive rusting or other cause.

B. Welded Wire Fabric:

1. Type: As fabricated in accordance with CRSI, unless otherwise noted.

C. Templates:

1. Required for all footing and column dowels, and where required for proper alignment of reinforcing.

D. Assemblies:

1. Fabricate and assemble structural steel items in shop in conformance with AISC and AWS D1.1. Shearing, flame cutting, and chipping shall be done carefully and accurately. Cut, drill, or punch holes at right angles to the surface of the metal. Do not make or enlarge holes by burning. Holes shall be clean-cut without torn or ragged edges.
2. Welding of deformed bar anchors and headed stud anchors shall be installed by full-fusion process equivalent to TRW Nelson Stud Welding Division or KSM Welding Services Division, Omark Industries. See Section 051200 "Structural Steel."
3. Welding of reinforcement shall be done in strict accordance with AWS requirements. Do not weld reinforcing bars larger than No. 9. Welding shall be performed subject to the observance and testing by Owner's Testing Laboratory.
4. Coatings where required, shall be applied after fabrication and prior to casting concrete.
5. Welding of crossing bars (tack welding) for assembly of reinforcement is not permitted.

PART 3 - EXECUTION

3.1 INSTALLATION OF REINFORCEMENT

A. General:

1. Perform the work of this section in accordance with approved shop drawings, ACI 318 and CRSI recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as specified.
2. Before placing reinforcing steel, inspect forms for proper fitting and compliance with allowable tolerances.
3. Reinforcing steel and fabric shall be free of form coatings, sealers, powdered and scaled rust, mill scale, earth, ice, and other materials which will reduce or destroy bond with concrete.
4. Do not place concrete until the completed reinforcing steel work has been observed and accepted by Owner's Testing Laboratory as specified in Section 014000 "Quality Requirements."
5. Reinforcing is not permitted to be "floated into position".
6. Bend bars cold.
 - a. Do not heat or flame cut bars.
 - b. No field bending of bars partially embedded in concrete is permitted, unless specifically approved by Engineer and tested by Independent Testing Laboratory for cracks.
7. Weld only as indicated.
 - a. Perform welding per ANSI/AWS D12.1 and/or ANSI/AWS D1.4.
 - b. See structural drawings for additional requirements.
8. Tag reinforcing steel for easy identification.

B. Placement of Reinforcing Bars:

1. Comply with approved shop drawings, ACI 318 and Contract Documents.
2. Accurately position, support and secure reinforcement in a manner to prevent displacement before and during placement of concrete.
 - a. Place reinforcing bars within tolerances specified in ACI 117.
 - b. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, hangers and other accessories for fastening reinforcing bars and welded wire fabric in place.
 - c. Before placing concrete, clean reinforcement of foreign particles and coatings.
3. If bars are displaced beyond specified tolerance when relocating the bars to avoid interference with other reinforcement or embedded items, notify Engineer for approval prior to concrete placement.
4. Avoid cutting or puncturing vapor retarder/barrier during reinforcement placement.
 - a. Repair damages before placing concrete.

5. Concrete Coverage: Maintain concrete cover around reinforcement as indicated on drawings.
 6. Bar Supports: Use type specified in this section.
 7. Tie Wires: After cutting, turn tie wires to the inside of section and bend so that concrete placement will not force ends to be exposed at face of concrete.
 8. Placement of Wire Fabric:
 9. Install in lengths as long as practicable.
 10. Support in position during placement of concrete.
 11. Overlap the wire fabric 6" or panel widths +2", whichever is larger.
 - a. Securely tie together with wire.
 12. Offset laps of adjoining widths to prevent continuous laps in either direction.
 13. Locate wire fabric in the top third of slabs, unless noted otherwise on structural drawings.
- C. At Construction Joints:
1. Reinforcing bars and wire fabric shall be continuous through construction joints, unless otherwise indicated on drawings.
- D. At Expansion Joints:
1. Reinforcing bars and wire fabric shall NOT be continuous through expansion joints, unless otherwise indicated on drawings.
- E. Splicing:
1. Comply with requirements specified in this Section under "Splicing System".
 2. Do not splice reinforcement except as indicated on structural drawings.
 3. Tension couplers may be used and installed per manufacturer's specifications where indicated on drawings.
- F. Dowels in Existing Concrete:
1. Install dowels and dowel adhesive in accordance with supplier's recommendations.
 2. Minimum embedment length shall be 12 bar diameters, unless noted otherwise.

3.2 INSTALLATION OF ACCESSORIES

- A. Install concrete accessories in accordance with manufacturer's published instructions and Contract Documents.
1. Inspect locations to receive concrete accessories.
 2. Immediately report to the Engineer in writing of conditions that will adversely affect the Work or fails to meet Contract Document requirements.
 3. Do not place concrete until reinforcement, accessories and other built-in items have been inspected and accepted by Owner's Testing Laboratory.

- B. Construction and Control Joints:
 - 1. Construction and control joints indicated on drawings are mandatory and must not be omitted.
 - a. Provide construction joints in accordance with ACI 318.
 - b. Provide 1-1/2" deep key type construction joints at end of each placement for slabs, beams, wall and footings.
 - 1) Bevel forms for easy removal.
 - 2. Provide waterstops in construction joints as indicated.
 - 3. Install waterstops to form continuous diaphragm in each joint.
 - 4. Support and protect exposed waterstops during progress of Work.
 - 5. Field-fabricates joints in waterstops according to manufacturer's printed instructions.
- C. Coordinate the installation of pipes, bolts, hangers, anchors, flashing and other embedded items with the work of other trades.

3.3 FIELD QUALITY ASSURANCE

- A. General: The Owner's Testing Laboratory shall test and inspect concrete reinforcement and embedded assemblies as Work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate Engineer for final acceptance.
- B. Owner's Testing Laboratory shall provide qualified personnel at site to inspect reinforcement and embeds using the latest Drawings and reviewed shop drawings, as follows:
 - 1. Prior to placement, inspect reinforcement and embeds for grade, quality of material, absence of foreign matter, and for suitable storage.
 - 2. Provide continuous inspection of reinforcement and embedded assemblies during placement and immediately prior to concreting operations for: size, quantity, vertical and horizontal spacing and location, correctness of bends and splices, clearances, compliance with specified tolerances, security of supports and ties, and absence of foreign matter.
 - 3. Inspect epoxy-coated reinforcement for coating damage and required applied coatings.
- C. Owner's Testing Laboratory shall submit inspection, observation, and/or test reports to the Engineer as required herein and shall provide an evaluation statement in each report stating whether or not concrete placement conforms to requirements of Specifications and Drawings and shall specifically note deviations therefrom.
- D. Report deficiencies to Contractor immediately.

END OF SECTION 032000

SECTION 03 30 00
STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Construction Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete for building construction and site work, and self-leveling concrete topping. Section Includes:
 - 1. Cast-in-place concrete used in the construction of site structures.
- B. Related Sections:
 - 1. Section 024119 "Selective Demolition"
 - 2. Section 031000 "Concrete Formwork"
 - 3. Section 032000 "Concrete Reinforcement and Embedded Assemblies"

1.3 DEFINITIONS

- A. Abrasive – Any hard, strong substance, such as rocks, sand, water, or minerals, that will cut, scour, pit, erode, or polish another substance.
- B. Adhesion – The bonding of two surfaces through internal effects such as molecular (valence) forces or interlocking action, or both.
- C. Admixture – A material other than water, aggregates, hydraulic cement, or fiber reinforcement, added to concrete, mortar, or grout, during batching or mixing to enhance plastic or hardened material properties, or both.
- D. Aggregate – Granular materials, such as sand, gravel, and crushed stone, commonly used in concrete, mortar, or grout.
- E. Bond – Adhesion and grip of a material to other surfaces against which it is placed.
- F. Cathodic Protection – A form of corrosion protection for reinforced concrete wherein a sacrificial metal is caused to corrode in preference to the reinforcement, thereby protecting the reinforcement from corrosion.
- G. Cofferdam – A temporary structure enclosing all or part on a construction area so that construction or repair can proceed in the dry.
- H. Cohesion - The state in which the constituents of a mass of material are held together by chemical and physical forces.

- I. Consolidation – The process whereby the volume of freshly placed mortar or concrete is reduced to the minimum practical space and voids are eliminated, usually by vibration, rodding, tamping, or some combination of these actions.
- J. Corrosion – Degradation of concrete or steel reinforcement caused by electrochemical or chemical attack.
- K. Cure – The process by which a compound attains its intended performance properties by means of evaporation, chemical reaction, heat, radiation, or combinations thereof.
- L. Degradation – A detrimental change in the physical and/or chemical properties of a material.
- M. Delamination – A separation along a plane parallel to a surface.
- N. Deterioration – Physical manifestation of failure of a material (including, but not limited to, cracking, delamination, flaking, pitting, scaling, spalling, staining) caused by service conditions or internal autogenous influences.
- O. Erosion – Progressive disintegration of a solid by the abrasive or cavitation action of gases, fluids or solids in motion.
- P. Form – A temporary structure, or mold, to support a material while it is curing and gaining sufficient strength to be self-supporting.
- Q. Grout – A mixture of cementitious material and water, with or without aggregate, proportioned to produce a pourable consistency without segregation of the constituents.
- R. Keyway – A recess or groove in a concrete substrate which is filled with material to provide increased shear strength along the interface.
- S. Proprietary – Made and marketed by one having the exclusive right to manufacture and distribute.
- T. Reinforcement – Bars, wires, strands, fibers, or other slender members which are embedded in concrete primarily to improve tensile strength.
- U. Sacrificial Anodes – Chemically active metals such as zinc, aluminum, and magnesium which, when electrically connected to the reinforcing bar, will provide the energy needed to cathodically protect the reinforcing bar.
- V. Saturated Surface-Dry – Condition of an aggregate particle or other porous solid when the permeable voids are filled with water and no water is on the exposed surfaces.
- W. Segregation – The differential concentration of the components of mixed concrete, aggregate, or the like, resulting in nonuniform proportions in the mass.
- X. Shrinkage – A decrease in one or more dimensions of an object or material.

Y. Slump – A measure of consistency of freshly mixed concrete.

1.4 REFERENCE STANDARDS

- A. Requirements, abbreviations and acronyms for reference standards are defined in Section 01095.
- B. AASHTO M171 – Sheet Materials for Curing Concrete.
- C. AASHTO T237 – Testing Epoxy resin Adhesive.
- D. AASHTO T260 – Test for Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials.
- E. AASHTO TP23 – Proposed Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.
- F. ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.
- G. ACI 301 – Standard Specifications for Structural Concrete.
- H. ACI 302.1R – Guide for Concrete Floor and Slab Construction.
- I. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- J. ACI 304.2R – Placing Concrete by Pumping Methods.
- K. ACI 305R – Hot Weather Concreting.
- L. ACI 306R – Cold Weather Concreting.
- M. ACI 308 – Standard Practice for Curing Concrete.
- N. ACI 309R – Guide for Consolidation of Concrete.
- O. ACI 318 – Building Code Requirements for Structural Concrete.
- P. ACI 360 – Concrete Slabs on Grade.
- Q. ASTM C 31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- R. ASTM C 33 – Standard Specification for Concrete Aggregates.
- S. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- T. ASTM C 42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- U. ASTM C 94 – Standard Specification for Ready-Mixed Concrete.

- V. ASTM C 138 – Standard Test Method for Unit Weight, Yield and Air Content (Gravimetric) of Concrete.
- W. ASTM C 143 – Standard Test Method for Slump of Hydraulic Cement Concrete.
- X. ASTM C 150 – Standard Specification for Portland Cement.
- Y. ASTM C 172 – Standard Practice for Sampling Freshly Mixed Concrete.
- Z. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- AA. ASTM C 231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- BB. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.
- CC. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- DD. ASTM C 330 – Standard Specification for Lightweight Aggregates for Structural Concrete.
- EE. ASTM C 494 – Standard Specification for Chemical Admixtures for Concrete.
- FF. ASTM C 567 – Standard Test Method for Unit Weight of Structural Lightweight Concrete.
- GG. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
- HH. ASTM C881 – Standard Specification for Epoxy-Resin-Base Bonding System for Concrete.
- II. ASTM C 939 – Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
- JJ. ASTM C 1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- KK. ASTM C 1106 – Standard Specification for Fiber-Reinforced Concrete.
- LL. ASTM D 638 – Standard Test Method for Tensile Properties of Plastics.
- MM. ASTM D 648 – Standard Test Method for Deflection Temperature of Plastics Under Flexural Load.
- NN. ASTM D 695 – Standard Test Method for Compressive Properties of Rigid Plastics.
- OO. ASTM D 7508 – Standard Specification for Polyolefin Chopped Strands for Use in Concrete.
- PP. ASTM E 154 – Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- QQ. ASTM E 1155 – Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness

Numbers.

RR. CRD-C 611 – Corps of Engineers Method for Flow of Grout Mixtures (Flow Cone Method).

SS. CRD-C 621 – Corps of Engineers Specification for Nonshrink Grout.

TT. FHWA-RD-77 – Sampling and Testing for Chloride Ion in Concret.

1.5 QUALITY ASSURANCE AND QUALIFICATIONS

A. Work of this Section shall be performed by a company which specializes in the type of concrete work required for this Project, with a minimum of 10 years of documented successful experience and shall be performed by skilled workmen thoroughly experienced in the necessary crafts.

1. Work shall be performed in compliance with Owner's insurance underwriters' requirements.

B. For the purpose of this specification section, "Corrosive Environment" is defined as the slab structure of the parking garage, ramps, and loading docks, including those portions of the beams and columns contained within the slab structure.

C. Materials and installed work may require testing and retesting at any time during progress of work, as directed by Engineer. Tests, including retesting of rejected materials for installed work will be done at Contractor's expense.

D. Quality assurance testing will be performed by the Owner in accordance with the Special Conditions.

E. Provide free access to work and cooperate with appointed testing firm.

F. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

G. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

H. One slump test will be taken for each set of test cylinders taken.

I. The Contractor shall furnish the concrete necessary for making test specimens.

1.6 SUBMITTALS

A. Submit the following according to Conditions of the Construction Contract and Division 1 Specification Sections.

B. Mix Design: Six weeks before placing concrete submit mix designs for each type and strength of concrete required for this Project.

1. Mix designs shall be prepared or reviewed by an approved independent testing laboratory

- retained by the Contractor in accordance with requirements of ACI 301 and ACI 318, signed by a registered engineer, carefully coordinated with design requirements and Contract Documents.
2. Before submitting to Owner's Testing Laboratory, submit complete mix design data for each separate mix to be used on the Project in a single submittal to Engineer.
 3. Data shall be from the same production facility that will be used for this Project.
- C. Mix Design Data: To include but not be limited to the following:
1. Design Compressive Strength: As indicated on the Drawings.
 2. Proportions: ACI 301 and ACI 318.
 3. Gradation and quality of each type of ingredient including fresh unit weight, aggregates sieve analysis.
 4. Water/cement ratio.
 5. Type of fly ash, if approved by Engineer.
 6. Slump: ASTM C 143.
 7. Certification and test results of the total water soluble chloride ion content of the design mix - FHWA RD-77 or AASHTO T260.
 8. Air content of freshly mixed concrete by the pressure method, ASTM C 231, or the volumetric method, ASTM C 173.
 9. Unit Weight of Concrete: ASTM C 138.
 10. Strength at 7 and 28 Days: ASTM C 39.
 - a. Document strength based on basis of previous field experience or trial mixtures per ACI 301. Proportioning by Water-Cement Ratio is not permitted.
 - b. Submit strength test records, mix design materials, conditions, and proportions for concrete used for record of tests, standard deviation calculation, and determination of required average compressive strength.
 11. Manufacturer's brand name and type of admixtures, if approved by Engineer.
 12. Manufacturer's brand name and type of polypropylene fiber reinforcement, if specified within Contract Documents.
 13. Locations on the Project where each type and strength of concrete is to be used.
 14. All information indicating compliance with Contract Documents including method of placement and method of curing.
 15. Lightweight Concrete: Design the mix to produce the strength and modulus of elasticity as indicated, with a split-cylinder strength factor (F_{sp}) of not less than 5.5 and a dry weight of $112 \pm 3 \text{ lbs/ft}^3$ after 28 days.
 16. Shrinkage tests shall be made in the field to verify the specified shrinkage limit.
 - a. One set of shrinkage tests shall be made from every 10,000 square feet of floor slab area.
- D. Product Data: Shall be clearly marked to indicate all technical information which specifies full compliance with this section and Contract Documents, including published application instructions, product characteristics, compatibility and limitations for each of the following:

1. Each type of admixture.
 2. Bonding agent.
 3. Curing compound and floor hardener. Furnish a written statement guaranteeing that the compound will not leave discoloration on concrete to be left exposed, or affect the bond for paint or other applied finishes. Include provision in written statement that in the event of failure of applied finishes to bond to membrane cured concrete, to remove the curing compound and leave suitable surfaces for bonding such finishes.
 4. Absorptive covers and moisture retaining covers.
 5. Self-leveling concrete topping.
- E. Concrete Joint Location Schedule: Include plans and schedule indicating locations and details of construction joints, waterstops, sleeves, embedments, etc.
- F. Survey of As-built Conditions: Survey and report levelness, flatness, and final elevations of finished floors. Include testing of one half the gross area for each floor, with tested bays selected at regular spacing. At the tested bays, provide top of concrete elevation survey at 2-ft grids each way.
- G. Structural Repairs: Material type and procedures.
- H. Patching Defective Concrete Finishes: Proprietary patching.
- I. Certificate from concrete supplier that the materials delivered and used at the Project meet applicable ASTM standards.
- J. Hazardous Materials Notification: In the event no product or material is available that does not contain asbestos, PCB or other hazardous materials as determined by the Owner, a "Material Safety Data Sheet" (MSDS) equivalent to OSHA Form 20 shall be submitted for that proposed product or material prior to installation.
- K. Asbestos and PCB Certification: After completion of installation, but prior to Substantial Completion, Contractor shall certify in writing that products and materials installed, and processes used, do not contain asbestos or polychlorinated biphenyls (PCB), using format in General Conditions.

1.7 QUALITY ASSURANCE AND QUALITY CONTROL

- A. Contractor Qualifications:
1. Experienced with successful installations of specified materials in similar environments and on similar structures in use for minimum of 5 years.
 2. Foremen with minimum of 5 years of experience as foremen on similar projects, who are fluent in English, to be on site at all times during Work. Do not change foremen during course of Project except for reasons beyond control of Contractor; inform Owner in advance of any changes.
 3. Foremen and at least 50 percent of laborers must be trained by material manufacturers in use of specific products to be used.

- B. Qualifications for Installer of Adhesive-Grouted Dowels:
1. ACI-CRSI certified Adhesive Anchor Installer and/or installers who are qualified by the product manufacturer.
 2. Foreman or laborer with minimum 5 years of experience performing similar Work to be on site at all times during Work. Do not change foreman or laborer during course of Project except for reasons beyond control of dowel Installer; inform Owner in advance of any changes.
- C. Ready-Mix Concrete Supplier Qualifications:
1. ASTM C94; Certification of Production Facilities and Delivery Vehicles by National Ready Mixed Concrete Association.
- D. Adhesive for Adhesive-Grouted Dowels:
1. Provide samples of adhesive to Owner and/or Quality Assurance Inspector for observation of set and compression testing.
 2. Provide minimum of 3 samples per shift during first 4 shifts of adhesive use on project.
 3. Make samples by placing adhesive in 3/8-inch-diameter test tubes to height of approximately 1 inch so that after trimming cylinder of 3/8-inch diameter and 3/4-inch length can be obtained.
- E. Pre-Construction Meeting:
1. Review requirements for concrete spall repair Work, including but not limited to:
 - a. Schedule.
 - b. Availability of materials and Contractor's personnel, equipment, and facilities needed to make progress and avoid delays.
 - c. Site use, access, staging, and set-up location limitations, including on-site testing laboratory and sample storage.
 - d. Limitations due to Owner's use of facility.
 - e. Procedures for concrete spall repair Work, including but not limited to:
 - 1) Removal of unsound and sound concrete.
 - 2) Surface preparation.
 - 3) Coating of exposed reinforcing steel.
 - 4) Installation of supplemental reinforcement.
 - 5) Installation of adhesive-grouted dowels.
 - 6) Spall repair material placement: including but not limited to formwork; proprietary spall repair materials; batching, mixing, and placement procedures; finishing; and curing.
 - f. Approved mockup requirements and procedures.
 - g. Testing and inspection requirements.
 - h. Site protection measures and protection of adjacent surfaces.
 - i. Governing regulations.

2. Contractor's site superintendent/foremen, Contractor's quality control representative, Owner, Engineer of Record, representatives of other trades directly affected by Work and/or other stakeholders must attend.
- F. Pre-Placement Meeting (Required for projects requiring ready-mix concrete only):
1. Conduct meeting at Project site before concrete placements.
 2. Review requirements for specific concrete spall repair placement, including but not limited to:
 - 1) Materials and Contractor's personnel, equipment, and facilities that will be used for placement.
 - b. Site use, access, and staging.
 - c. Coordination with Owner's use of facility.
 - d. Procedures for concrete spall repair placement, including but not limited to:
 - 1) Prewetting concrete substrate.
 - 2) Batching, mixing, and placement procedures.
 - 3) Finishing.
 - 4) Curing.
 - 5) Special procedures related to temperature and humidity during placement, finishing, and curing, and thermal/mass concrete effects.
 - e. Testing and inspection requirements.
 - f. Site safety and protection measures, including but not limited to protection of adjacent surfaces.
 - g. Criteria for formwork stripping and shoring removal.
 3. Contractor's site superintendent/foremen, Engineer of Record, Owner, Quality Assurance Testing and Inspection Representative(s) and representatives of other trades directly affected by Work must attend.
- G. Contractor's Quality Control System:
1. Contractor's quality control system is the means of assurance that construction complies with the requirements of the Engineer of Record and/or specification. Controls must be adequate to cover all construction operations.
 2. Establish a Quality Control system and perform sufficient inspection and tests of all items of Work, including that of subcontractors, to ensure conformance to the specification for materials, workmanship, construction, finish, functional performance, and identification.
 3. Maintain records of all inspections and tests performed, instructions received from Owner, Engineer of Record or Quality Assurance Inspector(s), and actions taken as a result of those instructions. These records must include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken. Contractor must document inspections and tests as required by

this section.

4. Testing and Inspection: Include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - a. Contractor-performed tests and inspections including subcontractor performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - b. Owner-performed tests and inspections.
 5. Materials and fabrication procedures are subject to inspection. Tests in the mill, shop, or field must be conducted by a qualified Inspection Agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
 6. Contractor must promptly remove and replace materials or fabricated components that do not comply with the specified requirements at no cost to the Owner.
- H. Field Quality Control and Quality Assurance Testing:
1. Quality Assurance Testing Agency: As required by the Engineer of Record, the Owner or Contractor (only at the request of the Owner) will provide qualified third-party Quality Assurance Testing and Inspection to perform inspections and tests and submit reports during Work. Reports will be provided to Owner and Contractor. See drawings for required inspections and testing.
 - a. Quality Assurance Testing and Inspection must be performed, supervised and/or reviewed by a professional engineer licensed in the State in which the Work is performed unless otherwise permitted by Owner.
 2. Sampling of materials must be in accordance with ASTM C172 and will be performed on grade. Sampling must generally comply with the following requirements:
 - a. When pumping, the spall repair material will be directed to a wheelbarrow or other suitable means for testing agency to acquire sufficient materials for testing and casting all specimens (approximately 2-1/2 cubic feet).
 - b. Collect first test sample at beginning of placement, and subsequent samples at frequency noted in Table 1 of this Specification.
 - c. Samples from proprietary spall repair material must be taken from the second batch prepared. If two or more mixers are used, ensure that samples are obtained from mixers in an alternating fashion.
 3. Test Sample Set:
 - a. Six 3-inch diameter by 6-inch long cylinders, or six 4-inch diameter by 8-inch long cylinders should the coarse aggregate size exceed 3/4 inches will be made and cured in accordance with ASTM C31. The number of required sets must be in accordance with the Table 1 of this Specification.
 - b. Slump in accordance with ASTM C143.

- c. For Self-Consolidating Concrete: Slump flow in accordance with ASTM C1611.
 - d. Air content in accordance with ASTM C231
 - e. Concrete and air temperature in accordance with ASTM C1064.
4. Cylinders will be cured under field conditions for 1 day; then transported to testing laboratory and cured for remaining period until testing.
 5. For each test sample set, 2 cylinders will be tested in compression at 3 days, 2 cylinders at 7 days and 2 cylinders at 28 days. Compression tests will be performed in accordance with ASTM C39 and must be an average of 2 samples at a given age. Owner may adjust required number of sample test sets and/or frequency of testing upon Contractor request and/or based on schedule and need.
 6. For proprietary spall repair materials, Contractor must record material bag weights for minimum of 10 percent of planned bags per lot of material. The average bag weight must be used to determine amount of water to be used, proportional to manufacturer's product data based on the measured bag weight.
 7. Test reports for each test sample will include following information:
 - a. Specimen number.
 - b. Portion of structure represented by material tested.
 - c. Date cast.
 - d. Date tested.
 - e. Slump or slump flow and visual stability index.
 - f. Air content.
 - g. Concrete and air temperature.
 - h. Individual cylinder strength and type of failure.
 - i. Spall repair material strength on product data sheet.
 - j. Notice if test indicates spall repair material does not conform with following criteria:
 - 1) Spall repair material strength will be considered satisfactory if average of two 28-day test results meets or exceeds the specified 28-day strength and neither 28-day test results is below 90% of the specified 28-day strength.
 - 2) Proprietary spall repair materials must be within 1 inch of the manufacturer's specified slump or slump flow. Spall repair material may be rejected if slump or slump flow not within specified limits or if segregation is visible at leading edge of spread. Manufacturer must provide slump or slump flow if not reported on typical product data sheet.
 - k. Non-Conforming Spall Repair Material:
 - 1) If tests indicate that spall repair material is not in conformance with criteria above, remove and replace non-conforming spall repair material or perform additional testing, acceptable to Owner and/or Engineer of Record, to verify conformance with Specification, at no cost to Owner.
 - 2) For Additional Contractor Performed testing:
 - a) Procure core samples in accordance with ASTM C42.
 - b) If tests indicate that slump, air entrainment, or other requirements

have not been met, examine core samples petrographically, according to ASTM C856, to evaluate hardened concrete characteristics.

- c) If compressive-strength tests do not meet acceptance requirements, procure 3 core samples from each portion of structure represented by unsatisfactory tests, and test in compression. Strength of spall repair material in area represented by core tests is satisfactory if average of 3 compressive strength tests equals or exceeds 85 percent of specified 28-day compressive strength and no compressive-strength test value is less than 75 percent of specified 28-day compressive strength. If strength acceptance criteria are not met, remove and replace non-conforming spall repair material areas at no cost to Owner.
 - 3) Perform additional inspection and testing and inspecting, at no cost to Owner, to determine compliance of replaced or additional Work with specified requirements.
 - 4) Contractor is responsible for any schedule delays, costs and related items resulting from non-conforming materials or additional testing of suspected non-conforming materials.
8. Cast additional cylinders to verify spall repair material strength to determine when shoring or formwork may be removed as required. Cast cylinders with final placement of day and field cure adjacent to spall repair location until tested. Contractor to pay for cost of sampling and testing.
 9. Contractor Responsibilities:
 - a. Contractor must Coordinate Work schedule to allow inspections and testing.
 - b. Provide access to Work in timely manner for inspections and testing.
 - c. Record lot numbers, expiration dates, and use dates of materials.
 - d. Maintain record of locations and quantities of Work installed.
 10. Inspections:
 - a. Inspections are to be performed at critical steps throughout the spall repair process. Unless indicated otherwise, a qualified Quality Assurance Inspector and/or Engineer of Record must perform inspections.
 - b. Contractor's Quality Control representative must perform initial inspections and correct any items not in conformance with specification prior to requesting inspection. Subsequent inspections will be performed if required by the Owner and/or Engineer of Record.
 - c. Do not proceed with Work that may make hold point inspections difficult or impossible to perform until inspection has been completed and deficiencies corrected, unless Engineer of Record and/or Owner waives specific inspection requirements.

1.8 DELIVERY, HANDLING, STORAGE

- A. Comply with General Conditions and Section 016000 "Product Requirements."

B. Storage:

1. Store materials in accordance with ACI 304R.
2. Store cement in weathertight buildings, bins or silos that will exclude moisture and contaminants.
3. Store admixtures to avoid contamination, evaporation, damage, and in accordance with manufacturer's temperature and other recommendations.
4. Keep packaged material in original containers with seals unbroken and labels intact until time of use.

C. Handling:

1. Handle fine and coarse aggregates as separate ingredients.
2. Arrange aggregate stockpiles to avoid excessive segregation, and prevent contamination with other materials or with other sizes of like aggregates.
3. Do not use frozen or partially frozen aggregates.
4. Allow sand to drain until it has reached relatively uniform moisture content before use.
5. Protect liquid admixtures from freezing and temperature changes that would adversely affect characteristics, and in accordance with manufacturer's recommendations.

1.9 WARRANTY

- A. Comply with General Conditions, agreeing to repair or replace specified materials or Work that has failed within the warranty period. Failures include but are not limited to the following:
1. Oily, waxy or loose residue which may interfere with the bonding or discoloration of various applied Architectural finish materials.
 2. Discoloration of concrete surfaces scheduled to remain exposed as a finish.
 3. Areas which show surface failure or defects.
 4. Areas which puddle water.
 5. Areas which are not properly prepared to receive Architectural finish materials. If necessary, the Contractor, at his own expense, shall have the Owner's Testing laboratory perform appropriate test for bond and discoloration.
 6. Patches that become crazed, cracked or sound hollow when tapped.
 7. Self-leveling concrete topping that has cracked, spalled and not performed in accordance with manufacturer's design criteria.

1.10 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.11 COORDINATION

- A. Coordinate the placement of joint devices, embedded items, mechanical items, and electrical

items with erection of concrete formwork and placement of form accessories.

PART 2 - PRODUCTS

2.1 UNAUTHORIZED MATERIALS

- A. Materials and products required for work of this section shall not contain asbestos, polychlorinated biphenyls (PCB) or other hazardous materials identified by the Owner.

2.2 ACCEPTABLE MANUFACTURERS

- A. Products of the manufacturers specified in this section establish the minimum aesthetic, functional and quality standards required for work of this section.
1. BASF/Shakopee, Minnesota.
 2. Ardex, Inc/Coraopolis, Pennsylvania.
 3. Euclid Chemical Company/Cleveland, Ohio.
 4. Sika Corporation/Lyndhurst, New Jersey.
 5. FullForce Engineered Solutions/Helena, Alabama.
 6. The Burke Co/San Mateo, California.
 7. Vapor Retarder: Fortifiber Corp/Los Angeles, California.
 8. Vapor Barrier: W.R. Meadows, Inc/Elgin, Illinois.
 9. Grout: US Grout Corp., Five Star Products, Inc/Fairfield, Connecticut.
 10. Substitutions: Comply with General Conditions using form in Section 01631/Product Substitutions.

2.3 CONCRETE MATERIALS

A. Portland Cement:

1. Type: ASTM C150/Types I, II or III made in United States, as required to meet Engineer's design requirements and Contract Documents.
2. Provide cement that is uniform in color and from a single source.

A. Aggregates for Normal Weight Concrete:

1. Coarse Aggregates: Crushed stone or gravel conforming to ASTM C 33, with a total water soluble chloride ion content below 0.02%.
2. Fine Aggregate: Natural sand, or sand prepared from stone or gravel, clean, hard, durable, uncoated and free from silt, loam and clay.
3. Classification of Aggregates: As required to meet Engineer's design requirements.
4. Provide aggregates from a single source for exposed concrete.
5. Do not use fine or coarse aggregates that contain substances that cause spalling.
6. Maximum coarse aggregate size: As specified in ACI 301.
 - a. In columns, limit nominal maximum size aggregate as above but not larger than 2/3 of minimum clear distance between bars.

- B. Aggregates for Lightweight Concrete:
 - 1. ASTM C 330.
 - 2. Classification of Aggregates: As required to meet Engineer's design requirements.
 - 3. Provide aggregates from a single source for exposed concrete.
 - 4. Maximum coarse aggregate size: As specified in ACI 301.
- C. Water: Clean, potable, and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.
- D. Fly Ash:
 - 1. Type: ASTM C 618, Type F.
 - 2. Shall not be used unless part of an approved mix design.
 - 3. Shall not be used in concrete supporting vehicular traffic.
 - 4. Weight of fly ash is limited to 25% of total cementitious material content.
- E. Nonshrink Grout
 - 1. Type: SikaGrout-928 or Euclid Chemical's "HI-FLOW" pre-packaged natural aggregate grout, high-precision, nonshrink, ready-to-use, complying with the following requirements:
 - a. Grout shall conform to most current version of ASTM C 1107/Grade B when tested at a fluid consistency of 25-30 seconds per CRD-C 611/ASTM C939 at temperature extremes of 45°F and 90°F and an extended working time of 30 minutes.
 - b. All material used including water, mixer and pre-packaged grout must be initially at the 45°F and 90°F limits when testing is initiated.
 - c. Manufacturer must provide independent certification of ASTM C 1107 compliance without modification of standard methods and certify that the grout's post hardening nonshrink property is not based on gas expansion.
 - d. Grout shall have minimum strength of 6,000 psi minimum when cured at 72 °F (22 C) and meet the volume change and exceed the compressive strength requirements of CRD-C 621.

2.4 CONCRETE PRODUCTION

- A. Mix Design:
 - 1. Contractor is responsible for the preparation of mix designs for each type and strength of concrete required for this Project.
- B. Density: Determine air-dry unit weight in accordance with ASTM C 567.
- C. Concrete Type/Strength:
 - 1. As indicated on drawings.
 - 2. Admixtures: Can be used as part of mix design only as specified in this Section under

“Admixtures”.

D. Concrete Mix for Steel-Pan Stairs:

1. Type: 4,000 psi, 3/8" maximum size aggregate, placed at W/CM ratio of 0.50 maximum.

E. Ready Mixed Concrete:

1. Shall be batch-mixed and transported in accordance with ASTM C 94.

2.5 AIR ENTRAINMENT

A. No entrained air content is required in concrete placed in the foundation.

B. Provide entrained air content of $6\% \pm 1-1/2\%$ for normal weight concrete exposed to weather, unless specified otherwise.

C. Included is concrete at the exterior of the structure with at least one surface exposed to weather, slabs, beams, and columns in parking garages, ramps, and loading docks. For columns and walls with specified 28-day strength ($f'c$) greater than 5000 psi, required air concrete exposed to weather may be reduced to $3.5\% \pm 1-1/2\%$.

2.6 SLUMP

A. Contractor shall provide slump guidelines adhering to strength and water/cement ratio requirements.

1. Mix design shall provide slump for concrete prior to and after addition of superplasticizers.
2. Design concrete with a maximum slump of 4", except as noted below.
3. If a slump greater than 4" is desired, it shall be achieved with a mid or high-range water reducer.
 - a. Design concrete mixes using a mid or high-range water reducer, for a starting slump of two to three inches prior to addition of reducer, three to four inches for lightweight concrete.
 - b. Design concrete mixes using a mid-range water reducer, for a final slump not to exceed 6" after addition of reducer. Final slump for concrete using a high range water reducer shall be 8".

2.7 WATER-CEMENTITIOUS MATERIALS RATIO

A. The water-cementitious materials ratio shall not exceed values indicated, including any water added to meet specified slump in accordance with the requirements of ASTM C 94.

1. Weight of fly ash or pazzolanic additives shall be included with the weight of cement used to determine the water-cementitious materials ratio.
2. Provide concrete with maximum water-to-cementitious-material ratio of 0.45, by weight.

Provide concrete with maximum water-to-cementitious-material ratio of 0.40 for exterior exposed elements and elements below final grade. All concrete at the parking garage, ramps, and loading docks is considered exposed to the exterior. All concrete with at least one face exposed to weather, including perimeter columns and curbs, and architectural concrete is considered exposed to the exterior. See architectural drawings for locations.

2.8 CHLORIDE ION CONTENT

- A. The total water-soluble chloride ion content of the mix including all constituents shall not exceed 0.15 percent by weight of cement, unless corrosion inhibitors are added to the mixture to offset the additional chloride.
- B. If the specified level of water-soluble chloride ion content cannot be maintained, appropriate level of Calcium Nitrate admixture shall be added to the mix in accordance with Calcium Nitrite manufacturer's recommendation to offset the excess amount of chloride at no additional cost to the Owner.

2.9 EVALUATION AND ACCEPTANCE OF CONCRETE

- A. In accordance with ACI 301, except where otherwise specified.
- B. If, at any time during construction, the concrete resulting from the approved mix design deviates from Specification requirements for any reason, such as lack of workability, or insufficient strength, the Contractor shall have his laboratory verify the deficiency and modify the mix design, subject to approval, until the specified concrete is obtained.

2.10 ADMIXTURES

- A. General:
 - 1. Admixtures specified below can be used only when established in the mix design with Engineer's prior written approval.
 - 2. Each admixture approved by Engineer shall be used in strict compliance with manufacturer's published instructions.
 - 3. Manufacturer shall certify all admixtures to be compatible with each other.
- B. Air Entraining Admixture:
 - 1. Type: Master Builders "Micro-Air" or "AE-90" ready-to-use air-entraining admixture, ASTM C 260, formulated to improve stability of air entrainment to increase resistance to damage from freeze/thaw cycles and to scaling from deicing salts, reduced permeability for increased watertightness, reduced segregation and bleeding and improved plasticity and workability.
- C. Water-Reducing Admixtures:
 - 1. Type: Master Builders "POZZOLITH 220-N" or Euclid Chemical's "WR-75" or "WR-91" ready- to-use water-reducing liquid admixture, ASTM C 494/Type A, formulated for flat

and cast concrete work, to improve workability, reduce segregation, improve finishing characteristics, increase compressive and flexural strength, and not initiate or promote corrosion of reinforcing.

D. High-Range Water-Reducing Admixture for Cold Weather:

1. Type: Master Builders "RHEOBUILD 1000" or Euclid Chemical's "EUCON 37" high-range, water-reducing admixture, ASTM C 494/Type F, formulated to aid in the production of concrete with the following qualities in a plastic state:
 - a. Plasticity range of 6" to 8".
 - b. Normal setting characteristics.
 - c. Extended slump retention.
 - d. Controlled time of set.
 - e. Cohesive and non-segregating.
 - f. Minimal bleed water.
2. In a hardened state, admixture shall provide the following engineering properties:
 - a. Higher, earlier strengths than can be achieved with conventional superplasticizers.
 - b. Increased ultimate compressive strength.
 - c. Higher modulus of elasticity.
 - d. Improved bond strength to steel.
 - e. High durability.
 - f. Reduced shrinkage and creep.
 - g. Highly reliable in-place structural integrity.
3. Typical Locations: Columns, elevated slabs, for temperatures 85°F (30°C) and below.

E. Retarder for Hot Weather:

1. Type: Master Builders "POZZOLITH 100-XR" or The Euclid Chemical Company "Retarder 75" ready-to-use, liquid admixture, ASTM C 494/Type B and D, formulated for concrete work to retard setting time, and facilitate placing and finishing.

F. Non-Corrosive Accelerator for Cold Weather:

1. Type: Master Builders "POZZUTEC 20" or The Euclid Chemical Company "Accelguard 80" or "Accelguard 90" ready-to-use, non-chloride, liquid admixture, ASTM C 494/Type C and E, formulated for concrete work to accelerate setting time, and increase early and ultimate strengths across a wide range of cold weather and sub-freezing temperatures.

2.11 SELF-LEVELING CONCRETE TOPPING

- A. Type: Topping formulated to level concrete floors without shrinking, cracking or spalling, and capable of being placed from feathered edge to 1" thickness without aggregate in one pour.

1. Note: If greater than 1" thickness is required, aggregate shall be used in accordance

with manufacturer's requirements.

2. Appropriate primer shall be utilized for all underlayment applications.

2.12 ADHESIVES

- A. Bonding Agent for Cured Concrete: ASTM C 881 Grade 3, Type IV and V, Class B and C.

1. Tensile Strength: 2000 psi min., ASTM D 638/Cure 1.
2. Tensile Elongation: 4% maximum at break, ASTM D 638/Cure 1.
3. Compressive Yield Strength: 8000 psi minimum at 2% deflection, ASTM D 695/Cure 1.
4. Compressive Modulus: 4.0×10^5 psi minimum, ASTM D 695.
5. Shear Strength: 4500 psi min./dry/dry concrete, AASHTO T237/Cure 2.
6. Heat Deflection: 105°F (41°C), ASTM D 648/Cure 1.

- B. Bonding Agent for Uncured Concrete: ASTM C 881, Grade 2, Type II and IV, Class B and C.

1. Tensile Strength: 4000 psi, ASTM D 638.
2. Tensile Elongation: 2.5% maximum at break, ASTM D 638.
3. Compressive Yield Strength: 8500 psi minimum.
4. Compressive Modulus: 3.5×10^5 psi minimum, ASTM D 695.
5. Shear Strength: 5000 psi min. damp-to-damp, AASHTO T237.
6. Heat Deflection: 127°F (53°C).

2.13 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745, Class A, minimum 15 mil thickness. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products:
 - a. Interplast Group; Barrier-Bac VB-350, 16-Mil
 - b. Stego Industries LLC; Stego Wrap 15-Mil Vapor Barrier.
 - c. Fortifiber Corporation; Moistop Ultra A.
 - d. Raven Industries Inc.; Vapor Block 15.
 - e. Reef Industries, Inc.; Griffolyn Type-65G.
 - f. W.R. Meadows, Inc.; Perminator 15.

2.14 CURING COMPOUNDS AND SEALERS

- A. Interaction with cover material:

1. See Drawings for material applied over concrete.
2. Use only curing and sealer compounds that are compatible with cover material.
3. Where cover material is liquid rubberized asphalt, use only sodium silicate type curing compounds and sealers.

- B. Curing and Sealing Compound (VOC Compliant 350 g/l): Liquid type membrane-forming

- curing compound, clear styrene acrylate type, complying with ASTM C1315, Type I, Class A, 25% solids content minimum. Moisture loss shall be not more than 0.40 Kg/m² when applied at 300 sq. ft./gal. Manufacturer's certification is required.
- C. Curing and Sealing Compound (VOC Compliant, 700 g/l): Liquid type membrane-forming curing compound, clear styrene acrylate type, complying with ASTM C1315, Type I, Class B, 25% solids content minimum. Moisture loss shall be not more than 0.30 Kg/m² when applied at 300 sq. ft./gal. Manufacturer's certification is required.
- D. Curing Compound (Strippable): The compound shall conform to ASTM C 309. All slabs on grade, as noted on drawings. Install in strict accordance with the manufacturer's recommendation and supervision.
- E. Surface Sealer:
1. Solids by Weight: 14%.
- F. Application Rate: Smooth troweled concrete, 250-350 fl²/gal.
- G. Liquid Densifier/Sealer: The liquid densifier compound shall be a silicate based sealer which penetrates concrete surfaces, increase abrasion resistance and provides a "low-sheen" surface that is easy to clean and eases the problem of tire mark removal.
- H. Mineral Aggregate Hardener: The specified mineral aggregate hardener shall be formulated, processed and packaged under stringent quality control at the manufacturer's owned and controlled factory. The hardener shall be a factory-blended mixture of specially processed graded mineral aggregate, selected portland cement and necessary plasticizing agents.
1. Application Rate: 1 lb. per sq. ft.
- I. Non-Oxidizing Metallic Hardener: The specified non-oxidizing metallic floor hardener shall be formulated, processed and packaged under stringent quality control at the manufacturer's owned and controlled factory. The hardener shall be a mixture of specially processed non-rusting aggregate, selected portland cement and necessary plasticizing agents.
1. Application Rate: 1.5 lb. per sq. ft.
- J. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- K. Moisture-Retaining Covers: Each of the following are acceptable:
1. Polyethylene sheeting: AASHTO M171.
 2. Polyethylene coated burlap.
- L. Sand Cushion: Clean, manufactured or natural sand.
- M. Non-Slip Aggregate:

1. Abrasive aggregate shall be composed of 60% to 75% of aluminum oxide abrasive bonded by a vitreous ceramic material. Use hard, homogeneous, non-glazing, rustproof aggregate which is unaffected by moisture or cleaning compounds.
- N. Epoxy Joint Filler: The epoxy joint filler shall be a two (2) component 100% solids compound, with a minimum shore D hardness of 50.
- O. Polymer Repair Mortar: These patching mortars may be used when color match of the adjacent concrete is not required. Prior approval by the Engineer is required.
- P. High Strength Flowing Repair Mortar: For forming and pouring structural members, or large horizontal repairs, provide the flowable one-part, high strength microsilica modified repair mortar with 3/8" aggregate. The product shall achieve 9000 psi @ 28-days at a 9-inch slump.
- Q. Repair Topping: Self-leveling, polymer modified high strength topping. The topping shall exhibit the following properties: Chaplin Abrasion Test – 0.02mm (0.0079") maximum @ 28 days (British Standard 8204).

2.15 MICRO-FIBER REINFORCEMENT

- A. Provide micro-fiber reinforcement at manufacturer's recommended dosage rate: ASTM C1116, Type III – Synthetic fiber reinforced concrete per ASTM D7508 (polypropylene fiber only).
 1. Products:
 - a. Sika Corporation; Sika Fibermesh-150.
 - b. Euclid Chemical; PSI Fiberstrand 150.
 - c. FullForce Engineered Solutions; FiberForce 150.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Subgrade:
 1. Dampen subgrades not covered with membrane by sprinkling immediately before placing concrete.
 - a. Omit when subgrade is already damp.
 2. Dry out soggy subgrade before placing slabs unless wetting is uniform and placing can be done without damage to subgrade.
 3. Do not place concrete on frozen ground.
- A. Forms:
 1. Coordinate with Section 031000 "Concrete Formwork."
 2. Remove dirt, sawdust, nails and other foreign material from formed space.

3. Dampen wood forms by sprinkling immediately before placing.
 4. Cool metal forms by sprinkling immediately before placing.
- B. Construction and Control Joints:
1. Construction and control joints indicated on drawings are mandatory and must not be omitted.
 2. Type: 1-1/2" x 3-1/2" minimum (except as noted) with continuous level key at end of each placement for slabs, beams, walls and footings.
 - a. Before placement, treat the surfaces as specified in this section.
 - b. Remove loose particles and laitency from surface prior to next concrete placement.
 3. In areas where construction and control joints are not indicated or specified, verify locations with Engineer.
 4. Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Architect/Engineer.
 5. Coordinate location of construction and control joints with locations of joints in finish materials where they exist.
- C. Concrete Accessories:
1. Coordinate with Section 032000 "Concrete Reinforcement and Embedded Assemblies."
- D. Dewatering:
1. Remove water from concrete formwork.
 2. Divert any flowing water to sump and remove by pumping.
- E. Vapor Retarder/Moisture Barrier Placement:
1. Place vapor retarder/moisture barrier under slabs-on-grade in position with longest dimension parallel with direction of pour.
 2. Joints: Lap 6" minimum and seal with manufacturer's recommended mastic or pressure-sensitive tape.
 3. Prevent damage to moisture barrier.
 4. If moisture barrier is damaged, place a piece of moisture barrier over damaged area (6" larger all around) and tape in place with type of tape recommended by moisture barrier manufacturer.
 5. Seal laps and intersections of walls with compatible trowel mastic or pressure-sensitive sealing tape.
 6. Seal around pipes and other penetrations with compatible trowel mastic.

3.2 JOINTS IN CONCRETE

- A. Locate construction and control joints based only on approved joint location submittal.
1. Do not use control joints in framed floors or composite slabs.

- B. For Joint Fillers: Coordinate with Sections 032000 "Concrete Reinforcement and Embedded Assemblies" and Section 079200 "Joint Sealants."
- C. Construction, control and isolation joints are located and detailed on Drawings.
 - 1. Comply with ACI 301.
 - 2. Tool slab joints at time of finishing.
 - 3. Saw-cut control joints with Soff-Cut Saw to a depth of 1-1/4" or conventional saw to 1/4 slab depth. Proper profile is required for an elastomeric sealant.
 - 4. Place construction joints perpendicular to main reinforcement.
- D. Isolation Joints:
 - 1. Interrupt structural continuity resulting from bond, reinforcement or keyway at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams and other locations, as indicated.
- E. Construction and Control Joints in Walls: Maximum joint spacing is as indicated on Drawings.

3.3 MIXING

- A. All concrete shall be ready-mixed conforming to ASTM C 94 except as follows:
 - 1. Provide concrete materials, proportions and properties as herein specified in lieu of ASTM C 94 Section 4.
 - 2. Water, beyond that required by the mix design, shall not be added at the Project site.
 - 3. Furnish delivery ticket with each load of concrete delivered to the site to the Contractor. In addition to the requirements of ASTM C 94 Section 16, provide the following information on the delivery tickets:
 - a. Type and brand of cement.
 - b. Cement content per cubic yard of concrete.
 - c. Microsilica admixture content per cubic yard of concrete.
 - d. Admixtures.
 - e. Type and maximum size aggregate.
 - f. Total water content.
 - g. Air entrainment.
 - h. Slump.
 - i. Water-cementitious materials ratio.
 - j. Fly ash content per cubic yard of concrete.
- B. High range water reducing agents (superplasticizer), if added at the batch plant, may be added again at the Project site.
 - 1. If superplasticizers are added at the batch plant, the concrete mix design must account for the delivery time, workability, finishability, and setting time required on the jobsite for proper placing and finishing procedures.

2. If the superplasticizer is redosed at the jobsite in air entrained concrete, air content must be checked after mixing.

3.4 CONCRETE PLACEMENT

A. Prior to Concrete Placement:

1. Mechanical vibrators are required for placing concrete.
2. Remove debris from space to be occupied with concrete.
3. Notify Engineer and Testing Laboratory 48 hours prior to starting concrete placement.
4. Mix designs approved by Testing Laboratory and reviewed by Engineer must be maintained on file in Contractor's Field Office.
5. Reinforcement and accessories shall be in proper locations, clean, free of loose scale, dirt or other foreign coatings that may reduce bond to concrete, complete in accordance with Section 03200/Concrete Reinforcement and Embedded Assemblies.
6. Fog spray forms, reinforcing steel, and subgrade just before pouring concrete.
7. Do not place concrete having a slump outside of allowable slump range.
8. Place concrete before initial set has occurred, but in no event after it has been discharged from the mixer more than 30 minutes. All concrete shall be placed upon clean, damp surfaces, free from puddled water, or upon properly consolidated fills. Placement upon soft mud or dry earth is not permitted.
9. Unless adequate protection is provided, concrete shall not be placed during rain.
10. Rain water shall not be allowed to increase mixing water or to damage the surface finish.
11. Do not use aluminum equipment in placing and finishing concrete.

B. For Conduits and Pipes Embedded in Concrete:

1. Conform to requirements of ACI 318/Chapter 6. For variations from these requirements, submit a written request for Engineer's review and approval.
2. In concrete slabs over metal deck, place conduit at top of deck. Maximum conduit diameter is limited to 1-1/4 inch. No crossovers are permitted.
3. Provide steel sleeves or holes for pipes passing vertically through concrete.
4. Embed only rigid conduit with galvanized finish.
5. Do not embed aluminum materials.
6. Do not cut, bend or displace the reinforcement.

C. Pumping: Pumping shall be done in strict accordance with ACI 304.2R. The mix design, slumps at the pump and at the discharge end of the line, type of pump to be used, and redosage with high range water reducing (superplasticizer) shall be discussed at the Pre-Concrete Conference. Lightweight concrete necessitates the use of a 5" line and a pump that will produce the required volume at a pumping pressure lower than 1500 psi.

D. Placing Concrete in Forms:

1. Clean and prepare forms as specified in Section 031000 "Concrete Formwork."
2. Place concrete continuously without interruption between predetermined construction

and control joints in walls.

3. Deposit concrete in forms in horizontal layers no deeper than 24" and in a manner to avoid inclined construction joints.
4. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
5. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping.
 - a. Use equipment and procedures for consolidation of concrete in accordance with ACI 309R.
6. Do not use vibrators to transport concrete inside forms.
7. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine.
8. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer.
9. Do not insert vibrators into lower layers of concrete that have begun to set.
10. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
11. Deposit concrete within 1-1/2 hours after batching.

E. Placing Concrete Slabs:

1. Place concrete continuously without interruption between predetermined construction and control joints in floors.
 - a. Place slabs on grade by the long strip cast method. Refer to ACI 302 and 360 for recommended methods of placement.
2. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
3. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
4. Bring slab surfaces to correct level with a straightedge and strike off.
 - a. Use highway bull floats or darbies to smooth surface free of humps or hollows.
 - b. Do not disturb slab surfaces prior to beginning finishing operations.
5. Maintain reinforcing in proper position on chairs during concrete placement.
6. During periods of setting, materials shall not be placed and loads shall not be imposed on slabs.

F. Placing Concrete on Steel Decks

1. Exercise care during concrete placement on steel decks to prevent concentrated loads or high pile-ups of concrete and to avoid impacts caused by dumping or dropping of concrete on steel decks.

2. Do not use buggies on unprotected areas of deck. If buggies are used to place concrete, furnish and install planked runways to protect deck from damage.
- G. Placing Concrete at Construction Joints:
1. To secure full bond at construction joints, surfaces of concrete already placed, including vertical and inclined surfaces, shall be thoroughly cleaned of foreign materials and laitance, roughened with tools such as chipping hammers or wire brushes to a minimum amplitude of 1/4 inch, and recleaned by stream of water or compressed air.
 2. Before new concrete is placed, dampen joints with water.
 3. After water disappears from surfaces, coat the joints with a cement grout mixed to the consistency of very heavy paste. The mix shall be composed of 1 part cement, 1½ parts of fine sand and a 50:50 mixture of approved bonding admixture and water, mixed to a consistency of a very heavy paste.
 4. Surface shall receive coating of at least 1/8" thick, scrubbed in with stiff bristle brush.
 - a. New concrete shall be deposited before the bonding grout dries.
- H. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- I. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings.
1. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- J. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
1. Cast-in safety inserts and accessories as shown on drawings.
 2. Screed, tamp, and trowel-finish concrete surfaces.
- K. Separate Floor Toppings:
1. Where required, place concrete floor topping to required lines and levels.
 2. Prior to placing concrete, roughen concrete base course and remove deleterious material.
 - a. Broom and vacuum clean.
 3. Place dividers, edge strips, reinforcement and other items to be cast in place.
 4. Dampen base course with water immediately before placing concrete.
 5. Slab Finish: As specified for "Interior Floor Slabs" in this section.
- L. Cold-Weather Placement:
1. Protect concrete work from physical damage or reduced strength which could be caused

by frost, freezing actions, or low temperatures, in compliance with ACI 306R and as specified in this section.

2. When air temperature has fallen to or is expected to fall below 40°F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F, and not more than 80°F, at point of placement.
3. Do not use frozen materials or materials containing ice or snow.
 - a. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
4. Use only the specified non-corrosive accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

M. Hot-Weather Placement:

1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305R and as specified in this section.
2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C).
3. Mixing water may be chilled, or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water.
4. Use of liquid nitrogen to cool concrete is Contractor's option.
5. If temperature becomes too hot, cover reinforcing steel with water-soaked burlap so that steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
6. When concrete operations must be performed in direct sun, wind, high temperatures, low relative humidity, or other adverse placing conditions, the specified evaporation retarder shall be applied one or more times during the finishing operation to prevent plastic cracking.

N. Fog spray forms, reinforcing steel, and subgrade just before placing concrete.

1. Keep subgrade moisture uniform without puddles or dry areas.

3.5 CONCRETE FINISHES

A. General:

1. Comply with recommendations for concrete finishing established by ACI 302.1R and ACI 304R.
2. Comply with dimensional tolerance limitations given by ACI 117.

B. Finish for monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile and other bonded applied cementitious finish flooring material, and where indicated:

1. Scratch Finish.
 - a. After placing slabs, finish surface to tolerances of FF=15 (floor flatness) and FL=13 (floor levelness) measured according to ASTM E 1155.

- b. Slope surfaces uniformly to drains where required.
 - c. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
 - C. Finish for monolithic slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated:
 1. Float Finish.
 - a. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating.
 - b. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both.
 - c. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units.
 - d. Finish surfaces to tolerances of FF=20 (floor flatness) and FL=17 (floor levelness) measured according to ASTM E 1155.
 - e. Cut down high spots and fill low spots.
 - f. Uniformly slope surfaces to drains.
 - g. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
 - D. Finish for interior floor slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or another thin film-finish coating system:
 1. Trowel Finish.
 - a. After floating, begin first trowel-finish operation using a power-driven trowel.
 - b. Begin final troweling when surface produces a ringing sound as trowel is moved over surface.
 - c. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance.
 - d. Grind smooth any surface defects that would telegraph through applied floor covering system.
 2. Finishing Tolerance: "Steel-trowel" finish all interior floor slabs to tolerances of $F_f=25$ (floor flatness) and $F_L=20$ (floor levelness) measured according to ASTM E 1155.
 3. Floor Slopes: Where drains occur, slope floor slabs uniformly to drains, maintaining scheduled slab thickness.
 4. Floor Edges at Expansion Joints: Tool edges minimum 3/8".
 5. Defects: Remove defects of sufficient magnitude to show through floor covering by grinding.
 6. Floor Hardener: Use only where scheduled and in accordance with manufacturer's published instructions.
 7. Dry Cement: Shall not be used during finishing.

- E. Finish where ceramic or quarry tile is to be installed with thin-set mortar:
 - 1. Trowel and Fine Broom Finish:
 - a. Apply a trowel finish as specified.
 - b. Immediately follow by slightly scarifying the surface with a fine broom.
- F. Rough Formed Finish:
 - 1. Acceptable for formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated.
 - 2. Concrete surface shall have texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4" in height rubber down or chipped off.
- G. Smooth Formed Finish:
 - 1. Required for formed concrete surfaces exposed to view, or scheduled to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system.
 - 2. Surface is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - 3. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- H. Smooth Rubbed Finish:
 - 1. "Smooth Rubbed" finish shall consist of a finish free of fins, joint marks smoothed off, blemishes removed and surfaces left smooth and unmarred.
 - 2. Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment not later than one day after form removal.
 - 3. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced.
 - a. Do not apply cement grout other than that created by the rubbing process.
- I. Grout-Cleaned Finish:
 - 1. Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
 - 2. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint.
 - 3. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 - 4. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes.

5. Remove excess grout by scraping and rubbing with clean burlap.
6. Keep damp by fog spray for at least 36 hours after rubbing.

J. Unformed Surfaces:

1. 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.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.6 CURING AND PROTECTION

A. Normal Conditions:

1. Protect concrete from premature drying, excessive hot or cold temperature, and mechanical damage.
2. Concrete and concrete patching materials shall be cured according to manufacturers published recommendations.
3. Begin curing as soon as free water has disappeared from concrete surface after concrete has been placed and finishing has been completed.
4. Cure slabs on grade, concrete toppings, concrete pour strips and supported slabs not subject to conditions of hot or cold weather concreting using the method outlined in ACI 308.
 - a. Unless otherwise noted, maintain concrete in a continuously moist condition for at least 7 days after placement.
5. Cure walls and columns in accordance with ACI 308.
6. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
 - a. Cure slabs in the parking garage, ramps, and loading docks in accordance with ACI 308 recommendations for moist curing.
7. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
 - a. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared).
 - b. Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions.
 - c. Recoat areas subjected to heavy rainfall within 3 hours after initial application.
 - d. Maintain continuity of coating and repair damage during curing period.
 - e. Use curing and sealing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.

- 1) Floors to receive covering shall be cleaned thoroughly using a power

- scrubber and industrial strength detergent.
- 2) Hand-brooming and sweeping is not sufficient.
- f. Strippable curing compound may be used in lieu of a moist curing method when approved by the Architect.
- 8. Provide moisture curing by the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Use continuous water-fog spray.
 - c. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet.
 - d. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4" lap over adjacent absorptive covers.
- 9. Provide moisture-retaining cover curing as follows:
 - a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive.
 - 1) Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- 10. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed.
 - a. If forms are removed, continue curing by methods specified above, as applicable.
- 11. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
 - a. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.
- B. Cold-Weather Protection:
 - 1. Whenever concrete is placed at or below ambient air temperatures of 40°F, or whenever in the opinion of Engineer the temperatures are likely to occur within 24 hours after placement of concrete, comply with this section and concreting procedures recommended by ACI 306R.
 - 2. Do not use salt, chemicals or other foreign materials in mix to lower freezing point of concrete.
 - 3. When concrete is placed under conditions of cold weather concreting (defined as a period when the mean daily temperature drops below 40°F for more than 3 successive days), take additional precautions as specified in ACI 306R when placing, curing, monitoring and protecting the fresh concrete.

C. Hot-Weather Protection:

1. When concrete is placed under conditions of hot weather concreting, provide extra protection of the concrete against excessive placement temperatures and excessive drying throughout the placing and curing operations with an evaporation-control material.
 - a. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
2. Hot weather is defined as air temperature which exceeds 90°F or any combination of high temperature, low humidity and/or high wind velocity which causes a rate of evaporation in excess of 0.2 pounds per square feet per hour as determined by ACI 305R.
3. Hot weather curing is required if these conditions occur within a 24-hour period after completion of concrete placement.
4. Forms, reinforcing and the air shall be cooled by water fog spraying immediately before placing concrete.
 - a. The placement temperature of the concrete shall be 50°F to 90°F.

D. D Protect concrete work against damage from heat, cold, and defacement of any nature during construction operations.

E. Treat the concrete immediately after finish work is completed to provide continuous moist curing above 50°F for at least 7 days, regardless of ambient air temperatures.

F. Floor surfaces, wherever indicated by weather conditioning, shall be sprinkled during the interval between finishing operation and the start of curing to positively ensure against the possibility of surface drying.

3.7 CONCRETE SURFACE REPAIRS

A. Perform patchwork in accordance with ACI 301.

B. After Stripping Forms:

1. Immediately after stripping forms, patch all honeycombing, defective joints, voids, etc. before the concrete is thoroughly dry.
2. Remove all burrs, fins, and ridges before the concrete is thoroughly dry.
3. Remove stains from rust, grease and oils, from release agents, etc.
4. For exposed-to-view surfaces, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color.
 - a. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching.
5. When finished, color and texture of all patches shall match adjoining surfaces.

C. Defective Areas:

1. Chip away defective areas, honeycomb, rock pockets, voids over 1/4" in any dimension and holes left by tie rods and bolts, down to solid concrete but in no case to a depth less than 1" and saw-cut edges to prevent feather edging of fill material.
 2. Apply a brush-coat of specified bonding agent.
 3. Mix dry-pack mortar, consisting of one part portland cement to 2 1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 4. Immediately fill prepared areas with concrete or dry-pack material consisting of 1: 1-1/2 mixture of cement and concrete and mixed slightly damp to touch.
 5. Thoroughly compact the fill material into place until excess paste appears on surface.
 - a. Leave slightly higher than surrounding surface.
 6. Leave fill material undisturbed to permit initial shrinkage.
 7. When cured, finish all patches to match adjoining surface.
- D. Repairing Formed Surfaces:
1. Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Architect/Engineer.
 2. Surface defects, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that not be removed by cleaning.
 3. Flush out form tie holes and fill with dry pack mortar or precast cement cone plugs secured in place with bonding agent.
 4. Repair concealed formed surfaces, where possible, containing defects that affect the durability of concrete.
 - a. If defects cannot be repaired, remove and replace concrete.
- E. Repairing Unformed Surfaces:
1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish.
 2. Correct low and high areas herein specified.
 3. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 4. Repair finished unformed surfaces containing defects that affect durability of concrete.
 - a. Surface defects include crazing and cracks in excess of 0.01" wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 5. Repair defective areas, except random cracks and single holes not exceeding 1" in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts and expose reinforcing steel with at

- least 3/4" clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials to provide concrete of same type or class as original concrete.
 - d. Place, compact and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
- F. Depressed spots and high spots in concrete surfaces which are in excess of specified tolerances shall be leveled and ground-smooth.
- 1. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 - 2. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 - b. Proprietary underlayment compounds may be used when acceptable to Engineer.
 - 3. Leveling materials shall be approved by Architect/Engineer.
- G. If honeycomb exists around reinforcement, chip to provide clear space at least 3/4" wide all around steel to afford proper ultimate bond.
- 1. For areas less than one and one-half inches deep, patch shall be made in same manner as described above for filling form tie holes.
 - a. Carefully and adequately use fill materials to prevent sagging.
 - 2. Thicker repairs shall require buildup in successive layers, each layer being applied as described including polymer repair mortars.
 - 3. High strength repair mortar shall be used in formed repairs.
 - 4. To aid strength and bonding of multiple layer repairs, nonshrink metallic aggregate shall be used as an additive.
- H. Contractor shall be responsible for repairing all cracks wider than .02" in concrete superstructure floor slabs by epoxy injection or routing and sealing as required by Architect/Engineer.
- 1. Use epoxy adhesive, Eucopoly Injection Resin by The Euclid Chemical Company or Sikadur 35, LV, LPL according to manufacturer's recommendations.
- I. For Structural Repairs: Materials and method must be accepted by Engineer before repairs are performed.
- J. Repair methods not specified above may be used, subject to acceptance of Engineer.
- K. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

1. Mix, place, and cure concrete as specified to blend with in-place construction.
2. Provide other miscellaneous concrete filling shown or required to complete Work.

3.8 PLACEMENT OF SELF-LEVELING CONCRETE TOPPING

- A. Prepare existing surfaces and place self-leveling concrete topping in strict compliance with manufacturer's published instructions and Contract Documents.
- B. Finish: Smooth as specified in this section for interior concrete floors.

3.9 SOURCE QUALITY CONTROL

- A. The Owner's Testing Laboratory shall conduct concrete quality evaluations for compliance with the Special Instructions provisions of the 2012 International Building Code and as follows:
 1. Review and test Contractor's proposed materials.
 2. Review and test Contractor's proposed concrete mix designs.
 3. Secure and test production samples at plants or stockpiles.
 4. Check batching and mixing operations to extent deemed necessary to assure compliance with Specifications.

3.10 FIELD QUALITY ASSURANCE

- A. General: The Owner's Testing Laboratory shall test and inspect concrete material and operations as Work progresses in accordance with the Special Inspections provisions of the 2012 International Building Code. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate Architect/Engineer for final acceptance.
- B. Owner's Testing Laboratory is responsible for monitoring and testing of concrete placement.
 1. Owner's Testing Laboratory shall provide qualified personnel at site to monitor concreting operations as follows.
 - a. Record temperature of concrete at time of placement.
 - b. Record weather conditions at time of placement, including temperature, wind speed, relative humidity, and precipitation.
 - c. Record types and amounts of admixtures added to concrete batches, including that added after departure of concrete trucks from batch plant.
 - d. Record amounts of and monitor dosing of high-range water-reducing admixtures added at site for site-added admixtures and redosing for plant-added admixtures.
 - e. Monitor consistency and uniformity of concrete.
 - f. Monitor preparation for concreting operations, placement of concrete, and subsequent curing period for conformance with Specifications for following procedures:
 - 1) Concrete curing.
 - 2) Hot weather concreting operations.
 - 3) Cold weather concreting operations.

2. Owner's Testing Laboratory shall conduct test of concrete as follows:
 - a. Obtain each test sample from different batches selected on strictly random basis. Choice of batch sampled shall be based on number selected at random before commencement of concrete placement. Record location in structure of sampled concrete.
 - b. Determine air content of normal weight concrete on regular and frequent basis in accordance with either ASTM C 231 or ASTM C 138.
 - c. Determine air content and unit weight of lightweight concrete on regular and frequent basis in accordance with ASTM C 173 for air content and with ASTM C 567 for unit weight.
 - d. Conduct one test for air content for each strength test required or for every 50 cubic yards of fly ash concrete placed, whichever is less. Test in accordance with ASTM C 173 or ASTM C 231.
 - e. The water content of freshly mixed concrete will be tested on a random basis during placement in accordance with AASHTO TP 23.
 - f. Conduct slump tests for conformance with Specifications. Tests for slumps shall be made as often as deemed necessary by Testing Laboratory to assure conformance with Specifications. Conduct a minimum of one slump test for each strength test as specified herein.
 - g. Conduct slump tests for concrete enhanced with high-range water-reducing admixtures as follows:
 - 1) Concrete with plant added high-range water-reducing admixtures shall be sampled immediately upon arrival at job site. Batches delivered to site with slump in excess of nine (9) inches shall be rejected.
 - a) Concrete with site added high-range water-reducing admixtures shall be sampled immediately upon arrival at job site for conformance to slump requirements.
 - h. Conduct strength tests of concrete as follows:
 - 1) Secure composite samples in accordance with ASTM C 172.
 - 2) Make one strength test (composed of five standard cylinders) for each 100 cu. yd. or fraction thereof for each mix design of concrete placed in one day, except that in no case shall given mix design be represented by less than five tests.
 - 3) Mold cylinders in accordance with ASTM C 31 and cure under standard moisture and temperature conditions in accordance with ASTM C 31, Section 7 (a).
 - 4) Test two cylinders at seven days, and two cylinders at 28 days in accordance with ASTM C 39. 28-day test result shall be average strength of two cylinders. One cylinder shall be retained in reserve for later testing if required.
 - 5) When high early strength is required, additional cylinders shall be made and tested at 3 days.

- 6) When required by Testing Laboratory's contract with Owner or by Testing Laboratory's contract with Contractor, conduct additional cylinder tests for the following:
 - a) To assist construction operations, such as form work removal.
 - b) Changes in materials or proportions requested by Contractor after initial mix design reviews.
 - c) Additional testing of questionable concrete specified herein.
 - 7) If one cylinder in a test manifests evidence of improper sampling, molding or other damage, discard cylinder and base test results on that of remaining cylinder.
 - 8) Conduct core tests on questionable concrete as follows:
 - a) Take at least three representative cores from each member or area of concrete in place that is considered questionable. Location of cores shall be determined by Architect/Engineer so as to least impair strength of structure. Before testing cores, replace any that show evidence of having been damaged subsequent to or during removal from structure or which have reinforcement present.
 - b) Cores from structure exposed to soil or constant moisture in service (e.g. basement walls, retaining walls, slab-on-grade, piers, footings, etc.) shall be tested wet. Cores for all other concrete may be tested dry. Prior to commencement of coring, verify with Architect whether cores are to be tested wet or dry.
 - c) Test cores in accordance with ASTM C 42.
 - d) Fill core holes with low slump concrete or mortar with a strength equal to or greater than that specified for area cored.
3. Owner's Testing Laboratory shall evaluate concrete for conformance with Specifications as follows:
- a. Slump:
 - 1) Testing Laboratory shall maintain a slump moving average, comprised of the average of all batches or most recent five (5) batches tested, whichever is fewer.
 - b. Strength test:
 - 1) Testing Laboratory shall maintain a compressive strength moving average, comprised of three (3) consecutive strength test results, for each mix design used in Work.
 - 2) Strength level of concrete will be considered satisfactory provided averages of all sets of three (3) consecutive strength test results (i.e. moving average) equal or exceed specified 28-day strength, and no individual strength test result falls below specified 28-day strength by more than 500 psi.
 - 3) If strength tests fail to meet minimum requirements, concrete represented by such tests shall be considered questionable and shall be subject to further evaluation by core testing as specified herein.

- c. Core tests: Concrete in area represented by core test will be considered adequate if average strength of cores is equal to at least 85% of, and if no single core is less than 75% of, specified 28-day strength.
- 4. Testing Laboratory shall report on the following items in addition to that required by Division 1.
 - a. As specified in Section 3.10.B.1:
 - 1) Temperature of concrete.
 - 2) Weather conditions.
 - 3) Total water quantity and types and quantities of admixtures added to concrete batches.
 - 4) Hot weather concreting operations.
 - 5) Cold weather concreting operations.
 - b. As specified in Sections 3.10B.2 and 3.10B.3:
 - 1) Air content.
 - 2) Amount of cubic yards of concrete placed.
 - 3) Individual slump results, sampling location, who performed slump test and slump moving average.
 - 4) Water Content.
 - 5) Individual concrete strength test results, mix designation, sampling location, who molded test specimens, location in structure of sampled concrete, compressive strength moving average, type of fracture, and detailed information on storage, transportation, and curing of specimens prior to testing.
 - 6) Reports on additional cylinders requested by Contractor for information only.
 - 7) Core test results.
- C. Owner's Testing Laboratory shall submit inspection, observations, and/ or test reports to the Engineer, via the Contractor, as required herein and shall provide an evaluation statement in each report stating whether or not concrete placement conforms to requirements of Specifications and Drawings and shall specifically note deviations therefrom.
- D. Report deficiencies to the Contractor immediately.

END OF SECTION 033000